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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730227.

Start date : 2016-12-01 Duration : 30 Months
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Report on (voluntary) standards, policies and regulatory frameworks in Europe relevant to CRMs

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SCREEN - Contract Number: 730227

Solutions for CRITICAL Raw materials - a European Expert Network Dimitrios Biliouris

Document title	Report on (voluntary) standards, policies and regulatory frameworks in Europe relevant to CRMs
Author(s)	Mr. Tiess GUENTER, Diego Murguia (Minpol), Blazena Hamadova (Minpol)
Number of pages	120
Document type	Deliverable
Work Package	WP7
Document number	D7.2
Issued by	MinPol
Date of completion	2018-02-15 11:06:59
Dissemination level	Public

Summary

Report on (voluntary) standards, policies and regulatory frameworks in Europe relevant to CRMs

Approval

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2018-02-15 11:07:09	Mr. Tiess GUENTER (MinPol)
2018-02-15 11:35:03	Mr. Stéphane BOURG (CEA)

SCRREEN

**D 7.2 - REPORT ON NATIONAL POLICIES,
REGULATORY FRAMEWORKS AND
(VOLUNTARY) STANDARDS IN EUROPE
RELEVANT TO CRMS**

DRAFT REPORT

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ACRONYMS AND ABBREVIATIONS

BGS	British Geological Survey
CRM	Critical Raw Material
CSA	Coordination and support action
DRC	Democratic Republic of the Congo
EIP-RM	European Innovation Partnership on Raw Materials
EoL	End-of-life
EPR	Extended Producer Responsibility
EC	European Commission
EEE	Electrical and Electronic Equipment
EU	European Union
HREEs	Heavy Rare Earth Elements
LREEs	LREEs Light Rare Earth Elements
OCTs	Overseas countries and territories
OECD	Organisation for Economic Co-operation and Development
RIA	Research and innovation action
RMC	Raw material commitment
RMI	Raw Material Initiative
SME	Small and medium-size enterprise
TEU	Treaty on the European Union
U.S. / USA	United States of America
USGS / WMD	United States Geological Survey / World Mining Data
WEEE	Waste of Electrical and Electronic Equipment
WTO	World Trade Organisation

CRMs symbols

Sb	→	Antimony	In	→	Indium (metal)
Be	→	Beryllium	Mg	→	Magnesite, Magnesium
Bor	→	Borates	Nb	→	Niobium
Co	→	Cobalt (metal)	Phos	→	Phosphate
Coal	→	Coking coal	PGMs	→	Platinum Group Metals
Cr	→	Chromium	Si	→	Silicon metal
Fl	→	Fluorite	LREE	→	Light Rare Earth Elements
Ga	→	Gallium	HREE	→	Heavy Rare Earth Elements
Ge	→	Germanium (metal)	W	→	Wolfram (Tungsten)
Gr	→	Natural graphite (substance)			

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ABOUT THE SCRREEN PROJECT

Since the publication of the first list of Critical Raw Materials (CRM) in 2010 by the Ad-hoc Working Group on CRM, numerous European projects have addressed (part of) the CRMs value and several initiatives have contributed to gather (part of) the related community into clusters and associations. This led to the production of important knowledge, unfortunately disseminated. Numerous databases have also been developed, sometimes as duplicates.

For the first time in the history, SCRREEN aims at gathering European initiatives, associations, clusters, and projects working on CRMs into along lasting Expert Network on Critical Raw Materials, including the stakeholders, public authorities and civil society representatives.

SCRREEN will contribute to improve the CRM strategy in Europe by (i) mapping primary and secondary resources as well as substitutes of CRMs, (ii) estimating the expected demand of various CRMs in the future and identifying major trends, (iii) providing policy and technology recommendations for actions improving the production and the potential substitution of CRM, (iv) addressing specifically WEEE and other EOL products issues related to their mapping and treatment standardization and (vi) identifying the knowledge gained over the last years and easing the access to these data beyond the project.

The project consortium also acknowledges the challenges posed by the disruptions required to develop new CRM strategies, which is why stakeholder dialogue is at the core of SCRREEN: policy, society, R&D and industrial decision-makers are involved to facilitate strategic knowledge-based decisions making to be carried out by these groups. A specific attention will also be brought on informing the general public on our strong dependence on imported raw materials, on the need to replace rare materials with substitutes and on the need to set up innovative and clean actions for exploration, extraction, processing and recycling

EXECUTIVE SUMMARY

This Deliverable is part of SCRREEN's workpackage seven titled 'Policy issues'. Its overall objective is the identification, mapping and brief analysis of policies, strategies, regulatory frameworks and voluntary standards relevant to critical raw materials (as defined by the European Commission - EC), at European Union (EU) and EU Member State (MS) level. The report is focused on the second list of CRMs published by the European Commission in 2014 but includes references in the standards section to natural rubber and vanadium, two critical raw materials (CRMs) included in the 2017 list. This report is built upon an inventory of policies, strategies, legislation and standards collected from MinPol, AFNOR and WEEE Europe's databases, from different research projects (MINLEX, MIN-GUIDE, INTRAW, MINATURA2020, STeP) and from inputs for Italy received from ECODOM (Italian household appliance recovery and recycling consortium).

Currently the EU is a major global consumer of CRMs: estimates indicate that individual consumption of CRMs ranges between 7% and 25% (2012); yet, CRM production in the EU is much lower spanning between a 0 and 17% of the global supply (2015) with 12 CRMs nowadays produced across the MSs (cf. D7.1). At the same time, MSs hold a considerable potential to produce more volumes of CRMs, even those currently imported to a 100% rate, as MSs have not only geological potential but also capacity to refine some CRMs, both from primary (virgin ores, CRMs often as by-products) and secondary (scrap) sources. To unleash such potential, MSs need to have regularly updated dedicated mining policies or strategies (national mineral policy frameworks – NMPF) aiming to implement a sound management of their CRM stocks and potential within their territories.

Despite such potential, our results show that, while a majority of MSs has some kind of mineral policy or strategy in place to manage the exploration, extraction, beneficiation and trading of primary minerals, still a minority of MSs have policies or strategies focused on secondary raw materials (resource efficiency action plans). In relation to CRMs, already 8 years after the publication of the first CRM list in 2010, only a minority of MSs mention or include CRMs as the core focus of their policies. In other words, CRMs are usually (and still) not in focus for many MSs. Furthermore, it is striking that countries with a large CRM potential such as Italy, Poland, Portugal or Spain do not have dedicated national policies or strategies focused on promoting the domestic extraction (e.g. safeguarding via land use planning, e.g. approach of mineral deposits of public importance) or the recycling of such minerals.

However, companies and consortiums have implemented their own policies, some of them good practices. For instance, ECODOM has agreed with its partners to apply a price

compensation mechanism to resolve the problem of low and inestable scrap prices (when primary raw materials are cheap, alternative good quality secondary materials cannot compete). Thus, in its contracts with the treatment providers, ECODOM has introduced an indexing mechanism linked to the market value of the secondary raw materials: when this value rises, the Consortium pays to suppliers a lower amount; when the value goes down, the Consortium thus recognizes its suppliers a higher amount. The purpose of this mechanism, which allows processors to count on total revenues (sum of the amount paid by Ecodom and revenues from secondary raw materials sales), is to ensure that these suppliers maintain a high quality standard, even in unfavorable market situations.

Substitution of CRMs may also appear as a desirable objective to reduce the import dependency of the industry from imported CRMs. Yet, our results indicate that it is not a priority in any of the mineral policies or strategies of MSs. Only Germany and France, and to some extent the Netherlands and the UK, have issued strategies covering CRM substitution.

In the case of regulatory frameworks, CRMs are also not appearing as a priority substance or in special focus in the national mining laws which regulate primary minerals exploration, extraction and beneficiation. Considering secondary minerals, Member States are being led by EU legislation (via transposition) towards the inclusion of resource efficiency and recovery of minerals as a topic of increasing importance, including specific legislation on objects which contain potentially recoverable CRMs such as used batteries, automobiles, WEEE. Yet, much progress is still required as CRMs also do not appear as a topic of special importance or focus in the national legislation of EU MSs.

Moreover, in some cases the necessary legislation is either not passed or not effective. Besides, it seems that there exists a non-level playing field for primary and secondary CRMs because the system is structured according to the principles of a linear economy (and not a circular one based on the value chain approach). In Italy, it has been reported that there is a general lack of a level playing field in the WEEE recycling sector with “parallel flows” (illegal WEEE flows) undermining fair competition and promoting an inefficient recycling (as these illegal operators target the most profitable minerals only and have very inefficient and polluting processes). In Italy, two years after the entry into force of Legislative Decree No. 49/2014, many implementing decrees are still missing, among these, the decree on the quality of the treatment is particularly important to ensure the proper functioning of the WEEE system. Such decree would be necessary to prevent the authorization of WEEE treatment being granted - as is the case now - to organisations that do not use environmentally-friendly processes.

With regards to voluntary standards, there are few standards dedicated specifically to primary CRMs, and these are international ISO standards. There exist other standards not

dedicated to CRMs but which include the thematic and are applicable, e.g. on terminology, sampling techniques, measurement and characterisation of CRM as trace elements in raw materials, and horizontal standards (environmental management, social responsibility). Likewise few voluntary standards exist for secondary raw materials (developed under m518 mandate), and some are under development (under m543 mandate). At European level, we are facing a void in terms of the organization of the collection of CRM; the characterisation of their properties as secondary CRMs are not standardized. A main barrier is the separation between a secondary raw material and wastes. A clarification and a better distinction should be provided in order to improve the collect and the valorization of such raw materials.

I INTRODUCTION

Given the European industry's high dependence on imports of minerals (especially metals), the European Commission (EC) commissioned a first study to identify 'critical raw materials' (CRMs) considered 'critical' on the basis of their supply risk and economic importance. In 2010 a first list of 14 elements identified as critical was published (European Commission, 2010). In 2014 a second revised list was published featuring 20 CRMs taken from a 'criticality zone' of high supply risk and economic importance (European Commission, 2014). In September 2017 a third revised list was published (European Commission et al., 2017) identifying 27 raw materials as CRMs. In comparison to the 2014 list, the new list includes 9 more new materials: baryte, bismuth, hafnium, helium, natural rubber, phosphorus, scandium, tantalum, vanadium, with bismuth, helium, phosphorus being entirely new to the list.

In Europe, the development of CRM value chains (upstream and downstream industry extracting, trading or using intermediate CRMs as input to their manufacturing processes), including substitution and development of new CRM technologies/markets, is hampered by fragmented policies or strategies, conflicting regulations or standards, or by the fact that such do not exist. The overall objective of D7.2 is the identification of policies, strategies, regulatory frameworks and (voluntary) standards relevant to CRMs at European Union (EU) and national (EU Member State) levels.

Specific objectives of this Deliverable are:

- Map and briefly describe EU, national and regional policies and strategies, standards and regulatory frameworks applicable to CRMs
- Identify and describe any gaps and constraints in the policy and regulatory framework that may hinder technical development or trade

Scope

As defined by the EC (European Commission, 2014, 2010), Critical Raw Materials (CRMs) are those raw materials which are economically and strategically important for the European economy and which have a high-risk associated with their supply. These materials are not classified as 'critical' because they are considered scarce but rather because:

- they have a **significant economic importance** for key sectors of the European economy, such as consumer electronics, environmental technologies, automotive, aerospace, defence, health and steel;

- they have a **high-supply risk** due to the very-high import dependence and high level of production concentration in a few countries;
- there is **currently a lack of (viable) substitutes**, due to the very unique and reliable properties of these materials for existing as well as future applications.

Given the recent publication of the third CRM list, it seems reasonable to believe that EU Member States have not yet had the time to update their policies and strategies to the new elements. Work on this deliverable started much earlier than the publication of the new list. Based on those two reasons, this Deliverable 7.2 is working predominantly with the list of 20 CRMs identified by the EC in 2014 as shown below:

Antimony	Magnesite
Beryllium	Magnesium
Borates	Natural Graphite
Chromium	Niobium
Cobalt	PGMs (platinum, palladium, rhodium, ruthenium, iridium and osmium)
Coking Coal	Phosphate Rock
Fluorspar	Heavy rare earth elements (HREEs) ¹
Gallium	Light rare earth elements (LREEs) ²
Germanium	Silicon Metal
Indium	Tungsten

Yet, in some cases some CRMs from the 2017 list have also been considered (e.g. natural rubber, vanadium in the chapter 5 on standards).

Following Eurostat's definitions, raw materials are basic substances or mixtures of substances in an untreated state except for extraction and primary processing³. They can be subdivided into primary and secondary raw materials. Primary raw materials are the product of the primary production sectors, which encompass the extraction of natural resources from the environment and their transformation through processing or refining. The obtained raw materials are primary commodities, the base materials for further manufacturing. These materials will end up as waste (or scrap), from which secondary raw materials can be derived. Also materials obtained during the manufacturing process (usually called new or pre-fabrication scrap) are often considered secondary raw materials.

For the purposes of this Deliverable we define:

¹ Include europium, gadolinium, terbium, dysprosium, erbium, yttrium, others (holmium, erbium, thulium, ytterbium, and lutetium according to the EC Critical material profiles, <http://ec.europa.eu/DocsRoom/documents/11911/attachments/1/translations> , accessed 07.03.17

² Include lanthanum, cerium, praseodymium, neodymium, samarium

³ See <http://ec.europa.eu/eurostat/web/environmental-data-centre-on-natural-resources/natural-resources/raw-materials> (accessed 21.11.17)

- **Primary CRMs:** they include natural inorganic or organic substances in nature in the form of virgin ores or rocks (natural accumulations) including the unexploited components of abandoned mines. Primary CRMs target those materials that are extracted as the primary extraction target of a mine or quarry (borates, chromium, coking coal, fluorspar, magnesite, tungsten, phosphate rock, silicon metal) and those extracted as by-products (cobalt, gallium, germanium, indium, rare earth elements, PGMs associated to copper-nickel ores). Some CRMs like antimony or beryllium can be extracted either as primary product or as a by-product (antimony out of gold and base metal mining, beryllium as a by-product of small scale emerald gemstone mining operations).
- **Secondary CRMs:** the definition is wide-encompassing and includes waste streams (recyclates) of waste materials that are recovered, recycled and reprocessed for use as raw materials such as pre- and post-fabrication scrap, WEEE or batteries, and includes mine waste (as defined by the Extractive Waste Directive 2006/21/EC⁴) stored in fixed, mining waste facilities such as waste dumps/heaps or equivalent. Landfills (municipal/industrial) are not included.

Methodology

First, an inventory of existing policies, strategies, legislation and standards was created (available in the Annex). Information was collected based on existing databases. Information on policies and strategies was collated based on MinPol's database complemented with information available by the MIN-GUIDE⁵, MINATURA2020⁶, INTRAW⁷ and MINLEX⁸ projects. Information on the regulatory framework of each Member State was retrieved from MINLEX's database for primary minerals, and from the WEEE Europe⁹ and STeP projects (STeP e-waste world map¹⁰) for secondary minerals. Information on standards was compiled by AFNOR from its own database and complemented with MinPol's database.

Such inventory was used as the basis for the mapping and analysis. These last two tasks were complemented with information obtained from interviews (e.g. interview to ECODOM's president in 2016, information forwarded by ECODOM to MinPol), publications and other secondary sources.

Report outline

Chapter 2 introduces a brief recapitalization on the CRM status in the EU (already discussed in D7.1). Chapters 3 to 5 provide an analysis of the collected policies, strategies, regulatory

⁴ In such Directive 'extractive waste' is defined as 'waste resulting from the prospecting, extraction, treatment and storage of mineral resources and the working of quarries' (Art. 2).

⁵ Country Profiles available at <http://www.min-guide.eu/project-results>

⁶ www.minatura2020.eu

⁷ <http://intraw.eu/>

⁸ <https://publications.europa.eu/en/publication-detail/-/publication/18c19395-6dbf-11e7-b2f2-01aa75ed71a1/language-en>

⁹ <http://www.weee-europe.com/33-1-relevant-laws.html>

¹⁰ <http://www.step-initiative.org/step-e-waste-world-map.html>

framework and standards, all available in the form of an inventory in the Annex. Chapter 6 introduces a brief analysis of companies' policies on CRMs while Chapter 7 closes the Deliverable with conclusions.

2 RECAP ON THE STATUS OF CRM MINERAL CONSUMPTION IN THE EU AND FUTURE DEMAND

The current situation of CRM production in the EU is covered in CHAPTER 3 of D7.1 while information on use is available in D2.1 (Report on the current use of critical raw materials). Below, a brief summary on production is given as well as a demand forecast of selected CRMs. Assuming that the European demand for minerals will remain constant or grow (see Figure 1 below), we can argue that Europe's mineral consumption (MC) for CRMs (see Eq.1.1 below) is expected to grow substantially in the coming decades.

$$M_{C, CRM} = M_{PR} + M_I - M_E - M_W \quad \text{Eq. (1.1)}$$

where M_C = minerals consumed; M_{PR} = production of primary and secondary (recycling), $M_{PR} = M_{PR(PRIM)} + M_{PR(SEC)}$; M_I = minerals imported; M_E = minerals exported; M_W = Minerals going to waste, i.e. non-recoverable (lost in dissipative uses at their end of life).

