Written evidence submitted by CRUK

1. Introduction

Our response reflects CRUK experience as a new entrant to the UK electronic waste materials recovery market, bringing innovative technology and foreign direct investment (FDI) to address the issues of electronic waste and the circular economy at pace and scale.

2. Circular Resources UK (CRUK)

CRUK is a wholly owned subsidiary of a global group headquartered in Singapore with entities in Australia, US and Hong Kong. The business has developed a patented low temperature pyrometallurgical technology to recover precious metals and minerals from end of life, non-repairable or reusable electrical equipment (EEE) in a sustainable manner and guaranteeing secure data destruction within the process. This technology is currently being manufactured by engineers in the UK and can be deployed within 5-months, which for any comparable process is rapid. The technology has been proven at commercial scale in the US and having assessed other markets including USA, Japan, South Korea, Malaysia and Australia, CRUK has selected the UK to establish the first commercial operation. The benefits to the UK include:

- the growing recognition of the environmental challenge posed by EEE.
- the clear focus of national government to address the issue.
- access to skilled, UK based engineering services.
- the recognised volume of EEE identified per capita in the UK (ave. 24.9kg) in comparison with other developed economies[1]
- proximity to European markets.
- robust compliance and legal system.

CRUK have established a business rooted in strong sustainability and resource efficiency principals, aligned with the circular economy. The business plans for rapid growth across the UK, before entering European and global markets having already established international demand for its technology and business model. Thus far the business has been funded by values-driven private investment with an ambition to be fully operational within a six-month timeframe.

CRUK represents genuine FDI and will ensure high value resources and critical raw materials (CRM's) are safeguarded within the UK economy. This submission aims to frame the challenges faced in making investment into this essential element of the UK Circular Economy.

3. Process overview

The CRUK value proposition solves the urgent need to address the fastest growing waste stream in the world, namely electronic waste. Recognising EEE as a valuable feedstock is to accept it as a new asset class with intrinsic value and as a consequence reduce hazardous waste going to landfill. The CRUK technology captures elements that are essential to human progress and used in IT equipment such as computers, laptops, tablets

and mobile phones. This 'urban mining' technique allows countries to onshore and protect sources of these CRM's rather than relying on imports where not only is the carbon impact recognised but ethical practices can be difficult to assure. The process efficiency of the CRUK technology significantly exceeds that of traditional mining and conversion techniques, using less water, energy and displacing unacceptable working practices. Recovered materials fed into domestic manufacturing supply chains create further social, employment and economic benefits.

4. **What steps are being taken to move towards a circular economy for electronic goods? How can the UK Government support this transition?**

CRUK is in the process of deploying its first commercial facility in a quest to transform the UK e-waste industry from a linear to a circular economy.

In the UK existing 'bulk' WEEE processors disassemble, manually segregate and in some cases shred materials before exporting components such as PCB's for mechanical or chemical recovery. This pre-processing is not required for the CRUK process making it complementary to existing, conventional recyclers whilst increasing the range and volume of processed electronics. Focussing on a percentage recycled by volume is a useful indicator of the efficiency of bulk recovery but there is a danger that the recovery of precious metals and CRM's is lost in this statistic as a minor constituent in volume terms. These materials are however significant in terms of resource scarcity and have financial and strategic value. CRM domestic recovery in the UK is compelling by all metrics.

The CRUK technology suits the UK context particularly well as it is self-contained, modular, locally manufactured and does not rely on processors external to the UK.

With the growing recognition of the issues posed by, and the intrinsic value of EEE, advancements in recycling technologies are being rapidly developed around the world to address the challenge.

The advantages of the UK market can be coordinated in such a way as to attract new innovation and industry, establishing advanced recycling technologies that contribute to an essential part of the circular economy and setting the UK on a path to becoming a world leader in these technologies. This must be set in context of a compliance and regulatory environment in the UK that needs to better reflect materials recovery as an industrial process and not waste management. Presently the most challenging aspects of our selection of the UK is that our technology is new and unique and regulatory form over substance discourse takes such a long time. For example, planning and permitting can take more than four times as long as it takes to build and deploy the technology. This is a crucial area of efficiency that could be addressed by the UK government.

5. ***Why does recovering materials from electronic waste pose a significant challenge? What support is required to facilitate the adoption of recovery technologies?***

The challenge is not one of available technologies but a sectoral and structural one.

The generation of WEEE per capita, low current collection rates, lack of infrastructure and the challenges of meeting existing collection targets is well documented and will be

addressed by other contributors[2,3]. Feedstock certainty is critical for manufacturing processes, and CRUK is a manufacturing processor within the circular economy. Securing sufficient volumes of feedstocks is essential to providing a business risk profile that is attractive to investors.

The greatest environmental risk from EEE comes at the point where decisions are made as to what can and cannot be done with electronics when they reach the end of their lifetime. It is widely accepted that they cannot be included with mixed waste and must be segregated.

How to effect the segregation by the users/owners of EEE is key. Government and businesses are the majority owners/users of some classes of electronic goods in the UK and targeting their practices in managing EEE would capture a large portion of the UK EEE from a relatively small ownership group viewed in contrast to each household. Recognising steps the government is taking towards a green procurement strategy, cited by HP in their submission[4], Government should consider reporting of national and local EEE disposal at the same time factoring in the management of data destruction of government owned or leased equipment.

There are schemes around the world that can be viewed as 'best-practice' including the Australian linking of electronic import licenses to certified e-waste collection and processing.