An increasing upward trend in CRM demand needs to be met by a sustainable supply, which includes domestic extraction. However, domestic production in the EU Member States is quite low and there is a continuous need for imports. From the 20 identified CRMs, 12 of them are produced in the EU (either primary mining production, by-product during mineral processing or refining). However, the rate of the **EU production is very limited** and insufficient in comparison with the demand consumed by the downstream market. In fact, the EU is a significant net importer in almost all CRMs. Society and developed industry (downstream market) in the **EU are a significant world consumer** of CRMs, rates for individual CRMs reached from 7 to 25% of world consumption in 2012 (cf. Figure 6/D7.1).

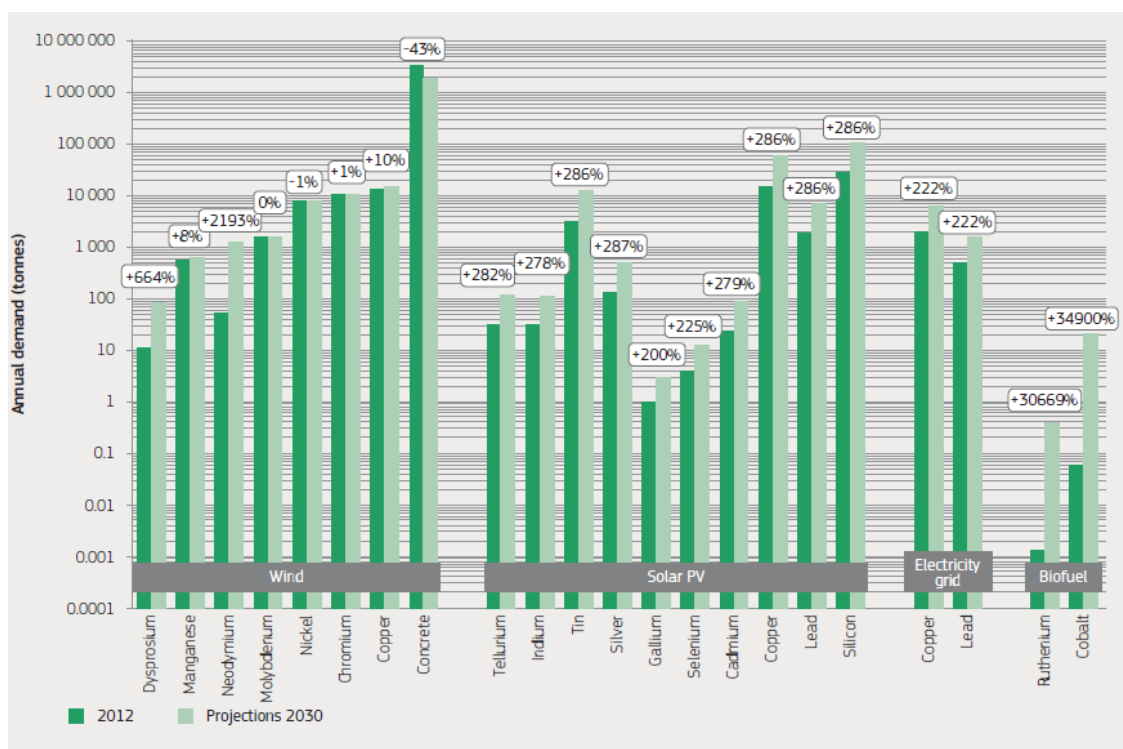
Antimony, beryllium, borates, magnesium metal, natural graphite, niobium and REE (light and heavy) are the 7 CRMs which **are not produced** in EU member states and its market is therefore 100% dependent on imports. From the others CRMs is rather **insignificant primary production** (in comparison with EU import rates and world production share) in cases of **cobalt** (mine production in Finland, refining production in Belgium, France), natural **graphite** (Germany, Sweden, Austria), **indium** (refining in Belgium, Germany, Italy, Netherlands and UK), **phosphates** rock (Finland) and **PGM** (Finland and Poland). Among CRMs, where EU member states contributed to the world production in 2015¹¹ by at least 1% belong **chromium** (Finland 3.39%), **coking coal** (Poland 1.17%, Czech Republic and Germany both about 0.3%),

¹¹ Reichl, C., Schatz, M., Zsak, G., (2016): World Mining Data. Vienna: BMWFW I

germanium (Finland 16.3%) **fluorspar** (Spain about 2%, United Kingdom 1.2%, Germany 0.9%), **gallium** (Germany 15% and Hungary 2%)¹², **magnesite** (Slovakia 3.3%, Austria 2.6%, Spain 1.7% and Greece 1.4%) and **silicon metal** (France 6%, Germany and Spain both 2%)⁶¹ and **tungsten** (Austria 1%, Spain 0.9%, Portugal 0.5% and United Kingdom 0.2%).

Figure I shows the current demand (2012) and the projected demand for 2030 of the raw materials required in four low-carbon technologies, namely wind, solar photovoltaic (PV), electricity grid and bioenergy (biofuel). These technologies are identified as priorities in the EU's Strategic Energy Technology (European Commission, 2016)¹³. Demand for raw materials will increase significantly for all four technologies.

Figure I: Current (2012) and projected (2030) annual demand of raw materials used for selected low-carbon energy technologies.



Source: JRC¹⁴

¹² Gunn, G. (ed.) (2014): Critical Metals Handbook. Hoboken: John Wiley and Sons

¹³ Innovation Partnership on Raw Materials (European Commission, Joint Research Centre)(2016). Raw Materials Scoreboard

¹⁴ JRC analysis based on European Commission, 2013, 'Critical Metals in the Path towards the Decarbonisation of the EU Energy Sector: Assessing Rare Metals as Supply-Chain Bottlenecks in Low-Carbon Energy Technologies', JRC Science and Policy Reports.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730227

Some of the raw materials needed for these technologies, including dysprosium, chromium, cobalt, gallium, indium, neodymium, silicon metal and platinum group metals are included in the 2014 EU critical raw materials list. The annual demand for raw materials used in solar PV technology will, for example, increase on average by 270 % by 2030. For wind power, demand for dysprosium will increase by about 660 % and demand for neodymium by about 2 200 %, due to the increasing market share of rare earths-based generators in both onshore and offshore wind applications. Sustainable biofuel production relies on specific catalysts, which contain cobalt and ruthenium metals. The demand for these metals is therefore expected to increase to more than 300 times its current level by 2030 (European Commission, 2016).

However, it may be difficult to meet this increase in demand, considering that many of these metals are often not mined on their own, but occur only as by-products from major metals. Indium for example is a by-product of zinc mining, gallium from aluminium and selenium and tellurium from copper. Because these by-products are often such small fractions of the host metal, it could prove difficult to increase their supply. Current production ratios for indium to zinc for example are 50 g/tonne, for germanium it is 6.9 g/tonne. To increase the production of indium or germanium in line with projected demand would imply the production of zinc exceeding its demand between two and ten times. This would also generate significant amounts of waste (European Commission, 2016).

3 MAPPING AND ANALYSIS OF CRM POLICIES, STRATEGIES, ALONG THE VALUE CHAIN

3.1 KEY REQUIREMENTS OF NATIONAL MINERAL POLICY FRAMEWORK (NMPF)

The overall objective of D7.2 is the identification/mapping at national level of policies, strategies and regulatory frameworks as well as (voluntary) standards in Europe relevant to CRMs. In this respect, it is important to take the following into account: the Council endorsed the reinforced Raw Materials Initiative in its Conclusions on tackling the challenges on raw materials and in commodity markets of 10 March 2011. The EU (European Commission, 2011) considered of particular importance:

*1. definition of a **National Minerals Policy**, to ensure that these resources are exploited in an economically viable and harmonized manner with other national policies based on sustainability, including a commitment to create a legal framework and appropriate information;*

*2. definition of a **land use planning policy for minerals** which includes*

- *2.1 long-term and regional estimates of minerals demand as well as the*
- *2.2 digital geological database,*
- *2.3 transparent methodology for identifying mineral resources,*
- *2.4 identification and preservation of the minerals resources taking into account other land uses, and*

*3. putting in place an **authorisation procedure for exploring and extracting minerals** that is clear, understandable, provides certainty and helps to streamline the administrative process*

With respect to D7.2, these requirements are key of any National Minerals Policy Framework (NMPF) (Marinescu et al., 2013; Tiess, 2011) and will be taken into account when analysing the CRM policies, strategies and regulatory frameworks at national level. Primary and secondary CRM are equally (i.e. policy weight) to be considered when framing a NMPF.

The first point (1.) implies that any national mineral policy needs to be harmonised with other related policies e.g. environmental and social ones, resource efficiency ones (circular economy). In this respect: not only securing the CRM supply is the main issue but at the same time, to consider sustainability and resource efficiency in balance with CRM mining. The second point (2.) includes CRM protecting if a country offers domestic potential (e.g. Mineral Deposits of Public Importance, cf. MINATURA2020 project¹⁵) but should be extended to

¹⁵ www.minatura2020.eu

secondary CRM potential as well. The third point (3.) considers the permitting procedure in relation to legal (mining and related) basics; for D7.2, primary and secondary CRM (equally) are covered (and analysed).

3.2 MAPPING AND ANALYSIS OF POLICIES AND STRATEGIES




As compiled by a map of CRM deposits in Europe by Eurogesurveys¹⁶ and as shown in Table I, many EU MSs have a considerable geological CRM potential, and, as previously mentioned, there is an ongoing production in various MSs. MSs with CRM production have, in general, a dedicated National Mineral Policy Framework in place (though obviously this is not a requisite for CRM extraction/production to take place).

Summarizing from Table I, the following 19 countries have dedicated mining policies or strategies (for primary minerals) in place:

- Austria mineral strategy (2012)
- Bulgarian National Strategy for Development of Mining Industry 2030 (2015)
- Czech new Raw Materials Policy (2017)
- Denmark, Greenland and the Faroe Islands – The Kingdom of Denmark, Strategy for the Arctic 2011-2020
- Estonian Mining Strategy (2017)
- Finland – Finnish Minerals Strategy (2010) and Arctic Region Strategy (2013)
- France – Strategic metals plan (2010)
- Germany – Raw materials strategy (2010) and Raw materials of strategic economic importance for high-tech made (2012)
- Greece – The National Policy for the Strategic Planning and Exploitation of Mineral Resources (2012)
- Hungary - Action Plan on Mineral Resources Management and Utilization (2015)
- Lithuania – State Strategy of Use of Underground Resources (under preparation)
- Netherlands – Raw Material document ("Grondstoffennotitie") (2011)
- Poland – Mining Policy (2017), under discussion
- Portugal – National Strategy for Mineral Resources (2012)
- Romania – Strategy of Mining Industry 2012-2035
- Slovakia – Raw Materials Policy (2004), new version under discussion
- Slovenia – National Mineral Resource Management Programme (2009) and National Mining Strategy (2011)
- Sweden – National mineral strategy (2013)
- United Kingdom – Resource Security Action Plan (2012)





¹⁶ Bertrand G, Cassard D, Arvanitidis N, Stanley G (2016) Map of Critical Raw Material Deposits in Europe. Energy Procedia 97:44-50. doi: 10.1016/j.egypro.2016.10.016

Table I: Primary and secondary CRM potential, production and CRM-related policies and strategies per MS.




EU Member State	CRM mining potential ¹⁷ & current production ¹⁸	Existing NMPF (mining & recycling)	CRM value chain included in NMPF?	NMPF coordinated with other policies (circular economy)?	Notes
• Austria	Potential: germanium, natural graphite, tungsten Production: magnesite (mined), tungsten (mined), natural graphite, recycling of tungsten; separated Rare Earth compounds ; Technology and trading (Indium, Antimony, Niobium, Tungsten)	✓ Austrian Minerals Strategy (AMS), Austrian Raw Materials Plan (AUTMINPLAN)	✓ CRMs mentioned in AUTMINPLAN	✓ Resource efficiency action plan (REAP) (2012)	-
 Belgium	Potential: phosphate Production: germanium (recovered), indium (refined), cobalt (refined),	No specific Mineral policy for primary minerals in place at national level. For secondary minerals, "Sustainable Materials Management Strategy" (2012)	No. CRMs not mentioned specifically in the Sustainable Materials Management Strategy.	-	-
 Bulgaria	Potential: magnesite Production: fluorspar (mined)	✓ The Bulgarian National Strategy for the Development of the Mining Industry 2030	No	Unknown	
 Croatia	Potential: -	No specific Mineral policy in place at national	-	-	-

¹⁷ Potential refers to primary mineral deposits hosting CRMs and is based on the map of CRM deposits in Europe by Cassard et al (2016), doi: [10.1016/j.egypro.2016.10.016](https://doi.org/10.1016/j.egypro.2016.10.016).





¹⁸ Production is based on the information surveyed in Annex

EU Member State	CRM mining potential ¹⁷ & current production ¹⁸	Existing NMPF (mining & recycling)	CRM value chain included in NMPF?	NMPF coordinated with other policies (circular economy)?	Notes
	Production: -	level			
 Cyprus	Potential: - Production: -	Committee for the Sustainable Development of Mineral Resources to issue recommendations on mineral resources	No	-	-
 Czech Republic	Potential: fluorite, niobium, natural graphite, tungsten Production: coking coal, fluorspar (mined)	New Raw Material Policy for Minerals and their Resources (MPO 2017) (primary minerals) Secondary raw materials policy (2016)	Yes. CRMs are mentioned in the new policy (MPO 2017). No. CRMs are not mentioned in the secondary raw materials policy (2016).	No, primary and secondary mineral policies in place appear to lack coordination. Also, no coordination with the Strategic framework for sustainable development (2010).	-
 Denmark	Potential: niobium, PGMs & REE in Greenland Production: -	Strategy for the Arctic 2011-2020 related to primary minerals (2011) Denmark without waste. Recycle more – incinerate less (2013)	Yes. CRMs mentioned. Yes. CRMs mentioned.	Yes, strategies are coordinated and CRMs are on focus.	-
 Estonia	Potential: phosphate Production: -	Mining policy 2017	-	Resource efficiency and waste policies are linked in the National Waste Management Plan 2014–2020, which focuses more on waste prevention	-






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EU Member State	CRM mining potential ¹⁷ & current production ¹⁸	Existing NMPF (mining & recycling)	CRM value chain included in NMPF?	NMPF coordinated with other policies (circular economy)?	Notes
 Finland	Potential: antimony, beryllium, chromium, cobalt, PGMs, phosphate, tungsten, REE Production: germanium, chromium, cobalt (mined), PGM (mined), phosphate rock	Finnish Minerals Strategy (2010) Arctic Region Strategy (2013)	Yes. CRMs mentioned in both strategies.	Yes, CRMs mentioned in the Natural Resource Strategy (2009) too.	
 France	Potential: antimony, beryllium, fluorite, germanium, tungsten, Production: silicon metal, indium, cobalt (refined)	The Strategic Metals Plan (2010) Committee for Strategic Metals (COMES) (2011)	Yes. Although the term is different (strategic metals), but CRMs are included.	No. For instance, CRMs do not appear in the French National Sustainability Strategy 2010-2013 (2010)	
 Germany	Potential: fluorite, indium Production: gallium, silicon metal, fluorspar, coking coal, natural graphite Chromium, beryllium	Raw materials strategy (2010) Raw materials of strategic economic importance for high-tech made (2012) German Resource Efficiency Program "ProgRess" (2012)	Yes, CRMs mentioned in the report "Raw materials of strategic economic importance for high-tech" (2012) and the Raw Materials Strategy (2010). In the ProgRess report (2012) CRMs are mentioned but not under the definition of the EC, i.e. the report says that a definition of the term "critical" still remains pending.	Unknown	






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EU Member State	CRM mining potential ¹⁷ & current production ¹⁸	Existing NMPF (mining & recycling)	CRM value chain included in NMPF?	NMPF coordinated with other policies (circular economy)?	Notes
 Greece	Potential: cobalt, magnesite, PGMs, REE, tungsten Production: magnesite	The National Policy for the Strategic Planning and Exploitation of Mineral Resources 2012	Yes. CRMs are mentioned.	Unknown.	-
 Hungary	Potential: magnesite Production: gallium	Action Plan on Mineral Resources Management and Utilization (2015) A comprehensive Hungarian mineral policy addressing all kinds of minerals is in progress (2017)	Yes. CRMs mentioned in the Action Plan (2015), i.e. rare earth elements.	4th National Environment Programme giving high priority to resource efficiency	-
 Ireland	Potential: - Production: -	No specific Mineral policy in place at national level (primary minerals) For secondary minerals, "Towards a Resource Efficient Ireland" (2014) and Roadmap for a National Resource Efficiency Plan for Ireland (2014) both under the National Waste Prevention Programme running since 2004	No. CRMs are not mentioned in any of the documents.	Unknown.	-
 Italy	Potential: antimony, fluorite Production: -	No specific Mineral policy in place at national level (primary minerals)	-	-	Currently (2017) discussing how to implement the RMI of the EU.




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EU Member State	CRM mining potential ¹⁷ & current production ¹⁸	Existing NMPF (mining & recycling)	CRM value chain included in NMPF?	NMPF coordinated with other policies (circular economy)?	Notes
 Latvia	Potential: - Production: -	No specific Mineral policy in place at national level	-	-	
 Lithuania	Potential: - Production: -	No specific Mineral policy in place at national level Lithuanian State Strategy of Use of Underground Resources is under preparation	-	-	-
 Luxembourg	Potential: - Production: -	No specific Mineral policy in place at national level	-	-	-
 Malta	Potential: - Production: -	No specific Mineral policy in place at national level	-	-	-
 Netherlands	Potential: - Production: -	Raw Material document (<i>Grondstoffennotitie</i>) (2011) Strategy for the Mineral Industry (<i>Strategi for mineralnæringen</i>) (2013)	Yes. CRMs mentioned.	Yes. CRMs are part of a general sustainable development strategy.	-

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EU Member State	CRM mining potential ¹⁷ & current production ¹⁸	Existing NMPF (mining & recycling)	CRM value chain included in NMPF?	NMPF coordinated with other policies (circular economy)?	Notes
 Poland	Potential: cobalt, fluorite, magnesite, coking coal, gallium, germanium, PGMs, natural graphite Production: coking coal, PGM	Polish mining policy in discussion	No. General development policy with link to raw materials. CRMs mentioned but not specifically	Unknown.	-
 Portugal	Potential: antimony, beryllium, indium, REE Production: tungsten (mined),	National Strategy for Geological Resources – Mineral Resources (ENRG-RM) (2012)	No. CRMs issue not addressed nor in focus.	Unknown.	-
 Romania	Potential: phosphate Production: -	The Strategy of the Mining Industry 2012-2035 (<i>Strategia Industrii Miniere 2012-2035</i>)	Yes. CRMs are mentioned.	Unknown.	-
 Slovakia	Potential: antimony, magnesite Production: magnesite	Raw Material Policy (Proposed)	No. CRMs not mentioned in the proposed policy.	Unknown.	-
 Slovenia	Potential: antimony Production: -	National Mining Strategy since 2011 exists with an extensive focus on efficient mineral resource management	No. CRMs not mentioned.	Unknown.	-

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EU Member State	CRM mining potential ¹⁷ & current production ¹⁸	Existing NMPF (mining & recycling)	CRM value chain included in NMPF?	NMPF coordinated with other policies (circular economy)?	Notes
 Spain	Potential: germanium ¹⁹ , phosphate, niobium, fluorite Production: silicon metal, fluorspar, magnesite, tungsten	No specific Mineral policy in place at national level	-	-	Mineral Resources Planning of Andalusia 2010–2013 (PORMIAN)
 Sweden	Potential: natural graphite, PGMs, REE, cobalt, tungsten, antimony, fluorite, phosphate, Production: -	National mineral strategy (<i>Regeringskansliet 2013</i>)	Yes, CRMs mentioned.	Unknown.	-
 United Kingdom	Potential: fluorite, phosphate Production: fluorspar, tungsten (mined),	Resource Security Action Plan (2012) ²⁰	Yes, CRMs mentioned and core focus.	Unknown.	-

Source: based on Table 2 (Annex)

¹⁹ Germanium oxide was produced at Asturiana de Zinc (now part of Glencore, formerly of Xstrata Zinc) from zinc concentrate until 2013 when the process scheme at the San Juan de Nieva plant was shut down.

²⁰ Department for Environment, Food and Rural Affairs (2012a): Resource Security Action Plan: Making the most of valuable materials. Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69511/pb13719-resourcesecurity-action-plan.pdf

It might not be a surprise to see the increasing number of Member States with mining policies. We suggest that this is based on the strong influence of the EU raw materials policy (cp. D7.1); nearly all mining policies are issued after 2008 (EU Raw Materials Initiative). And we also suggest that such policies were promoted by the increased GDP development (after the 2008 crisis) i.e. enabling the decision makers to design mining policies in order to decrease the imports and to increase the added value of its mining potential. For instance, Bulgaria's National Strategy for the Development of the Mining Industry 2030 argues: *"The implementation of general and specific strategic goals of Bulgarian's mining strategy will create prerequisites and guarantees for sustainable development of the mining industry in Bulgaria in accordance with the EU raw materials initiative, and a uniform and clear government policy on mineral resources of the country"*.

Policies and strategies focused on secondary minerals are less frequent, and only the following 7 countries have them in place:

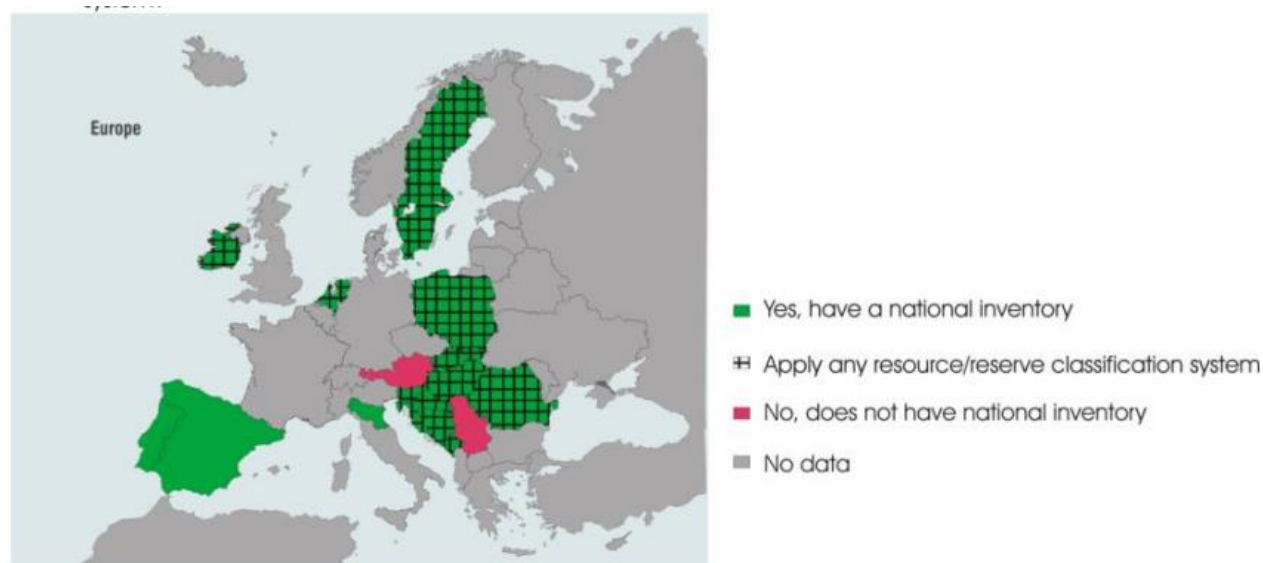
- Austria Resource efficiency action plan (REAP) (2012)
- Belgium "Sustainable Materials Management Strategy" (2012)
- Czech Republic Secondary raw materials policy (2016)
- Denmark Denmark without waste. Recycle more – incinerate less (2013)
- Germany German Resource Efficiency Program "ProgRes" (2012)
- Ireland "Towards a Resource Efficient Ireland" (2014) and Roadmap for a National Resource Efficiency Plan for Ireland (2014)
- United Kingdom Resource Security Action Plan (2012)

8 years have now passed since the first publication of the CRM list by the EC in 2010. If the focus is set on CRMs, we can only identify some examples of countries where CRMs are specifically included in the mining policies/strategies (leading to concrete policy actions), i.e. Austria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Netherlands, Romania, Sweden and the UK. However, the level of focus differs among these countries: in the case of the UK Resource Security Action Plan CRMs are in the core focus, whereas in the cases of Germany or Finland CRMs are mentioned, but are not in focus.

It is striking that countries with a large CRM potential such as Italy, Poland, Portugal or Spain do not have dedicated policies or strategies focused on promoting (as a priority) the domestic extraction or recycling of such minerals.

On the other hand, the question of mineral planning policy arises: in terms of CRM inventory policy and CRM / MDoPI policies (land use planning). The geographical distribution of the presence of mineral inventory analysis in European countries is shown in Figure 2 (compare also, EGS: map of CRM deposits in Europe by Cassard et al 2016).

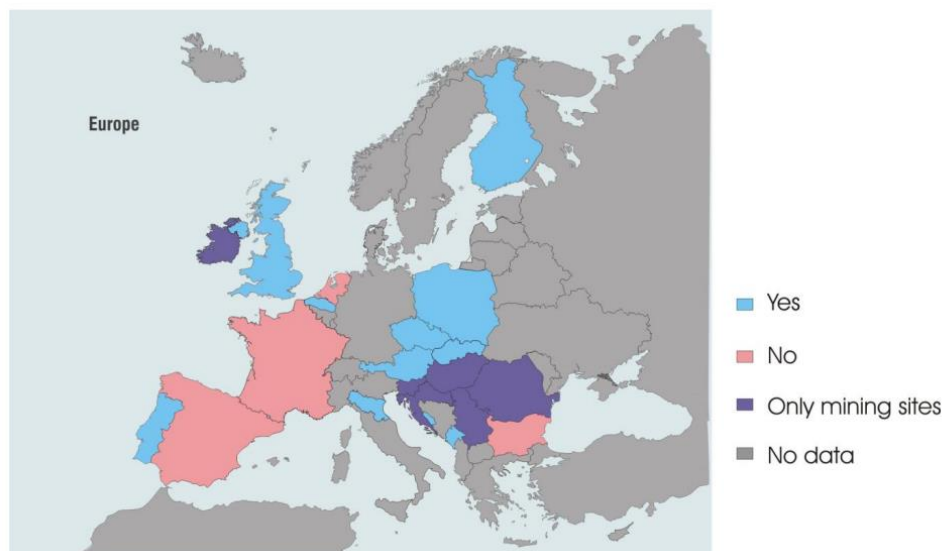
Figure 2: Mineral inventory analysis in Europe (Source: Horváth et al., 2016)²¹



A consequent implementation of mineral resources identified as having mineral potential into land use plans (LUP) is not always present as the Figure 3 is illustrating. There are countries which implement into LUP only active mines (Ireland, Hungary, Italy, Slovenia, Croatia, and Romania). Others have some kind of determination of mineral resources in LUP also for potential areas or resources identified by exploration (e.g. Czech Republic and Slovakia).

²¹ Note: the issue with reporting standards (e.g. PERC), it is important to know in a standard way the geological potential of CRMs in deposits around EU; therefore a connection to the chapter 'standards' is given.

Figure 3: Land use planning policies covering mineral resources in Europe
(Source: Horváth et al., 2016)



MSs are identifying their mining potential (digital geological knowledge base), however, there are not too many actions for the protection or safeguarding of deposits as recommended by the Commission (European Commission, 2011) and the Ad Hoc Working Group (Ad-Hoc Working Group of the RMSG, 2010) based on “a digital geological knowledge base; a transparent methodology (e.g. GIS application) for identification of mineral resources (quality, quantity, local importance); long-term estimates for regional and local demand taking into account of recycled materials; identifying and safeguarding mineral resources to meet minimum demand, taking account land uses.

According to the results of MINATURA 2020 project, 10 countries (and Emilia-Romagna Region in Italy) were identified as having some kind of concept of mineral safeguarding (Austria, Czech Republic, Denmark, Emilia-Romagna Region (Italy), Hungary, Poland, Portugal, Slovakia, Slovenia, Sweden and United Kingdom) (Source: Horváth et al., 2016). Austria might be one of those countries having a full national and regional / local planning approach; (planning hierarchy principle) for minerals i.e. the AUT MINPLAN which is based on GIS application. Other countries, like Sweden, Portugal, UK are also advancing (Tieess & Murguía, 2016). Austria is also one of the few countries considering CRMs in its Austrian mineral resources plan (2012).

Apart from that, most of the mining policies are focusing on the domestic mining part but not on the import (and export) of CRMs including the value chain (so called minerals consumption approach, see above / chapter 2). Most likely, only Austria and the Netherlands. In the case of Austria, the value chain is partly also considered (example

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REE/Treibacher²²) via the Austrian Raw Materials Allianz²³. The Austrian Federal Ministry of Science, Research and Economy founded in 2012 the Raw Material Alliance, which is acting as a discussion platform of stakeholders interested in improvements of raw material supply. The "Austrian Raw Material Alliance" is acting as a mirror committee of the European Innovation Partnership on Raw Materials. The overarching objective of this platform is the reduction of import dependency and increasing the supply security of raw material important for the Austrian economy. An initial focus has been placed on identifying strategies to increase recovery of critical raw materials (critical for the Austrian economy) out of waste²⁴.

In this regard, we can identify relevant gaps/barriers, which also are affecting the regulatory framework (see below). No concrete CRM policies, means also less input in the regulatory mining framework (see below). For instance, no concrete CRM exploration policies/provisions (e.g. giving a kind of priority), which could support a company or facilitate the MDoPI / CRM protecting (i.e. CRM protecting based on LUP). The Finnish and Sweden minerals strategy take CRM into account; Sweden: minerals of national interest. Moreover, nearly no concrete CRM minerals planning policies (cp. chapter 2 as required by the EC) have been identified.

Concerning CRMs substitution, it is one of the least advanced aspects within the EU Raw Materials Initiative (within the 3rd pillar of resource efficiency), and one of the least present in the policies or strategies of EU MSs. A recent report by the CRM_InnoNet project found that no EU Member State strategy addresses CRM substitution as its primary goal. Only, France and Germany, and, to some extent, the Netherlands and the UK, have issued strategies covering CRM substitution, primarily economically driven, reflecting the degree of the countries' dependence, determined by the importance of their local manufacturing or high-tech industry and/or the level of CRM imports. Countries, which appear to be less dependent, either because of domestic reserves or because of low industry dependence, often do not target CRM substitution in their strategies (Calleja et al., 2015). As recently communicated by KTN-UK to MinPol, the situation described in the 2015 report has not changed significantly.

Finally, the issue of raw material prices needs to be mentioned. Even though no mineral policy was identified for Italy, the ECODOM Consortium (Household appliance recovery and recycling consortium) is applying a "price compensation mechanism" to resolve low

²² Treibacher: Austrian company, see below, chapter: selected European CRM companies.

²³ <https://www.en.bmdw.gv.at/Energy/AUSTRIANMINERALSTRATEGY/Seiten/default.aspx>

²⁴ In three rounds of talks so far, a package was put to practical recommendations for the achievement of objectives. These recommendations for action to improve the framework conditions of R & D and regulatory framework should be subsequently implemented. Implementation of resource-related issues in a research program called "Production of the Future" is already fixed.

scrap prices. An economic problem that affects recycling companies are prices of raw materials: when primary raw materials are cheap, alternative (good quality) secondary materials cannot compete. Thus, in Italy, there exists a price compensation mechanism applied by ECODOM. In the contracts with the treatment providers, Ecodom has introduced an indexing mechanism linked to the market value of the secondary raw materials: when this value rises, the Consortium pays to suppliers a lower amount; when the value goes down, the Consortium thus recognizes its suppliers a higher amount. The purpose of this mechanism, which allows processors to count on total revenues (sum of the amount paid by Ecodom and revenues from secondary raw materials sales), is to ensure that these suppliers maintain a high quality standard, even in unfavorable market situations. This form of “fair compensation” was particularly useful in the second half of 2015, when the value of secondary raw materials (in particular iron and plastic) hit a real collapse. Despite its advantages, it is not used by any other System Collective in Italy (Interview Ing. Tursini 2016).

4 MAPPING AND ANALYSIS OF CRM REGULATORY FRAMEWORKS ALONG THE VALUE CHAIN

4.1 PRIMARY CRM

From the comprehensive mapping in the Annex we can state that mining laws (ML), in general, are the legal basics for mining in MSs.

But, as shown in Table 4 (Annex), no ML is allocating CRM as special group i.e. is allocating special rules for exploration/extraction/processing of CRMs (as well special roles with respect to the environmental law). The ML are allocating general roles for mineral resources i.e. how to explore/extract minerals. Comparing with the published mining policies (see above, Table I) in recent years, and the timeframe of EU CRM policies (2010/2014), neither the mining policies seem to significantly consider the EU-CRM findings/results nor the last amendment of the MLs (here one reason certainly, is the CRM policy lacking in the NMPF). This can be considered as a gap / barrier hampering companies from investing in exploration and extraction of primary CRMs in European countries. Companies, especially CRM ones, need investment security before evaluating and risking large investments.