On a regulatory basis, having the planning and permitting community see EEE processing as an industrial activity and regulate it accordingly is essential. More specifically when developing and proposing schemes to process EEE, current Town and Country Planning business 'Use Classes' are not well suited to categorise the activities. The range of classes, limited to B1, B2 and B8 appear to be insufficient to account for this emerging industry. It is understood that Use Codes originally defined in the 1987 Order have been lost as the categorisation has been "rationalised" with unintended consequences. Any technique applying a thermal treatment is in danger of automatically being classed as 'incineration' of "waste" and falling outside the 'General Industrial' B2 class and into *sui generis* requiring individual scrutiny which can add significant delay and uncertainty.

Similarly, when categorising new pyrolysis technologies under the Environmental Permitting (England & Wales) Regulations 2016, the advanced recovery of precious metals and minerals from end of life electronic equipment does not fall neatly into any category within the regulations. Again, there is a danger that 'pyrolysis' is confused with 'incineration' which fails to recognise the innovative nature of the process. Recognising EEE as a valuable resource and the process as one of mining and/or processing for the recovery of CRM's is more appropriate. EEE should be more correctly referred to as a 'feedstock'. To that end the technique should be seen as synonymous with primary metals production albeit a significantly lower energy, water and resource intensive process. Chapter 2 of the regulation, 'Production and processing of metals', sub-section 2.2, 'non-ferrous metals' is a potentially a better description of this new domestic industry. Indeed Part B recognises processes that remove oil, grease and other non-metallics, specifically referring to plastic and rubber removal from scrap cable which is clearly similar to the repossession of CRM's 'locked' into EEE prior to treatment.

The purpose of highlighting these specific categories is not to argue a case within the current regulations but to present the challenge of working within the constraints of the existing legislation, in light of rapidly advancing technologies. The effect of these challenges is the slowing of the deployment of new technologies and slowing the growth of the circular economy in the UK.
This challenge of categorisation within the existing environmental permitting process brings us back to business use classification. If all use of heat on EEE is treated as an incineration process the likely knock on influence on planning interpretation is that business Use Class B2 cannot be used, once again forcing a *suis gereris* status attracting delay and indecision.

The application of existing EU 'end of waste' regulation is also of importance to CRUK once operational. It is worth noting that for this evolving framework directive, current waste types are limited to just three groups, none of which apply to the complex feedstock materials associated with EEE. This evolving regulation requires new technologies in this field to be once again assessed on a case-by-case basis. Additionally, for multi-element feedstocks that are treated to separate a range of recovered materials there is the risk that the application of this regulation, which requires proof that 100% of the feedstock is converted to a distinct marketable product, in its current form will becomes cumbersome, complex and longwinded when applied to these new technologies. Recognising the benefits of recovery technologies as an advancement of the current situation, alongside the complexity of absolute proof that none of the elements remain as 'waste' should be considered as the UK takes sovereign responsibility for the application of important regulation for this emerging sector.

CRUK has found that existing schemes such as Enterprise Zones (EZ's) and in particular associated Local Development Orders (LDO's) have the potential to provide speed and alignment of thinking that helps accelerate new innovative private businesses navigate the planning process. The EZ scheme appears to be drawing to a close and LDO's are patchy and difficult to interrogate in a central, consolidated data source although it should be said that the LEP's contacted to date have been very supportive and keen to engage.
There are no national 'incubator' sites for these technologies that focus on addressing the issue of electronic waste, or metallurgical or emissions excellence generally. There is a limited pool of private companies marketing 'green tech' conurbations such as the Protos site in the North-West. However, although there are 'cluster effect' benefits in terms of grouping similar companies (the "Silicon Valley effect") these locations continue to be subject to existing national and local planning/permitting processes, and are unable to influence policies in any meaningful way that promotes rapid adoption of new green technologies such as the CRUK process.

6. *What proposals does the UK Government need to consider as part of its consultation on WEEE?*

6.1. Harness the benefits of the UK to attract FDI and emerging new technologies

As highlighted here, the UK provides a number of benefits for investors in the Circular Economy. Government must recognise and promote these benefits to attract new entrants to the rapidly evolving sector with a view to becoming a world leader in the recovery of precious metals and CRM's from what has been traditionally considered a waste material.

6.2. Recovery as an industrial process

Recovery of materials from WEEE in the UK is a new and nascent sector. It will become a multi billion pound turnover sector should the UK embrace this new industry. As such innovation in the sector is by definition disruptive and faces first mover disadvantages at the regulatory process and market practices levels. The UK Government has already indicated it sees merit in encouraging this sector and accelerating its growth. It is suggested that the UK Government view the EEE materials recovery sector as a manufacturing "sector". A distinct link in the circular economy chain, breaking the negative association with a 'dirty', manual and 'low-tech' part of the economy.

6.3. Fit for purpose regulation

It is important in terms of attracting new and innovative FDI to address the issue of how planning and environmental legislation is applied to end of life electronic waste. Legislation needs to be robust but at the same time not act as a disincentive or blocker to rapid action to address the issue recognised by the Environmental Audit Committee and contributors to this inquiry.

6.4. Funding

The Green Alliance[5] and the WEEE Forum[6] in their responses both cite the need for funding high quality recycling and new business models. Such funding could also be in the form of university and research funding. Currently InnovateUK calls for funding are applicable but not specific to addressing the challenges of the circular economy and specifically tackling growing volumes of WEEE.

This emerging sector requires a framework and certainties. It requires change around how end of life electronics are categorised and channelled, reducing materials sent to landfill and maximising resource availability as a precious feedstock.
Considerations should include secure data destruction and IP integrity. These are important aspects of end of life electronics management practices and have been somewhat neglected. Memory destruction is difficult, and in many cases it is impossible to fully erase.

References:

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