However, it would be important to allocate CRMs more specific (legislative) roles –as well the environmental legislative context needs to be taken into account - in order to increase the weight/importance, especially **if a MS offers CRM mining potential**. Especially, the REE are a good example, having radioactive potential, means a careful mining/environmental management is necessary (cp ERECON findings) but also the necessary of investment security is critical.

We would like to stress the **Norra Kärr project in Sweden** (involved in the H2020 EURARE project). Norra Kärr is a globally significant heavy REE deposit in Sweden, with a particular enrichment of the magnetic metals dysprosium (Dy) and neodymium (Nd). Vancouver, Canada – Leading Edge Materials Corp. (“Leading Edge Materials”) is 100% owner of the Norra Kärr heavy rare earth element (“REE”) project. Preparation of *additional* supporting documentation regarding the Norra Kärr Mining Lease, (which *already* was granted in 2013) is anticipated to be ready for *submission* to the Swedish Mining Inspectorate during December 2017²⁵. Company’s expectations regarding the Norra Kärr project is that the company has yet to generate a profit from its activities; there can be no guarantee that the estimates of quantities or qualities of minerals disclosed in the company’s public record will be economically recoverable; uncertainties relating to the availability and

²⁵ <http://leadingedgematerials.com/leading-edge-materials-provides-update-on-process-development-for-the-norra-karr-ree-project-sweden/>

costs of financing needed in the future; competition with other companies within the mining industry; the success of the Company is largely dependent i.a. upon the changes in world metal markets and equity markets; mineral resources are, in the large part, estimates and no assurance can be given that the anticipated tonnages and grades will be achieved; production rates and capital and other costs may vary significantly from estimates; changes in unexpected geological conditions; and delays in obtaining or failure to obtain necessary permits and approvals from government authorities²⁶.

4.2 SECONDARY CRM

Secondary CRM relevant law was mapped in the annex. Table 4 (Annex) provides a comprehensive mapping of secondary relevant CRM legislation. In fact, MSs implemented the EU Directives (described in Annex 9.2) i.e. MS are implementing relevant EU law into national law, for example Mining Waste Directive (secondary waste considered as ‘raw material’ in the national legislation).

Apart from that, secondary CRMs - in general - can be seen as “covered”, but they are not explicitly included/described in the legislation nor does the legislation favour their recovery. In other words, the legislation does not specifically target CRMs as a special focus on which resource efficiency should be set.

Besides we cannot argue that there exists a non-level playing field for primary and secondary CRMs because the system is structured according to the principles of a linear economy i.e. is there seems not be a value chain approach in the legislation. In this sense we can compare the results of the EEA report “More from less – material resource efficiency in Europe” (2016). Only some countries are providing a resource efficiency plan, i.e. considering concrete policies like Austria (see also Table I above, Austria/REAP 2012). Austrian’s REAP clearly is mentioning “*there is much interest in developing a policy on the recycling of critical materials. Due to their low concentration in products and wastes (however) this has not yet succeeded*” (European Environment Agency, 2016) (Country profile Austria, p8). The latter (no success due to their low concentration in products and wastes,) can be seen as barrier i.e. hindering a more efficiency re-use or recycling of secondary CRMs.

Certainly, in reality (apart from implementing the WEEE-Directive in national law), there is a general lack of a level playing field in the WEEE recycling sector; hindering a more efficiency re-use or recycling of secondary CRMs. Focusing again on the Italian example, we can observe that there is a lack of a level playing field in the WEEE recycling sector, with “parallel flows” (illegal flows) undermining fair competition. According to the information of

²⁶ <http://leadingedgematerials.com/leading-edge-materials-provides-update-on-process-development-for-the-norra-karr-ree-project-sweden/>

our Italian partner ECODOM, the demand for secondary raw materials needs to grow, encouraging the manufacturing industry to buy with fiscal mechanisms. The Extended Producers' Responsibility (EPR) is an effective and efficient tool for a transition to the circular economy, provided that legislation allows the obliged parties (the Producers) to effectively manage their own chain, in a non-monopoly environment ("Fair competition environment"). To that end, it is imperative to intervene before the legislator (by introducing some "minimum operating requirements") and then by control bodies (through a rigorous system of qualification of Collective Systems and verification of their work), for avoiding the excessive proliferation of EPR systems (as unfortunately happened in the case of the WEEE) and the persistence of anachronistic and expensive monopoly situations.

A success factor, as in several European countries (including Italy), is that producers have set up a "multi-consortium" system, in which several Collective Systems operate in competition with each other, generally under the coordination of an authority (in Italy, the WEEE Coordination Center). This has led to a constant search for efficiency, with a continuous decrease in costs. However, the WEEE system is a shared responsibility system: the law has assigned the first ring of the chain - the collection phase - not to Collective Systems, but to Local Authorities and Electrical and Electronic Equipment Distributors. From these two actors, therefore, the quantitative results depend: Collective Systems can only handle the quantities of WEEE that the subjects responsible for the collection submit to them. (Interview Ing. Tursini 2016)

In the case of Italy the weakness in the system lies in the collection: a study carried out in 2012 on behalf of ECODOM by the United Nations University, in collaboration with IPSOS and the Politecnico di Milano, estimated the amount of WEEE that every Italian citizen discards per year: there are 9 - 10 kg for each inhabitant whose traces are lost. It is an impressive amount (500,000 to 600,000 tonnes per year) of WEEE, which are subjected to "simplified" processing processes (to use an euphemism): processes that often add WEEE to other types of waste (scrap metal, cars) and focus on the second most profitable (and simpler to extract) raw materials without treating pollutants. This phenomenon of "parallel flows", as well as heavy environmental impacts, also has significant economic consequences: the WEEE recycling industry, the virtuous one, working with Collective Systems and using high quality standards, only manages 250,000 tonnes of WEEE per year. If it could deal with all flows (that is three times higher than the current ones) it could be a much more competitive industry, able to make the investments needed to obtain better results in terms of secondary raw material recycling (Interview Ing. Tursini 2016, ECODOM president).

The other weak point in the Italian WEEE system is the legislation, which unfortunately is still incomplete: three years after the entry into force of Legislative Decree No. 49/2014 (WEEE Decree), many implementing decrees are still missing (despite the mandate that they

should be implemented within the first six months after entry into force). Among these, of importance is the decree on the quality of the treatment. This decree is essential to prevent the granting of authorizations to handle WEEE to subjects who do not use environmentally friendly processes, thus ensuring a level playing field.

Again, focused on Italy, another important decree is that on the statute-type to which the Collective Systems will have to adapt. In this respect, ECODOM intends that the State merely gives some guidelines and prescribes indispensable control systems such as a board of statutory auditors, independent auditing firm, organizational model e.g. Legislative Decree 231/2001, without interfering with the way in which private individuals, i.e. EEE producers, decide to group into private law entities such as Collective Systems. Other important decrees are the Financial Guarantee Decree that the producers should provide whenever a new EEE enters the market (according to ECODOM, they hope that the Ministry will not introduce additional burdens on producers, useless in a system that, like domestic WEEE, works with the generational model in which producers present on the market in a given year must finance the management of all WEEE generated in the same year) and the Decree on how to perform "a counter-zero" withdrawal of small-scale WEEE by the distributors (according to ECODOM, they hope that unnecessary formal complications will not be introduced, as was the case in the "one against zero" withdrawal decree, because bureaucracy discourages virtuous behaviors).

A huge problem are the "parallel" or "illegal" flows (unfair competition, lack of level playing field): In fact, it is difficult to "make business" (i.e. to build sustainable business models over time) without a defined and stable regulatory framework. It becomes almost impossible if regulatory uncertainty allows (rather, favors) the existence of a "parallel market", which takes advantage of this uncertainty (letter of ECODOM president). The continuing lack of implementing decrees (in particular that on the quality of treatment) favors the interception of WEEE by individuals using "simplified" processing processes, which target the second most profitable (and simple to extract) commodities without treating pollutants, and therefore have much lower costs than those using high quality standards.

What is needed in Italy: some ideas, especially those contained in the proposal for the amendment of the Waste Directive, are interesting: for example, I refer to the hypothesis of introducing "minimum operating requirements" for the Management Systems set up by the Producers; This is a particularly felt need in Italy with regard to WEEE, because there are currently 16 Collective Systems, very heterogeneous among them not only in terms of size but also in terms of company purpose and composition. As is already the case in other countries (for example in France), a rigorous system of qualification of the Collective Systems should be set up and their activities checked to ensure that those subjects (which, as the Commission says, are "... essential part of Efficient waste management ") carry out

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their business in an efficient and environmentally sound manner and can play a role in the transition to a Circular Economy (Interview Ing. Tursini 2016).

5 MAPPING AND ANALYSIS OF CRM VOLUNTARY STANDARDS ALONG THE VALUE CHAIN

A voluntary standard is a document adopted by consensus and approved by a recognized body that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context. As defined in Regulation 1025/2012/EU on European standardisation, a voluntary standard is a technical specification, approved by a recognised standardisation body, for repeated or continuous application, with which compliance is not compulsory. Voluntary standards make things work. They give world-class specifications for products, services and systems, to ensure quality, safety and efficiency. They are instrumental in facilitating national, regional, European and international trade.

Standards may also be adopted on other bases, e.g. branch standards and company standards. Such standards may have a geographical impact covering several countries.

5.1 PRIMARY CRMS

AFNOR has undertaken a first comprehensive literature review of standards at National, European and international levels (see Annex). The objective of this task was to **identify relevant CRM-specific standards**.

AFNOR identified standards (published and under development/revision) useful for the SCRREEN project. These standards are elaborated at European (CEN and CENELEC) and international (ISO and IEC) levels, and few ones developed at national levels. Branch standards and company standards were also considered. This scoping standards presented the relevant documents in link with the critical raw materials firstly on the value chain of the primary CRM: mining; exploration stages; extraction; transportation; Production or transformation of ores. Others aspects should be considered in a second part: Social responsibility; Environmental aspects. Others documents developed and approved by only one kind of stakeholders are not considered as standards. Meanwhile, guidelines, principles and initiatives could be considered of interest.

AFNOR has found few specific standards dedicated to CRM in particular ISO standards. ISO created in 2016 a technical committee, ISO/TC 298 Rare Earth, dedicated to the standardization in the field of rare earth mining, concentration, extraction, separation and conversion to useful rare earth compounds/materials (including oxides, salts, metals, master alloys, etc.) which are key inputs to manufacturing and further production process in a safe and environmentally sustainable manner. No standard is published today. ISO/TC 45, is in

charge of the standardisation of methods for testing and analysis of raw materials for use in the rubber industry, including:

- latex;
- natural rubber, chemically modified natural rubber;
- synthetic and reclaim rubber, vulcanized crumb rubber;
- carbon black, silica and other fillers;
- rubber compounding ingredients.

ISO/TC 79/SC 5 is developing standards on magnesium and alloys of cast or wrought magnesium but the majority of its standards are analysis methods (see Table 5 in Annex).

AFNOR continued the standard literature review, and developed a list of standards and of standardization works under development **relevant for the SCRREEN** project. The published standards are not dedicated to primary CRM but include this thematic. This list is available in annex 9.3. AFNOR identified standards and standardization initiative relevant for SCRREEN project on the following topics:

- Terminology;
- Sampling;
- Measurement and characterisation of CRM in raw materials as trace elements;
- Horizontal standards. In this topic, standards on reference materials, management systems (environment, quality, societal responsibility, occupational health and safety) have been identified.

5.2 SECONDARY CRMS

Few voluntary standards are existing for secondary raw materials. Considering the value chain of primary raw materials, there are only 2 ways to collect CRMs and to prepare secondary raw materials:

- Machining
- End of life of a product

Existing voluntary standards were developed for their sector or to support a regulation. At European level, we are facing a void in terms of the organization of the collection of CRM and the characterisation of their properties as secondary CRMs are not standardized. Future standardization works could be based on works performed for other raw materials such as aluminium and copper. A main barrier is the separation between a secondary raw material and wastes. A clarification and a better distinction should be provided in order to improve the collection and valorization of such raw materials.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730227

At European level, voluntary standardization works are under development by CEN/CLC/JTC 10 Energy-related products - Material Efficiency Aspects for Ecodesign, in particular in terms of terminology, durability, upgradability, ability to repair, facilitate re-use, use or re-used components, ability to re-manufacture, recyclability, recoverability, recycling, use of recycled materials, documentation and/or marking regarding information relating to material efficiency of the product. The program of works are available in 9.3.2. No standard is published as the works began in August 2017.

Of interest is, for instance, the (under development) prEN 45558 standard (General method to declare the use of critical raw materials in energy related products), a European Standard that specifies the basis for definition of a procedure, content and form relating to declarations on the use of CRMs in energy-related products. The main intended use of this European Standard is to provide a means for which information on the use of CRMs can be exchanged up and down the supply chain that allows organizations, i.e., to assess energy-related products against the use of CRMs and to answer to compliance requirements in European legislation

CEN SABE (Strategic Advisory Body on Environment) is a body that advises the CEN (European Committee for Standardization) Technical Board on issues related to environment. Stakeholders identify environmental issues of importance to the standardization system and propose ways in which to respond. This committee is studying the best manner to address environmental aspects as recycling, circular economy in the European standardization.

6 Selected companies' policies on CRMs

EU Member States (respectively European) have potential in discovering new or developing already discovered mineral deposits of CRMs. EuroGeoSurveys recently published a map of CRM deposits in Europe, which illustrates the distribution of mineral potential of CRM in individual EU member states²⁷. Various companies along the CRM value chain can be found in Table 7 (Annex) (European Companies active in the CRM value chain).

A comprehensive mapping was done in the Annex (9.4). We identified in the upstream market: 5 companies / Exploration; 17 companies/ extraction; smelting, refining, concentration: 4; trading: 11. Downstream market: manufacturing: 5; completion for consumption: 14; recycling: 5. At a first sight we can see the relative low number of exploration and recycling companies. Most of the part is allocated to extraction; smelting, refining, concentration. There seems a certain balance between up- and downstream market. However, exploration and mining might be the lowest part.

It is important to take into account the ownership i.e. to differ between European and foreign companies. For instance, exploration of REE, cobalt by Leading Edge Material Corp. (Canadian company), exploration of lithium by Rio Tinto in Serbia, exploration of boron by Erin Ventures (Canadian company), exploration by New Age Exploration Limited (Australian company), exploration of tungsten by Almonty Industries (Canadian company). In the following, selected companies will be discussed (selection in terms of best practices, issues etc.).

When comparing the extensive mapping of mineral vs company policies we believe that in general the company policies / value chain is neither connected with the NMPF, or only partly. Examples like the AUT Raw Material Alliance and the German Raw Materials Alliance are exemptions (the latter does not exist anymore as it went bankrupt) The reason for this is different: first mining policies are not considering/allocating specific CRM roles (this would require a connection with the value chain because of the specific CRM features); second, mining policies are not considering the Mineral Consumption Analysis approach (cp chapter 2). Finally, a mineral policy would need to take into account the (specific features of CRM respectively the) value chain²⁸ as well corporate goals and strategie.

In the following some example from different MSs (see annex) are given:

Treibacher Industrie AG / Austria: for instance, is using separated Rare Earth compounds as raw material for further value adding. Treibacher AG has an ISO 9001 (quality management

²⁷ Bertrand G, Cassard D, Arvanitidis N, Stanley G (2016) Map of Critical Raw Material Deposits in Europe. Energy Procedia 97:44-50. doi: 10.1016/j.egypro.2016.10.016

²⁸ Also discussed in: MICA Project's D5.1

standard) and ISO 14001 (environmental management certificate). Treibacher AG identifies a situation, where purchasing is done in an opportunistic way and not in a strategic way, competitive prices are the main point of decision. Another point, which is extremely critical, is the fact that the whole value chain is more and more moving to China and South East Asia. The market for separated products is becoming smaller in Europe and even steps of further value adding down the value chain are done in China or other countries of Asia (Tiess, 2014). (e.g. there is no market for NdMetal in Europe, customers purchasing already the Nd-Fe-B alloy and even the finished Magnets from China).

The separation plant La Rochelle plant in France is owned by **Solvay** (former Rhodia). The capacity of the plant is in the range of 8000-10000 tonnes per year. The plant is capable of separating both LREE and HREE (Tiess, 2014). Solvay also produces recycled REE (cp D7.1).

Norra Kärr heavy REE deposit was explored in Sweden by **Leading Edge Materials Corp**²⁹, the same company also holds prospecting licence for two cobalt projects in Finland (Kontio) and Sweden (Vena). For Norra Kärr, the schedule projects production start-up was prognosed for early 2017 but this was strongly dependent on how long time the environmental permitting procedure will take and also on the ability to finance the further development of the project. In TasmanMetals PEA (Preliminary Economic Assessment) study published in May 2012, it was projected that by mining 1.5 Mt a year (mineral resource base of 59 Mt) with a 80% total recovery the output of three of the most “critical” REOs (Y, Dy and Tb) would correspond to a large percent of the current demand. As mentioned in D7.1, TasmanMetals did not get the mining permit; as mentioned above, submission to the Swedish Mining Inspectorate was planned during December 2017.

In the UK, Cornwall, the Wolf Minerals Limited is about to start production at the Drakelands Mine at **Hamerdon** tin-tungsten deposit³⁰.

Wolfram Bergbau- und Hüttengesellschaft is delivering best practices in operation of mining and recycling of tungsten.

Silmet plant in Estonia is owned by **Molycorp SILMET AS** <http://www.molycorp.com/about-us/our-facilities/molycorp-silmet/>. Capacity of about 3000-4000 mt/year of only LREEs. Being the part of international corporation Silmet believes that EU is the most expensive place to produce the REE (energy prices, fresh waterconsumption,

²⁹ Leading Edge Materials Corp (2017) Norra Karr Mine. In: Leading Edge Materials Corp. <http://leadingedgematerials.com/norra-karr/>. Accessed 04 Aug. 2017

³⁰ Wolf Minerals Limited (2017) Drakelands Mine. In: Wolf Minerals Limited. <http://www.wolfminerals.com.au/irm/content/drakelands-mine.aspx?RID=324&RedirectCount=1>. Accessed 04 Aug. 2017

environmental regulations), but price of their end products is the main reason for their customers to buy materials from China, despite the customer taxes and export quotas.

Silmet have heard most of from their customers saying how happy they are that Silmet produces in the EU, as if they cannot have the Chinese material they can buy their products. But it is very expensive to run here industry only for the case if customers cannot get Chinese product and at the same time beat the price (Tiess, 2014). Silmet believes EU-research should work on the direction how to recycle the separation process waste solutions to turn them to the market products (main technology is now to produce the Ammonium Nitrate fertilizers, but it is not profitable at all), how to decrease the energy and water consumption, how to re-use these resources and get the maximum benefit of them.

Problem for producers is Cerium – if one produces LREE then always 60-65% are produced as Cecomponents, which is the cheapest product – thus, most important question: how to turn it high volume high margin product? (usually, these products are automotive catalysts, glass polishing materials etc, but could also be water treatment chemicals, LED lightsetc.)

Moreover the problem is that all these areas are already covered by cheaper and more available materials-used in parallel – so new applications for Cecomponents are key elements for Silmet. To develop some idea show to keep the REE technological and applications knowhow more EU centralized, as Silmet knows most of the big EU producers have offices in EU but production units are in Asia – so lot of technologies and applications which are developed in EU by companies or Universities moving to Asia for production and will be copied by several of Asian companies who will not fulfil the IP requirements (Tiess, 2014).

UMICORE and GRAMET is delivering best practices in operation of recycling of different CRMs.

7 CONCLUSIONS

The European Commission asked EU Member States to establish and update regularly their national minerals policy (European Commission, 2011) with a special focus on CRM (European Commission, 2014, 2010; European Commission et al., 2017). It is the responsibility of MSs to create their national mineral policy framework (MPF). Any MPF should consider appropriate CRM policies equally for primary and secondary minerals, and in a best case scenario, integrating both types of minerals to facilitate the domestic/foreign CRM companies doing business along the value chain.

Compared with the comprehensive and regularly updated EU raw materials policy, the situation around MSs is diverse. While a majority of MSs has some kind of mineral policy or strategy in place to manage the exploration, extraction, beneficiation and trading of primary minerals, still a minority of MSs have policies or strategies focused on secondary raw materials (resource efficiency action plans). In relation to CRMs, already 8 years after the publication of the first CRM list in 2010, only a minority of MSs mention or include CRMs in the core focus of their policies. In other words, CRMs are usually (and still) not in focus for many MSs. Furthermore, it is a salient fact that countries with a large CRM potential such as Italy, Poland, Portugal or Spain do not have dedicated national policies or strategies focused on promoting the domestic extraction (e.g. safeguarding via land use planning, e.g. approach of mineral deposits of public importance) or the recycling of such minerals.

With regards to substitution of CRMs (and other minerals), it is not a priority in any of the mineral policies or strategies of MSs. Only Germany and France, and to some extent the Netherlands and the UK, have issued strategies covering CRM substitution.

Apart from that it is strongly recommended that a paradigm change should be envisaged, i.e. to include the value chain in the NMPF. In this sense, it is important to make a distinction between a *mining policy* and a *minerals policy*. The *minerals policy* takes the mineral consumption approach into account, and strives for an integrated planning of the mineral resources available within a country's territory (both primary and secondary). At this stage, it seems that the MSs are not considering this approach, and have separate policies to address primary and secondary (if such policies exist). However, the CRM value chain (up-/downstream) reflects the mineral consumption approach (production of CRM = domestic extraction + imports minus exports). To satisfy the CRM demand of any MS economy the CRM value chain needs to be taken into account with the whole picture, i.e. we believe that any NMPF should make a smart integration of CRMs along the value chain as well take corporate policies and strategies into account.

In the case of regulatory frameworks, CRMs are also not appearing as a priority or special focus in the national mining laws which regulate primary minerals. Considering secondary minerals, Member States are being led by EU legislation (via transposition) towards the inclusion of resource efficiency and recovery of minerals as a topic of increasing importance, including specific legislation on objects which contain potentially recoverable CRMs such as used batteries, automobiles, WEEE. Yet, much progress is still required as CRMs also do not appear as a topic of special importance or focus in the national legislation.

With regards to voluntary standards, there are few standards dedicated specifically to primary CRMs, and these are international ISO standards. There exist other standards not dedicated to CRMs but which include the thematic and are applicable, e.g. on terminology, sampling techniques, measurement and characterisation of CRM as trace elements in raw materials, and horizontal standards (environmental management, social responsibility). Likewise few voluntary standards exist for secondary raw materials (developed under m518 mandate), and some are under development (under m543 mandate). At European level, we are facing a void in terms of the organization of the collection of CRM; the characterisation of their properties as secondary CRMs are not standardized. A main barrier is the separation between a secondary raw material and wastes. A clarification and a better distinction should be provided in order to improve the collect and the valorization of such raw materials.

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9 ANNEX (INVENTORY)

9.1 NATIONAL AND REGIONAL POLICIES, STRATEGIES AND INITIATIVES RELATED TO CRMS

Table 2 : National/Regional policies, strategies and initiatives with and without CRM relevance

Country	Policy or Strategy Name	Link to CRM	Year	Focus / Aim
Austria	Austrian Minerals strategy	CRMs not mentioned specifically. General policy.	2012	Goal to secure the supply of mineral raw materials for the Austrian economy. ³¹
Austria	Resource efficiency action plan (REAP)	CRMs are mentioned. General policy. Securing supply and resource efficiency.	2012	REAP objective is to ensure a sustainable resource supply, to increase innovativeness, and to support the creation of “green jobs”. ³²
Austria	NSTRAT	CRMs not mentioned specifically. General policy. Sustainable development.	2002	The sustainable development strategy by the Austrian federal government. While it makes a link to raw materials, CRM are not mentioned. ³³
Austria	Austrian raw materials plan (“Rohstoffplan”) (AUTMINPLAN)	CRMs are mentioned. General policy. Land use planning, resource efficiency.	2012	it is focusing on mapping and evaluating different regions of raw material supply in Austria. The vision is to use as little as possible of the resources, to use them as efficient as possible, and – at least for the Austrian mining sector – to use existing mines and do not destroy intact landscapes. ³⁴
Austria	Raw materials security 2020+ (“Rohstoffsicherheit 2020+”)	CRMs not mentioned specifically. General policy. Supply security	2012	It discusses various means (among others use efficiency, recycling and to a smaller degree also substitution) to achieve this aim in a sustainable way. ³⁵
Austria	Strategy for research, technology and innovation	CRMs not mentioned specifically. General policy. Innovation.	2011	Promote research, technology and innovation to make Austria an innovation leader. ³⁶
Austria	Austrian Spatial Development Concept (OEREK 2011)	CRMs not mentioned specifically. Mentions the Austrian MINPLAN.	2011	Spatial development in general. ³⁷
Belgium	New Industrial Policy (“NIB”)	CRMs not mentioned specifically. Indirect connection to raw	2010	

³¹ The Austrian Minerals Strategy. <https://www.en.bmdw.gv.at/Energy/AUSTRIANMINERALSSSTRATEGY/Seiten/default.aspx>

³² More from less — material resource efficiency in Europe: 2015 overview of policies, instruments and targets in 32 countries. Country Profile: Austria. European Environment Agency

³³ NSTRAT Strategie des Bundes. <https://www.nachhaltigkeit.at/nstrat>

³⁴ Der Österreichische Rohstoffplan. <https://www.bmwf.gv.at/EnergieUndBergbau/Rohstoffplan/Seiten/default.aspx>

³⁵ Rohstoffsicherheit 2020+ - Rohstoffe für eine ressourceneffiziente Industrie. <https://nachhaltigwirtschaften.at/de/e2050/publikationen/rohstoffsicherheit-2020-industrie.php>

³⁶ Strategy for research, technology and innovation of the Austrian Federal Government. https://era.gv.at/directory/158/attach/RTI_Strategy.pdf

³⁷ http://www.oerok.gv.at/fileadmin/Bilder/2.Reiter-Raum_u_Region/1.OEREK/OEREK_2011/Dokumente_OEREK_2011/OEREK_2011_EN_Downloadversion.pdf

Country	Policy or Strategy Name	Link to CRM	Year	Focus / Aim
Belgium	Sustainable Materials Management Strategy	materials. ³⁸ CRMs not mentioned specifically. General policy. Recycling, reducing environmental impact.	2012	Its main focus is to achieve the maximisation of secondary raw material use in production processes, and the minimisation of environmental impacts resulting from raw material mining and processing. ³⁹
Belgium	Environment and Energy Technology Innovation Platform	CRMs not mentioned specifically. General policy. Recycling, sustainable development	2005	Government supports companies and researchers to develop sustainable products and processes, where the used materials must be maximally re-usable or fit into a closed cycle. ⁴⁰
Belgium	4th Environmental Policy Plan (MINA 4) 2011-2015	CRMs not mentioned specifically. General policy. Reducing environmental impact, substitution, sustainable development	2010	The plan includes a series of objectives for 2015 on eco-efficiency, the consumption of materials, natural resources and energy, and the use of substitutes and renewable energy. ⁴¹
Bulgaria	The Bulgarian National Strategy for the Development of the Mining Industry 2030	CRMs not mentioned specifically. General policy. Sustainable development, fight against illegal extraction and trade.	2015	The realisation of the priorities included in the strategy will guarantee stable investment environment in one of the key sectors of the Bulgarian economy. Bulgaria will introduce an efficient system for control on the activities connected with the exploration, extraction and processing of the ores and minerals. One of the major accents in the strategy is the prevention of illegal extraction.
Cyprus	Committee for the Sustainable Development of Mineral Resources	CRMs not mentioned specifically. Committee gives out recommendations on mineral resources	---	Committee for the Sustainable Development of Mineral Resources. ⁴²
Czech Republic	New Raw Material Policy for Minerals and Their Resources - MPO 2017	CRMs mentioned. General policy. Sustainable development	2017	An update of the former raw materials policy of 1999 was elaborated with the ambition to develop a coherent strategy for the next 15 years that sets out the mining resources for both mineral and domestic resources. ⁴³
Czech Republic	Secondary raw materials policy of the Czech Republic	CRMs not mentioned specifically. General policy. Secondary raw materials, recycling	2016	The secondary raw materials policy of the CR is the first document of the Czech Republic creating a strategic framework for an effective use of secondary raw materials, which was developed and prepared

³⁸ Strategy for research, technology and innovation of the Austrian Federal Government. https://era.gv.at/directory/158/attach/RTI_Strategy.pdf

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Country	Policy or Strategy Name	Link to CRM	Year	Focus / Aim
				by various experts from academia, industry associations and other specialists. ⁴⁴
Czech Republic	Strategic framework for sustainable development	CRMs not mentioned specifically. General policy. Sustainable development	2010	To establish a consensual framework for the preparation of other materials of a conceptual nature (sectoral policies and action programmes) and is an important starting point for strategic decision-making within individual departments, for interdepartmental cooperation, and for collaboration with interest groups. ⁴⁵
Denmark	Kingdom of Denmark, Strategy for the Arctic 2011-2020	CRMs mentioned. General policy. Sustainable development, social development ⁴⁶	2011	The strategy gives an overview of critical minerals (those that are already critical according to the EU Raw Materials Supply Group and those that might be critical in the long term) and the mining opportunities for these in Greenland. ⁴⁷
Denmark	Danish strategy for sustainable development	CRMs and raw materials not mentioned. Sustainable development, green innovation	2009	Though CRMs and raw materials are not mentioned, the goals from this strategy heavily depends on CRMs. ⁴⁸
Denmark	Denmark without waste. Recycle more - incinerate less	CRMs mentioned. Waste reduction, recycling	2013	CRMs are mentioned in the section of electronic waste, neodymium is mentioned as an example, however the focus is on recycling. ⁴⁹
Denmark	Action plan for promoting eco-efficient technology 2010- 2011	CRMs not mentioned. Economic growth, social development	2010	Has no direct link to raw materials but states that many raw materials are in limited supply (might be referring to CRMs). ⁵⁰
Denmark	Raw materials Act (Råstofloven)	CRMs not mentioned specifically. General policy. Sustainable development, reducing environmental impact	2013	The Raw Materials Act has the purpose of making sure that supply and production of raw materials takes place in a natural and environmentally safe way. ⁵¹
Estonia	Sustainable Estonia 21	CRMs not mentioned specifically. General policy. Sustainable development	2005	It is a strategy for developing the Estonian state and society until the year 2030 with the aim of integrating the success requirements arising

⁴⁴ Secondary raw materials policy of the Czech Republic. <https://www.mpo.cz/en/industry/politics-of-secondary-raw-materials-czech-republic/secondary-raw-materials-policy-of-the-czech-republic--221854/>

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⁵¹ Råstofloven. <http://nmkn.dk/lovomraader/raastofloven/>

Country	Policy or Strategy Name	Link to CRM	Year	Focus / Aim
				from global competition with the principles of sustainable development and preservation of the traditional values of Estonia. ⁵²
Estonia	Estonian Environmental Strategy 2030	CRMs not mentioned specifically. General policy. Sustainable development, environmental protection	2007	Updated from the 1997 strategy and it now has more concrete and comprehensive objectives regarding environmentally sustainable extraction. ⁵³
Estonia	Estonia 2020	CRMs not mentioned specifically. General policy. Sustainable development, competitiveness	2012	Improving competitiveness and creating jobs according to EU's growth strategy "Europe 2020". ⁵⁴
Finland	Natural Resource Strategy	CRMs mentioned. General policy. Sustainable development, protection of environment	2009	This strategy aims at drawing up a long-term vision of well-being based on the sustainable use of natural resources. ⁵⁵
Finland	Finnish Minerals Strategy	CRMs mentioned. General policy. Economic growth, innovation, protection of environment, substitution, recycling	2010	The objectives of this strategy are to promote domestic growth and prosperity, to develop solutions for global mineral chain challenges and to mitigate environmental impacts. ⁵⁶
Finland	Arctic Region Strategy	CRMs mentioned. Policy related to development (broad range) of the arctic region of the country.	2013	The objectives are to secure sufficient resources for the health and well-being of the arctic population, to improve the working conditions and to promote the well-being at work of all workers in the challenging Arctic environment. ⁵⁷
France	The French national sustainability strategy 2010-2013	CRMs not mentioned specifically. General policy. Sustainable development, protection of environment	2010	Its aim is being in a leading position in the field of "Green Economy". ⁵⁸
France	Strategic metals plan	CRMs mentioned. General policy for metals. Supply, competitiveness, substitution	2010	The basic aim of this initiative is to secure the raw material supply and thereby contribute to promote the competitiveness of the

⁵² Estonian Ministry of the Environment (2005): Sustainable Estonia 21. Estonian National Strategy on Sustainable Development. Available online at http://www.envir.ee/sites/default/files/elfinder/article_files/se21_eng_web.pdf

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Country	Policy or Strategy Name	Link to CRM	Year	Focus / Aim
				French industry. In addition to CRMs, it also considers other metals as national specific importance. ⁵⁹
France	Committee for Strategic Metals (COMES)	This committee was set up to assist the Ministry of Industry to prepare and implement a national strategic policy for metals. ⁶⁰	2011	Committee for strategic metals bringing together all the stakeholders in France. The COMES mission is to improve information about the needs of industry in the area of strategic metals, to identify the most critical resources, bring up to date the mining inventory and re-launch mining exploration, on land and at sea.
Germany	Perspectives for Germany	CRMs not mentioned specifically. General policy. Economic development, industrial development, resource efficiency	2002	This strategy is very general and considers raw materials at a very aggregated level. ⁶¹
Germany	Raw materials strategy	CRMs mentioned. General policy. Supply, sustainable development, innovation, substitution	2010	The key goal of this strategy is to secure a sustainable supply of non-energetic mineral raw materials for the German economy. ⁶²
Germany	German Resource Efficiency Program "ProgRes"	CRMs mentioned. General policy. Sustainable development, environmental protection, substitution	2012	The strategy is mainly motivated by environmental concerns and aims to reach the ambitious target set in the general sustainability strategy from 2002 with respect to raw material productivity. ⁶³
Germany	Raw materials of strategic economic importance for high-tech made in Germany	CRMs mentioned. Policy for CRMs directly. Innovation, sustainable development, substitution	2012	To expand research, development and education along the value chain of non-energy mineral raw materials over the next five to ten years. ⁶⁴
Greece	The National Policy for the Strategic Planning and Exploitation of Mineral Resources 2012	CRMs mentioned. Axes include land use planning, modernization of legislation, promotion of dialogue and education.	2012	The policy must ensure that the supply of mineral raw materials to the society will be done in a sustainable financial way, which is in harmony with the national development policies of other sectors, the protection of the environment and the principles of sustainable development
Hungary	Action Plan on Mineral Resources Management and Utilization	CRMs mentioned. General policy. Sustainable development	2015	The Action Plan provides a review of all major mineral commodity groups available in the country, sets a list of priorities, a future vision, and some details on the implementation. ⁶⁵

⁵⁹ European Environmental Agency (2011): Survey of resource efficiency policies in EEA member and cooperating countries. Country Profile: France. Available online at <http://www.eea.europa.eu/themes/economy/resource-efficiency/france-2014-resource-efficiency-policies>

⁶⁰ Min-guide.eu. (2011). MIN-GUIDE. [online] Available at: <http://www.min-guide.eu/mineral-policy/policyel-strategy-and-governance-committee-strategic-metals-1865> [Accessed 10 Oct. 2017].

⁶¹ Bundesregierung, Die (2002): Perspektiven für Deutschland

⁶² Bundesministerium für Wirtschaft und Technologie (BMWi) (2010): Rohstoffstrategie der Bundesregierung. Sicherung einer nachhaltigen Rohstoffversorgung Deutschlands mit nicht-energetischen mineralischen Rohstoffen. Available online at <http://www.bmwi.de/Dateien/BMWi/PDF/rohstoffstrategie-der-bundesregierung>

⁶³ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (BMU) (2012): Deutsches Ressourceneffizienzprogramms (ProgRes)-Programm zur Nachhaltigen Nutzung und zum Schutz natürlicher Ressourcen, Beschluss des Bundeskabinetts 29.2. 2012. Available online at http://www.bmubund.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/progress_en_bf.pdf

⁶⁴ Bundesministerium für Bildung und Forschung (BMBF) (2012): Wirtschaftsstrategische Rohstoffe für den Hightech-Standort Deutschland. Forschungs- und Entwicklungsprogramm des BMBF für neue Rohstofftechnologien. Available online at http://www.fona.de/mediathek/pdf/Strategische_Rohstoffe_EN.pdf

Country	Policy or Strategy Name	Link to CRM	Year	Focus / Aim
Ireland	Our Sustainable Future: A Framework for Sustainable Development in Ireland	CRMs not mentioned specifically. General development policy. Sustainable development, social development	2012	To identify and prioritise policy areas and mechanisms where a sustainable development approach will add value and enable continuous improvement of quality of life for current and future generations and set out clear measures, responsibilities and timelines in an implementation plan. ⁶⁵
Ireland	Ireland's National Waste Prevention Programme	CRMs not mentioned specifically. General environmental policy. Reducing environmental impact, resource efficiency	2004	The overall objective of the NWPP is to establish an ambitious programme that delivers substantive results on waste prevention & minimisation across both hazardous & non-hazardous waste arising. ⁶⁷
Ireland	Towards a Resource Efficient Ireland. A National Strategy to 2020 incorporating Ireland's National Waste Prevention Programme	CRMs not mentioned specifically. Reducing environmental impact and resource efficiency.	2014	The overarching objective is to implement EU and national policy on resource efficiency to break the link between economic growth and environmental impact ⁶⁸ .
Ireland	Roadmap for a National Resource Efficiency Plan for Ireland	CRMs are only mentioned once, but not focused in the report. General policy report on improving resource efficiency (production), green public procurement, life cycling thinking and awareness raising	2014	The roadmap presents steps and actions necessary to improve resource efficiency in Ireland ⁶⁹
Latvia	National Environmental Policy Plan	CRMs not mentioned specifically. General environmental policy. Reducing environmental impact, resource efficiency, conservation, recycling, substitution	2004	The focus is on recycling, substitution, and use efficiency and resource conservation. ⁷⁰
Latvia	Environmental Protection Policy	CRMs not mentioned specifically. General environmental policy. Reducing environmental impact, resource efficiency	1998	Focused on use efficiency and corresponds to the European environmental protection trend. ⁷¹
Latvia	Environmental policy strategy 2009-2015	CRMs not mentioned specifically. General environmental policy. Reducing environmental impact, resource efficiency, sustainable development	2009	Targets at the sustainable use of natural resources. ⁷²
Lithuania	National sustainable development strategy	CRMs not mentioned specifically. General development policy. Reducing environmental impact, resource efficiency, sustainable	2003	Reduction of the environmental impact from the main branches of economy (transport, industry, energy, agriculture, housing and

⁶⁵ Ministry of National Development (2012): National Energy Strategy 2030. Available online at <http://2010-2014.kormany.hu/download/7/d7/70000/Hungarian%20Energy%20Strategy%202030.pdf>

⁶⁶ Department of the Environment, Community and Local Government (2012): Our Sustainable Future. A Framework for Sustainable Development in Ireland. Available online at <http://www.environ.ie/en/Environment/SustainableDevelopment/PublicationsDocuments/FileDownload,30452,en.pdf>

⁶⁷ Environmental Protection Agency (2004): National Waste Prevention Programme. Available online at <http://www.epa.ie/waste/nwpp>

⁶⁸ Environmental Protection Agency (2014): <http://www.epa.ie/pubs/reports/waste/prevention/TowardsAResourceEfficientIreland.pdf>

⁶⁹ Environmental Protection Agency (2014) http://www.epa.ie/pubs/reports/research/waste/Research_128_web.pdf

⁷⁰ Ministry of Environmental Protection and Regional Development of the Republic of Latvia. http://www.varam.gov.lv/eng/dokumenti/politikas_planosanas_dokumenti/?doc=3294

⁷¹ The Ministry of Environmental Protection and Regional Development: Environmental Protection Policy in Latvia. Available online at http://www.varam.gov.lv/eng/dokumenti/publikacijas/publications_in_the_field_of_environmental_protection/?doc=3288

⁷² Environmental Policy Strategy 2009–2015. Ministry of Environment Riga, 2009

Country	Policy or Strategy Name	Link to CRM	Year	Focus / Aim
		development		tourism). ⁷³
Lithuania	European Union structural assistance for 2007-2013	CRMs not mentioned specifically. General development policy connected to raw materials.	2006	It highlights the importance of raw material prices in general for Lithuania's production. Increasing raw material prices are perceived as a threat in the conducted SWOT analysis. ⁷⁴
Lithuania	State Strategy of Use of Underground Resources	Development strategy by exploiting mineral resources.	Under preparation	Aimed at ensuring the rational use of mineral resources and contribute to the country's modern economic creation. To achieve this objective, is expected that a change in the use of mineral resources legislation will be required. ⁷⁵
Lithuania	Innovation Development Programme 2014–2020	Economic development strategy using innovative technologies. Link to raw materials mentioned. CRMs not mentioned specifically	2014	Fundamental strategic document setting guidelines for innovation policy in Lithuania. ⁷⁶
Lithuania	National Reform Programme 2014	Economic development strategy. Link to resource efficiency. No direct link to CRMs	2014	It summarizes the main structural reforms that are being implemented, or that are planned to be implemented, in the effort to achieve quantitative targets of the Europe 2020 Strategy. ⁷⁷
Malta	Strategic Plan for Environment and Development	General environmental and economic development strategy. Link to raw materials. CRMs not mentioned specifically. Resource efficiency, sustainable development, land use planning	2012	To provide the spatial component for the implementation of sustainable development and to promote the efficient use of resources, including local stone and soil, by, among other things, safeguarding mineral resources from sterilisation and ensuring phased extraction of minerals and restoration of quarries. ⁷⁸
Malta	Sustainable Development Strategy for Malta	General economic development strategy. Link to raw materials. CRMs not mentioned specifically. Minimising waste, resource efficiency, recycling, reducing environmental impact	2006	To conserve mineral resources by minimising waste and promoting the reduction and reuse of building material and proper disposal of building waste in approved sites. ⁷⁹
Netherlands	Raw Material document ("Grondstoffennotitie")	General policy for raw materials. CRMs mentioned. Substitution, innovation, supply, sustainable development	2011	Focus is on CRMs and also on the other raw materials which were on the long list. The primary policy goals of the Raw Material Document

⁷³ The Government of Lithuania (9/16/2009): DĖL NACIONALINĖS DARNIAUS VYSTYMOSI STRATEGIJOS patvirtinimo ir įgyvendinimo. The national sustainable development strategy. Approval and implementation. Available online at http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=354743.

⁷⁴ "Ministry of Finance (2006): National general strategy: The Lithuanian strategy for the use of European Union structural assistance for 2007-2013. Available online at http://www.esparama.lt/ES_Paramangliskas_medis/programming_for_2007_2013_tree/front_page/files/N_SRF_I.doc"

⁷⁵ Department for Environment, Food and Rural Affairs (2012): A Review of National Resource Strategies and Research. Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69526/pb13722-nationalresource-strategies-review.pdf

⁷⁶ Agency for Science, Innovation and Technology (2014): Innovation policy in Lithuania. Available online at <http://www.mita.lt/en/general-information/innovations/innovation-policy-in-lithuania>

⁷⁷ Minister of Economy (Ed.) (2014): Lithuania: National Reform Programme 2014 Vilnius. Vilnius. Available online at http://ec.europa.eu/europe2020/pdf/csr2014/nrp2014_lithuania_en.pdf.

⁷⁸ MEPA & Parliamentary secretariat for Planning and Simplification of Administrative Processes (Ed.) (2014): Strategic Plan for the Environment and Development. Final Version. Available online at http://www.mepa.org.mt/Documents/sped_final.pdf

⁷⁹ National Commission for Sustainable Development (Ed.) (2006): Sustainable Development Strategy. Available online at <https://secure2.gov.mt/tsdu/nsds>

Country	Policy or Strategy Name	Link to CRM	Year	Focus / Aim
				are to increase R&D expenditures, to preserve free trade and to support sustainable development. ⁸⁰
Poland	Operational Strategy of the polish geological survey	General development policy with link to raw materials. CRMs mentioned but not specifically. Sustainable development, economic development	2010	The operational strategy has the goal to provide a good foundation for the development of the Polish economy and for creating infrastructure, but it does not suggest specific instruments. ⁸¹
Poland	National Environment Policy	General environmental policy with link to raw materials. CRMs mentioned but not specifically. Environmental protection, illegal mining	2009	Improving the regulatory framework for the protection of mineral resources and underground water reserves, limiting pressures on the environment from geological exploration and resource exploitation, and eliminating illegal resource exploitation. ⁸²
Portugal	National Strategy for Geological Resources – Mineral Resources (ENRG-RM)	General development policy for raw materials. CRMs mentioned only once but not addressed nor in focus. Economics development, regional development, supply	2012	It aims at promoting a mining sector contributing to the GDP by ensuring raw material supply and generating revenues itself and that is able to promote regional development. ⁸³
Romania	The strategy of the mining industry 2012-2035 (“Strategia Industrii Miniere 2012-2035”)	General development policy for raw materials. CRMs mentioned (beryllium, graphite, magnesium, niobium, tantalum and tungsten). Economic development, social development, sustainable development	2012	The strategy has the goal to boost the activity in the mining industry and thereby increasing the production of raw materials and ultimately support employment and economic growth. ⁸⁴
Slovakia	Raw Material Policy (Proposed)	General development policy for raw materials. CRMs not mentioned specifically. Resource efficiency, sustainable development, environmental protection		Short-Mid-term: decrease the energetic demand, increase the production quality, and decrease environment impact and resource efficiency. Long-term: Mining efficiency, providing the transition of the thermic operation of the mining and processing company to purchased materials processing. ⁸⁵
Slovenia	National Mineral Resource Management Programme	General development policy for raw materials. CRMs not mentioned specifically. Resource efficiency, environmental protection, sustainable development	2009	Addresses efficient mineral resource management and covers the entire mining cycle from exploration, mine development and extraction to closure and remediation. ⁸⁶
Slovenia	National Mining Strategy	General development policy for raw materials. CRMs not		Extensive focus on efficient mineral resource management. ⁸⁷

⁸⁰ The Dutch national government (2011): Grondstoffennotitie. Available online at <http://www.rijksoverheid.nl/documenten-en-publicaties/rapporten/2011/07/15/grondstoffennotitie.html>

⁸¹ Polish Geological Institute (2010): Strategy 2010-2015. Warsaw. Available online at http://www.pgi.gov.pl/en/dokumenty-in-edycja/doc_view/19-strategy.html

⁸² Council of Ministers, Republic of Poland (2009): The national environmental policy for 2009-2012 and its 2016 outlook. Available online at http://www.mos.gov.pl/g2/big/2009_07/2826c539c3015384e50adac8fe920b0b.pdf

⁸³ Presidency of the Council of Ministers (2012): National Strategy for Geological Resources (ENRG-RM)

⁸⁴ Ministry of Economy (2012): The strategy of the mining industry 2012-2035. Strategia Industrii Miniere 2012-2035. Available online at http://www.minind.ro/resurse_minerale/Strategia_Industrii_Miniere_2012_2035.pdf

⁸⁵ European Environment Agency (2011): 2011 Survey of resource efficiency policies in EEA member and cooperating countries. Country profile: Slovakia. Available online at <http://www.eea.europa.eu/themes/economy/resource-efficiency/slovakia-2014-resource-efficiency-policies>

⁸⁶ European Environment Agency (2011): 2011 Survey of resource efficiency policies in EEA member and cooperating countries. Country profile: Slovenia. Available online at <http://www.eea.europa.eu/themes/economy/resource-efficiency/slovenia-2014-resource-efficiency-policies>

⁸⁷ 2011 Survey of resource efficiency policies in EEA member and cooperating countries COUNTRY PROFILE: Slovenia. European Environmental Agency. 2011

Country	Policy or Strategy Name	Link to CRM	Year	Focus / Aim
		mentioned specifically. Resource efficiency, environmental protection, sustainable development.		
Sweden	Swedish mineral strategy	General development policy for raw materials. CRMs mentioned. Resource efficiency, sustainable development, economic development, innovation	2013	The basic aim of this strategy is resource efficiency. The focus of the strategy is on base metals, precious metals and rare earths. ⁸⁸
Sweden	National actions for metallic materials	General development policy for metallic materials. CRMs not mentioned specifically. Innovation, sustainable development	2013	It is a strategic research and innovation agenda which was created under the lead of the Swedish steel producers' association. Plan two of its seven strategies can be related to CRMs. ⁸⁹
Sweden	Resource Efficient use of materials - so do we renew Swedish areas of strength ("Resurssmart Materialanvändning")	General development strategy for raw materials. CRMs mentioned. Recycling, resource efficiency		The basic aim of this strategy is recycling and increasing resource efficiency of, among others, rare earth metals. ⁹⁰
Sweden	European Rare Earth Competency network (ERECON)	Development strategy for CRMs. Supply, substitution		Aims at deepening the understanding about the opportunities to recycle and replace rare earth metals and to identify extractive and recycling potential of metals / minerals in Sweden. ⁹¹
United Kingdom	Resource Security Action Plan	Development plan for raw materials. CRMs mentioned. Substitution, sustainable development, economic development, environmental protection	2012	The analysis of CRMs forms a core part of the document, and many studies conducted both within the UK and internationally are compared. ⁹²

Source: MinPol's database complemented by the MIN-GUIDE project (Mineral Policy country profiles), the INTRAW Project and MINLEX's database.

9.2 REGULATORY FRAMEWORK

⁸⁸ Regeringskansliet (2013): Sweden's Minerals Strategy. Available online at <http://www.government.se/content/1/c6/21/89/86/30eccfae.pdf>

⁸⁹ The Swedish metals-producing Industry's associations (2013): National action for metallic materials. Available online at http://www.jernkontoret.se/ladda_hem_och_bestall/publikationer/stalforskning/National_action_for_metallic_materials_webb.pdf

⁹⁰ Resurssmart Materialanvändning. Available online at http://corporate.stenametall.com/PageFiles/16738/RD130314_Folder_A5_ROI-Agendan_final_LO.pdf

⁹¹ European Commission (Ed.): European Rare Earths Competency Network. Available online at http://ec.europa.eu/enterprise/policies/raw-materials/erecon/index_en.htm

⁹² Department for Environment, Food and Rural Affairs (2012a): Resource Security Action Plan: Making the most of valuable materials. Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69511/pb13719-resourcesecurity-action-plan.pdf

The EU Directives are differently transposed into national law in each and every member state so that following regulations apply in the various EU countries. The selection of countries included to those in addition to the EU-28 is based on those countries which have a substantial CRM potential according to findings by Eurogeosurveys (2016).

Although environmental, water management and other environmental-related laws may apply for a CRM mineral development project, they are not included in order to reduce the amount of laws applicable and because they can be consulted in the final report of the MINLEX study (see MinPol, 2017).

Following Eurostat's definitions⁹³, raw materials are basic substances or mixtures of substances in an untreated state except for extraction and primary processing. They can be subdivided into primary and secondary raw materials. Primary raw materials are the product of the primary production sectors, which encompass the extraction of natural resources from the environment and their transformation through processing or refining. The obtained raw materials are primary commodities, the base materials for further manufacturing and consumption processes. These materials will finally end up as waste, from which secondary raw materials can be derived. Thus, legislation at national level addressing extractive waste is considered targeting secondary minerals (CRMs).

The list of legislation consists, in general and for each country, of the following:

Primary CRMs

- Main mining act/law and, in some cases, other pieces which implement it/regulate it
- Law to manage waste from the extractive activities

Secondary CRMs

- Legislation regulating the management of batteries and accumulators
- Legislation regulating the management of WEEE
- Other legislation (e.g. establishment of a register for WEEE operators, etc.)

⁹³ See <http://ec.europa.eu/eurostat/web/environmental-data-centre-on-natural-resources/natural-resources/raw-materials> (accessed 21.11.17)

9.2.1 EU LEVEL

Table 3 : Summary of EU legislation with relevance for primary and secondary CRMs

Name	Aim, description	Relevance to CRMs
Circular Economy Package (adopted December 2015) Waste Framework Directive (2008/98/EC)	To close the loop and tackle all phases in the life-cycle of a product: from production and consumption to waste management and the market for secondary raw materials sets the basic concepts and definitions related to waste management and lays down waste management principles such as the "polluter pays principle" or the "waste hierarchy"	Of particular relevance are the proposed provisions on CRMs i.e. that Member States should take measures to achieve the best possible management of waste containing significant amounts of CRMs, taking economic and technological feasibility and environmental benefits into account, prevent products constituting the main sources of CRMs from becoming waste and include in their waste management plans nationally appropriate measures regarding collection and recovery of waste containing significant amounts of CRMs.
Directive on End-of-life Vehicles (2000/53/EC)	Aims at making dismantling and recycling of ELVs more environmentally friendly. It sets clear quantified targets for reuse, recycling and recovery of the ELVs and their components. It also pushes producers to manufacture new vehicles without hazardous substances	CRMs of importance for the vehicle (car) manufacturing industries (e.g. REE, in Germany (Nd,Dy)-Fe-B an excellent hard magnet for car manufacturers)
WEEE Directive (Directive 2012/19/EU)	Seeks to improve the environmental management of WEEE and to contribute to a circular economy and enhance resource efficiency the improvement of collection, treatment and recycling of electronics at the end of their life. It lays down collection, recycling and recovery targets for electrical goods and establishes the principle of EPR in Art 7(1): <i>"Without prejudice to Article 5(1), each Member State shall ensure the implementation of the 'producer responsibility' principle and, on that basis, that a minimum collection rate is achieved annually"</i> EPR is based on the "polluter pays" principle (PPP) and was regulated in order to create an economic incentive for producers to move towards more environmentally sound design and manufacturing.	Those CRMs contained/recoverable in WEEE. The WEEE Directive has as its objective to contribute to sustainable production and consumption of EEE through, as a first priority, the prevention of waste and, in addition, by the preparation for re-use, recycling and other forms of recovery of waste of EEE, so as to reduce the disposal of waste and to contribute to the efficient use of resources and the retrieval of valuable secondary raw materials contained in EEE
WEEE Package	Commission Implementing Regulation (EU) 2017/699 of 18 April 2017 establishing a common methodology for the calculation of the weight of electrical and electronic equipment (EEE) placed on the market of each Member State and a common methodology for the calculation of the quantity of waste electrical and electronic equipment (WEEE) generated by weight in each Member State.	
WEEE Mandate M/518 (2013) to the European Standardisation Organisations for standardisation in the field of WEEE (Directive 2012/19/EU)	To develop one or more European standard(s) for the treatment (including recovery, recycling and preparing for re-use) of WEEE. To assist relevant operators in fulfilling the requirements of the WEEE Directive	Those contained in WEEE and batteries (frequently disposed of together with WEEE)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730227

Name	Aim, description	Relevance to CRMs
RoHS 2 Directive (recast Directive 2011/65/EU)	<p>Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment: along with the WEEE Directive, the RoHS Directive provides for the creation of collection schemes where consumers return their used e-waste free of charge. The objective of these schemes is to increase the recycling and/or re-use of such products.</p> <p>It also includes the PPP principle.</p>	
The Batteries Directive (2006/66/EC)	Intends to contribute to the protection, preservation and improvement of the quality of the environment by minimising the negative impact of batteries and accumulators and waste batteries and accumulators. It also ensures the smooth functioning of the internal market by harmonising requirements as regards the placing on the market of batteries and accumulators.	With some exceptions, it applies to all batteries and accumulators, no matter their chemical nature, size or design. Of importance is the content of Cobalt in batteries (cf. the ProSum project)
Directive 2013/56/EU	Amends the Battery directive (2006/66/EC) and clarifies how batteries must be removable from EEE among other things.	
Waste Shipment Legislation (Regulation (EC) No 1013/2006)	The Regulation includes a ban on the export of hazardous wastes to non-OECD countries ("Basel ban") as well as a ban on the export of waste for disposal, e.g. illegal exports high-value waste streams such as WEEE or of end-of-life vehicles containing potentially recoverable CRMs. This Regulation implements into EU law the provisions of the "Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal" as well as the OECD Decision (C(2001)107/FINAL).	Compare with the e-stewards Standard for Responsible Recycling and Reuse of Electronic Equipment, developed by the Basel Action Network
Eco-design Directive (2009/125/EC)	Provides consistent EU-wide rules for improving the environmental performance of products, such as household appliances, information and communication technologies or engineering. The Directive sets out minimum mandatory requirements for the energy efficiency of these products. It may be complemented by the Energy Labelling Directive (2010/30/EU) which establishes mandatory labelling requirements.	The Ecodesign directive already covers all significant environmental impacts along the life-cycle of products but the focus so far has been on energy efficiency improvements. It is expected that in the future the Ecodesign Directive should make a much more significant contribution to the circular economy, e.g., by more systematically tackling material efficiency issues such as durability and recyclability ⁹⁴ .
Eco-design Mandate M/543 (2015) C(2015)9096 Final Commission Implementing Decision of 17.12.2015 on a standardisation request to the European standardisation organisations as regards eco-design requirements on material efficiency aspects for energy-related products in support of the implementation of Directive 2009/125/EC of the European Parliament and of the Council	<p>The mandate requests The European Committee for Standardisation (CEN), the European Committee for Electrotechnical Standardisation (Cenelec) and the European Telecommunications Standards Institute (ETSI) to draft new European standards and European standardisation deliverables on material efficiency aspects for energy-related products in support of implementation of Directive 2009/125/EC.</p> <p>The material efficiency aspects concerned are: extending product lifetime, ability to re-use components or recycle materials from products at EoL, use of re-used components and/or recycled materials in products.</p>	

⁹⁴ European Commission (2016) "Ecodesign Working Plan 2016-2019", Communication from the Commission, COM(2016) 773 final, 30.11.2016, http://ec.europa.eu/energy/sites/ener/files/documents/com_2016_773.en_.pdf, accessed 27.03.17.

Name	Aim, description	Relevance to CRMs
Regulation on Conflict Minerals	EU labels 4 minerals as “conflict”: gold, tin, tantalum and tungsten	Tungsten and newly (again) tantalum are on the list of CRMs

9.2.2 NATIONAL LEVEL

Table 4: List of national and regional regulations of relevance to CRMs

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
Austria	Act No. 38/1999 on Mining (Mining Law) MinroG, as amended by BGBl. I 95/2016	The MinroG applies to mineral exploration, production, and processing industry activities. ⁹⁵	Primary	Any CRM which may be mined.
Austria	Mining Waste Ordinance (in German: <i>Bergbau-Abfall-Verordnung</i>), BGBl II 130/2010, as amended by BGBl II 132/2013	This Ordinance implements the Mineral Raw Material Act (BGBl. I No. 38/1999). It lays down provisions relating to disposal of waste from mining activities and deals with waste management plan. ⁹⁶	Secondary	Any CRM which may be recovered from mine wastes.
Austria	Legislation on battery regulation (in German: <i>Verordnung des Bundesministers für Land und Forstwirtschaft, Umwelt und Wasserwirtschaft über die Abfallvermeidung, Sammlung und Behandlung von Altbatterien und akkumulatoren - Batterienverordnung</i>)	Obligation on Battery Producers for Collection and Recovery Scheme.	Secondary	Any CRM possibly recovered from waste batteries.

⁹⁵ Hastorun, S. (2013). *The Mineral Industry of Austria*. [online] minerals.usgs.gov. Available at: <https://minerals.usgs.gov/minerals/pubs/country/2013/myb3-2013-au.pdf> [Accessed 1 Oct. 2017].

⁹⁶ Ecolex.org. (2017). *Mineral Waste Disposal Ordinance..* [online] Available at: <https://www.ecolex.org/details/legislation/mineral-waste-disposal-ordinance-lex-faoc124101/> [Accessed 1 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
Austria	Ordinance of the Federal Minister for Land - Forestry, Environment and Water Management on waste prevention, collection and treatment of electrical and electronic equipment (in German <i>Verordnung des Bundesministers für Land - und Forstwirtschaft, Umwelt und Wasserwirtschaft über die Abfallvermeidung, Sammlung und Behandlung von elektrischen und elektronischen Altgeräten Elektroaltgeräteverordnung – EAG-VO</i>)	Official Full Text Not Available in English. According to Un-Official Translation. ⁹⁷ Prevention of WEEE, if it cannot be prevented then re use, recycling and other forms of recovery. Participation of all operators involved in any stage of the products life cycle.	Secondary	Any CRM possibly recovered from any kind of WEEE from any stage of their life cycles.
Austria	Federal Law on Sustainable Waste Management (in German <i>Bundesgesetz über eine nachhaltige Abfallwirtschaft, Abfallwirtschaftsgesetz 2002 – AWG 2002</i>)	Waste Prevention, Recovery and Disposal. It deals with multiple type of wastes Municipal waste, Hazardous Waste, Waste Oil etc.	Primary and secondary	Possible CRM Recovery from General Waste.
Belgium/Flanders	Royal decree on the placing on the market of batteries and accumulators 2009-1255	This Decree seeks to implement Directive 2006/66/EC on Batteries and Accumulators at National Level in Belgium. Decree obligated companies pay fees for recycling of the batteries they place onto the market; this scheme is called Bebat and works as a uniform system for all regions in Belgium. ⁹⁸	Secondary	Any CRM possibly recovered from waste batteries.
Belgium/Flanders	Royal decree on the prevention of dangerous substances on WEEE 2004-4180	The Decree is influenced by Directive 2002/96/EC of the European Parliament and the Council of 27 January 2003 for effective WEEE management.	Secondary	Possible CRM recovery from WEEE.
Belgium/Wallonia	Wallonia Decree of 27 June 1996 amended and its implementing	Contains Waste management hierarchy and principles (Full text is not available in English). ⁹⁹	Secondary	Possible CRM recovery from general waste.

⁹⁷ Ewit (2017). *Legal frame regulating WEEE management in Austria*. [online] Available at: http://ewit.site/wp-content/uploads/2017/01/WEEE_Ordinance-Austria-I.pdf [Accessed 1 Oct. 2017].

⁹⁸ Tsiarta, C., Watson, S. and Hudson, J. (2015). http://ec.europa.eu/environment/waste/batteries/pdf/batteries_directive_report.pdf. [online] <http://ec.europa.eu>. Available at: http://ec.europa.eu/environment/waste/batteries/pdf/batteries_directive_report.pdf [Accessed 1 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	orders, tax decree of 22 March 2007, etc.			
Bulgaria	Subsurface Resources Act (Mining Law) 23/12.03.1999, amended, SG No. 19/8.03.2011, last amended SG 56/24.07.2015	According to Article I of the act "This Act shall govern the terms and procedure for: I. prospecting, exploration and extraction of subsurface resources on the territory of the Republic of Bulgaria, its continental shelf and exclusive economic zone in the Black Sea". ¹⁰⁰	Primary	Any CRM which may be mined.
Bulgaria	Waste Management Act , 53 of 13.07.2012; last amended SG 61/25.07.2014. A special ordinance for the Mining Waste Management was accepted on 07.01.2016 and issued in SG 5/19.01. 2016 g	Act lays down measures and control mechanisms to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use. Act applies to household waste, industrial waste, construction and demolition waste, hazardous waste. ¹⁰¹	Secondary	Possible CRM recovery from general waste.
Bulgaria	Ordinance on the use of EEE (Decree No 256 from 13 November 2013)	The Ordinance sets annual WEEE collection targets of 41% in 2016, 48% in 2017, 55% in 2018, 60% in 2019 and 65% from 2020 onwards. ¹⁰²	Secondary	Possible CRM recovery from WEEE.
Bulgaria	Ordinance on the requirements for placing on the market of batteries and accumulators and treatment and transportation of waste batteries	According to Article I of this ordinance ¹⁰³ , "This Ordinance establishes the requirements for placing on the market of batteries and accumulators and for collection, transportation, temporary (short term) storage, preliminary treatment (pre-treatment), recycling, recovery and/or disposal of waste batteries and accumulators"	Secondary	Possible CRM recovery from waste batteries.

⁹⁹ Complianceandrisks.com. (2017). Wallonia (Belgium): Waste Decree, 27 June 1996 & Others - Amendment - (on determination of categorization of waste) Decree, 24 October 2013 | Compliance & Risks. [online] Available at: <http://www.complianceandrisks.com/regulations/wallonia-waste-decree-27-june-1996-others-amendment-on-determination-of-categorization-of-waste-decree-24-october-2013-20587/> [Accessed 1 Oct. 2017].

¹⁰⁰ FAOLEX. (n.d.). *Subsurface Resource Act*. [online] Available at: <http://extwprlegs1.fao.org/docs/pdf/bul91891.pdf> [Accessed 1 Oct. 2017].

¹⁰¹ MOEW (2014). *Waste Management Act*. [online] Available at: http://www5.moew.government.bg/?wpfb_dl=17875 [Accessed 1 Oct. 2017].

¹⁰² Popescu ML, Colesca SE, Ciocoiu CN (2014). *WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT MANAGEMENT IN TWO EU DEVELOPING COUNTRIES: ROMANIA AND BULGARIA*. [online] Available at: https://msed.vse.cz/msed_2014/article/339-Popescu-Maria-Loredana-paper.pdf [Accessed 1 Oct. 2017].

¹⁰³ Nordrecycling (n.d.). *Batteries Ordinance*. [online] Available at: http://www.nordrecycling.com/wp-content/uploads/2017/06/Batteries_Ordinance_BG_English.pdf?x28955 [Accessed 1 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	and accumulator (Adopted with a Decree of the Council of Ministers No 144 dated from 5.07.2005)	Companies are bound to pay fees for recycling of the batteries they place onto the market.		
Croatia	The Mining Act (Official Gazette 56/13 and 14/14.)	This Act regulates management of mineral raw materials and planning of mining economic activity, exploration and establishment of mineral raw material reserves, preparation and verification of mining projects, exploitation of mineral raw materials, granting concessions for exploitation etc. and other such Administrative jobs ¹⁰⁴	Primary	Any CRM which may be mined.
Croatia	Waste Electrical and Electronic Equipment (WEEE) Management, Ordinance NN 42/2014	Waste prevention, collection and recovery from Electrical and Electronic Products. Full Text Not Available in English.	Secondary	Possible CRM recovery from WEEE.
Czech Republic	Mining Law (Mining Act) No. 44 of 1988, as amended by Law No.186 of 2006	Purpose of this Act is to establish principles for the protection and economical utilization of mineral resources, especially in prospecting and exploration work, opening, preparation and extraction of mineral deposits, processing and refinement of minerals, as well as safety of operations and environmental protection during these processes. ¹⁰⁵	Primary	Any CRM which may be mined.
Czech Republic	Act No. 157/2009 Coll., on mining waste management and on amendments to some laws, in wording by act No. 168/2013 Coll	This act is a regulation transposing the EU Law – Directive 2006/21/EU.	Secondary	Possible CRM recovery from general waste.
Czech Republic	Law on Waste (184/2014)	Electronics and Electrical Waste management and prevention of its mixing with general waste. In compliance with Directive 2012/19/EU on Waste electrical and electronic equipment, this act lays down the minimal requirements applicable to the transportation of electrical equipment Rules on take-back of returned electrical equipment and electrical waste are also a part of this Law. ¹⁰⁶	Secondary	Possible CRM recovery from WEEE.
Czech Republic	Management of Electrical and	Waste prevention, collection and recovery from Electrical and Electronic Products.	Secondary	Possible CRM recovery from WEEE.

¹⁰⁴ Grbeš, A., Manovelo, I. and Maćešić, M. (2017). *Oil Regulation, Croatia*. [online] gettingthedealthrough.com. Available at: <https://gettingthedealthrough.com/area/24/jurisdiction/80/oil-regulation-croatia/> [Accessed 1 Oct. 2017].

¹⁰⁵ El Source Book (2017). ACT No. 44/1988 Coll., [online] Available at: <http://www.eisourcebook.org/cms/Czech%20Republic%20Mining%20Act.pdf> [Accessed 1 Oct. 2017]

¹⁰⁶ www.mzp.cz. (2014). *Czech Republic's Waste Prevention Programme*. [online] Available at: [https://www.mzp.cz/C1257458002F0DC7/cz/predchazeni_vzniku_odpadu_navrh/\\$FILE/OO-EN_WPP_Czech-20150407.pdf](https://www.mzp.cz/C1257458002F0DC7/cz/predchazeni_vzniku_odpadu_navrh/$FILE/OO-EN_WPP_Czech-20150407.pdf) [Accessed 1 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	Electronic Equipment and Waste Electrical and Electronic Equipment, Decree 352/2005			
Czech Republic	Decree on batteries and accumulators 170/2010	Waste collection and management from used Batteries.	Secondary	Possible CRM recovery from Waste Batteries.
Denmark	Act No. 1218 of 2016 on Raw Materials	Mining Law governing general mining procedure in the State. Full Text Not Available in English.	Primary	Any CRM which may be mined.
Denmark	Act No. 1317 of 2015 on Environmental Protection	This Act assigns obligations to companies which sell batteries on the Danish market. An environmental fee is to be paid based on quantities placed on the market, which is used to cover the cost of collection, recovery, and treatment of waste batteries disposed of by end-users. An excise duty is also applied. ¹⁰⁷	Primary	No direct relevance to the CRMs, more efficient management of the waste batteries can help in secondary extraction of raw materials, including some of the CRMs.
Denmark	Statutory Order on batteries and accumulators 1186/2009	Assigns obligations to companies which sell batteries on the Danish market. An environmental fee is paid based on quantities placed on the market, which is used to cover the cost of collection, recovery, and treatment of waste batteries disposed of by end-users. An excise duty is also applied. ¹⁰⁸	Secondary	Possible CRM recovery from waste batteries.
Denmark	Statutory Order on WEEE 130/2014	Deals in general registration of producers who place electrical and electronic equipment on the market and their representatives. Formulation of Collection Schemes for the producers. ¹⁰⁹	Secondary	Possible CRM recovery from WEEE.
Denmark	Shipments of Waste and Waste Electrical and Electronic Equipment (WEEE), Statutory Order 132/2014	Full text not available in English. According to unofficial English Translation. Order provides for provisions related to Notification, Documentation of Shipment of Waste from Denmark.	Secondary	Possible CRM recovery from WEEE.

¹⁰⁷ Informea.org. (2015). *Environment Protection Act (No. 1317 of 2015)*. | InforMEA. [online] Available at: <https://www.informea.org/en/legislation/environment-protection-act-no-1317-2015> [Accessed 1 Oct. 2017].

¹⁰⁸ Valpak (2017). *A Quick Guide to Batteries Legislation in Denmark*. [online] Available at: <https://www.valpak.co.uk/docs/default-source/international-compliance/denmark-batteries---30-11-2015---uv.pdf?sfvrsn=2> [Accessed 1 Oct. 2017].

¹⁰⁹ Retsinformation (2014). [online] Available at: <https://www.retsinformation.dk/forms/r0710.aspx?id=161674> [Accessed 1 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
		Provision of fee payment and compliance to ensure that the waste is shipped according to provisions of regulations. ¹¹⁰		
Estonia	Earth's Crust Act (Riigi Teataja No. 84, 572 of 2003)	This Act provides for the procedure and the principles of exploration, protection and use of the earth's crust and the purpose is to ensure the use of the earth's crust environmentally and economically efficient. ¹¹¹	Primary	Any CRM which can be mined from earth crust.
Estonia	Mining Act (Riigi Teataja No. 20, 118 of 2003)	Its purpose is to ensure the safety of persons, property and the environment and ensuring use of deposit economically. ¹¹²	Primary	No direct relevance to CRM, more efficient management of mineral deposit can help in recovery of materials, possibly including CRM.
Estonia	Waste Act 2004	It is implemented "to reduce the harmfulness and quantity of waste, and liability for violation of the established requirements." ¹¹³	Secondary	No direct relevance to the CRMs, more efficient management of waste can help in secondary extraction of raw materials, including some of the CRMs.
Estonia	Requirements for Reuse of Waste Electrical and Electronic Equipment (WEEE), Regulation No. 28, 2014	Its purpose is to make the list of preparatory operations for its reuse, such that it can be available to other persons as a used WEEE. (Full text available in Estonian only). ¹¹⁴	Secondary	Possible CRM recovered from WEEE.
Estonia	Producer Obligation to Inform Consumers on Recycling and Disposal of their Used Products,	No information available in English.	Secondary	N/A

¹¹⁰ Danish EPA. (2017). *Statutory Order on shipments of waste and shipments of used electrical and electronic equipment*. [online] Available at: [http://eng.mst.dk/media/mst/9295848/Statutory%20Order%20on%20shipments%20of%20waste%20and%20shipments%20of%20used%20electrical%20and%20electronic%20equipment%20\[DOK3193396\].PDF](http://eng.mst.dk/media/mst/9295848/Statutory%20Order%20on%20shipments%20of%20waste%20and%20shipments%20of%20used%20electrical%20and%20electronic%20equipment%20[DOK3193396].PDF) [Accessed 1 Oct. 2017].

¹¹¹ Min-guide.eu. (2017). *MIN-GUIDE*. [online] Available at: <http://www.min-guide.eu/mineral-policy/earths-crust-act-1759> [Accessed 8 Oct. 2017].

¹¹² Min-guide.eu. (2017). *MIN-GUIDE*. [online] Available at: <http://www.min-guide.eu/mineral-policy/mining-act-1758> [Accessed 8 Oct. 2017].

¹¹³ Complianceandrisks.com. (2017). *Estonia: Waste Act 2004 | Compliance & Risks*. [online] Available at: <http://www.complianceandrisks.com/regulations/estonia-waste-act-2004-1014/> [Accessed 8 Oct. 2017].

¹¹⁴ Step-initiative.org. (2017). *Estonia: Requirements for Reuse of Waste Electrical and Electronic Equipment (WEEE), Regulation No. 28, 2014 - STEP*. [online] Available at: <http://www.step-initiative.org/estonia-requirements-for-reuse-of-waste-electrical-and-electronic-equipment-weee-regulation-no-28-2014.html> [Accessed 8 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	Regulation No. 57, 2013			
Estonia	Recovery, Recycling and Disposal of Waste Electrical and Electronic Equipment, Regulation No. 65, 2009	This is applying to electrical and electronic equipment specified in subsection 25 (3) (4) of the Waste Act and the categories and sub-categories are provided in the annex to this Regulation, (next text available in Estonian only). ¹¹⁵	Secondary	Possible CRM recovered from WEEE
Estonia	Treatment of Waste Electrical and Electronic Equipment Regulation 9, 2005	No information available in English.	Secondary	N/A
Finland	Mining Act (621/2011)	The purpose of this Act is to promote mining and organise the use of areas needed for it, and exploration, in a socially, economically, and ecologically manageable way. ¹¹⁶	Primary	Any CRM which may be mined.
Finland	Government Decree on mining activities (391/2012)	The main purpose of this decree is waste management plan which must include other data necessary for assessing whether waste management as well as to stop the generation of soil and rock material waste and control on its harmfulness. ¹¹⁷	Primary	Any CRM which may be mined from mining waste.
Finland	Finnish Waste Act (646/2011) and Waste Decree (179/2012)	It implies for the operations for the recovery and disposal of waste. ¹¹⁸	Secondary	Possible CRM recovered from general waste.
Finland	Government Decree on batteries and accumulators (520/2014)	No Information found in English.	Secondary	No direct relevance to the CRMs, more efficient management of waste batteries and accumulators can help in secondary extraction of raw materials, including some of the CRMs.
Finland	Government Decree on extractive waste (190/2013)	This Decree applies to the preparation and make use of waste management plans for extractive waste, establishment, closure and aftercare of a waste coming from extraction, control and supervision of extractive waste management. ¹¹⁹	Secondary	Waste generated during mining extraction. Possible extraction of secondary elements, including some of the CRMs.
Finland	Government Decree on end-of-life vehicles and restrictions on the use of hazardous substances in	Purpose is to restrict the use of substances which is harmful for nature. More text is not available in English.	Secondary	Possible extraction of CRM used in vehicles.

¹¹⁵ STEP (2017). Estonia: Recovery, Recycling and Disposal of Waste Electrical and Electronic Equipment, Regulation No. 65, 2009 - STEP. [online] Available at: <http://www.step-initiative.org/estonia-recovery-recycling-and-disposal-of-waste-electrical-and-electronic-equipment-regulation-no-65-2009.html> [Accessed 7 Oct. 2017].

¹¹⁶ Min-Guide (2017). MIN-GUIDE. [online] Available at: <http://www.min-guide.eu/mineral-policy/policya1-mines-mining-code-1849> [Accessed 7 Oct. 2017].

¹¹⁷ Anon (2017). [online] Available at: <http://www.finlex.fi/en/laki/kaannokset/2012/en20120391.pdf> [Accessed 7 Oct. 2017].

¹¹⁸ Finlex (2017). 179/2012 English - Translations of Finnish acts and decrees - FINLEX ®. [online] Available at: <http://www.finlex.fi/en/laki/kaannokset/2012/en20120179> [Accessed 7 Oct. 2017].

¹¹⁹ Finlex (2017). 190/2013 English - Translations of Finnish acts and decrees - FINLEX ®. [online] Available at: <http://www.finlex.fi/en/laki/kaannokset/2013/en20130190> [Accessed 7 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
Finland	vehicles (123/2015, in Finnish) Government Decree on WEEE (519/2014, in Finnish)	No information in English.	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Finland	Act on restriction of the use of certain hazardous substances in electrical and electronic equipment (387/2013)	The purpose of this Act is to protect human health and the environment impact by reducing the use of harmful substances in electrical and electronic equipment and to promote the recovery and disposal of waste coming from electrical and electronic equipment environmentally. ¹²⁰	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Finland	Government Decision on the part of the National Waste Plan concerning transfrontier waste shipments (495/1998, Finlex)	Waste shipment issues. Sets out the conditions under which the Finnish Environment Institute, as the competent authority, may approve international waste shipments to, from, or through Finland.	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
France	Mining Code	This regulation has purpose of "strengthen the environmental procedures and consultation with populations, enhance legal certainty, increasing transparency to give permits and authorizations for minerals exploration and extraction." ¹²¹	Primary	CRM which may be mined.
France	Environmental Code – Section 7 Batteries and accumulators Article R543-124 to 134	There are various changes done in manufacturing of batteries and accumulators within this code, such as restriction on use of unsafe substances and introduction of minimum recycling yields. ¹²²	Secondary	CRM related to batteries and accumulators.
France	Environmental Code – Section 2 Design, production and distribution of WEEE Article L541-10-2	The objective of this code is if manufacturing, imports or introduction of electric or electronic household appliances in Nation market has been done professionally, then it is obliged to provide and contribute to the collection, removal and treatment of electric or electronic household appliance waste independent of manufacturing date. ¹²³	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
France	Environmental Code – Sub section 2 Provisions related to WEEE Article R543-172 to 206-4	This code is related to the composition of electrical and electronic equipment with the purpose of elimination of waste from this equipment. ¹²⁴	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of

¹²⁰ Finlex (2017). 387/2013 English - Translations of Finnish acts and decrees - FINLEX ®. [online] Available at: <http://www.finlex.fi/en/laki/kaannokset/2013/en20130387> [Accessed 7 Oct. 2017].

¹²¹ Min-guide.eu. (2017). MIN-GUIDE. [online] Available at: <http://www.min-guide.eu/mineral-policy/policya1-mines-mining-code-1849> [Accessed 7 Oct. 2017].

¹²² Anon (2017). [online] Available at: https://www.entreprises.gouv.fr/files/files/directions_services/libre-circulation-marchandises/english/Batteries.pdf [Accessed 7 Oct. 2017].

¹²³ Anon (2017). [online] Available at: https://www.legifrance.gouv.fr/content/download/1963/13739/version/3/file/Code_40.pdf [Accessed 7 Oct. 2017].

¹²⁴ Anon (2017). [online] Available at: http://ec.europa.eu/environment/archives/waste/reporting/pdf/WEEE_Directive.pdf [Accessed 7 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
				raw materials, including some of the CRMs.
France	Decree on the registration and reporting for batteries and accumulators	After the registration users are enable fill the important information to prepare their reports. The generation of reports depends on the sector, the category of player, type of organisation responsible for the collection and treatment of waste. ¹²⁵	Secondary	No direct relevance to the CRMs, more efficient management of waste batteries and accumulators can help in secondary extraction of raw materials, including some of the CRMs.
France	Approval Procedures and Specifications for Organisations Managing Household Waste Electrical and Electronic Equipment, Ministerial Order, December 2014	Its purpose is approving the procedure and setting down details for eco-organisations in the household waste electrical and electronic equipment sector. ¹²⁶	Secondary	CRM possible extracted from household waste Electrical and Electronic Equipment.
France	Electrical and Electronic Equipment Distributor Responsibility Under Article R. 543-180 of the Environmental Code, Order, October 2014	It deals with the conditions for implementation of the recovery obligations of electrical and electronic equipment distributors. ¹²⁷ (More text in French)	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
France	Procedure for Approval and Specifications for Bodies Coordinating Collection Schemes of Household Waste Electrical and Electronic Equipment, Order, December 2014 (and another one relevant for Individuals)	Not available in English.	Secondary	N/A
France	Producer Responsibility for the Environmentally Sound Collection, Treatment, Recovery and Disposal	Its objective is to deal with responsibility of extended producer of waste electrical and electronic equipment. (Further text available in French). ¹²⁸	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of

¹²⁵ Syderep (2017). Cite a Website - Cite This For Me. [online] Available at: <https://www.syderep.ademe.fr/en/commun/pa/0/index/download/idElement/522> [Accessed 7 Oct. 2017].

¹²⁶ STEP (2017). France: Approval Procedures and Specifications for Organisations Managing Household Waste Electrical and Electronic Equipment, Ministerial Order, December 2014 - STEP. [online] Available at: <http://www.step-initiative.org/france-approval-procedures-and-specifications-for-organisations-managing-household-waste-electrical-and-electronic-equipment-min.html> [Accessed 7 Oct. 2017].

¹²⁷ Legifrance (2017). Version électronique authentifiée publiée au JO n° 0239 du 15/10/2014 | Legifrance. [online] Available at: http://www.legifrance.gouv.fr/jopdf/common/jo_pdf.jsp?numJO=0&dateJO=20141015&numTexte=30&pageDebut=16948&pageFin=16949 [Accessed 7 Oct. 2017].

¹²⁸ Legifrance (2017). Avis relatif au champ d'application de la filière de responsabilité élargie du producteur des déchets d'équipements électriques et électroniques | Legifrance. [online] Available at: <http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000029805190> [Accessed 7 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	of Waste Electrical and Electronic Equipment, Notice, November 2014			raw materials, including some of the CRMs.
France	Requirements for Authorised Representatives of WEEE Producers, Order, October 2014	Purpose is to ensure compliance with producer's obligations as set out in the mandate by authorized representative. (More text available in French). ¹²⁹	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
France	Accreditation for WEEE Collection Facilities, Ministerial Order, December 2005	Not available in English. ¹³⁰	Secondary	N/A
France	General Requirements for Classified Installations Subject to Declaration - WEEE Handling, Ministerial Order, December 2007	Information available only in French. ¹³¹	Secondary	N/A
France	Household Lighting Equipment as Waste Electrical and Electronic Equipment (WEEE), Ministerial Order, July 2006	The aim is to minimize the household lighting equipment waste related to Electrical and Electronic Equipment. ¹³² (More text available in French)	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
France	Licenses for Management of Waste Electrical and Electronic Equipment (WEEE), Ministerial Order, June 2012	Not available in English.	Secondary	N/A
France	Technical Requirements for	The objective is treatment of disposal of waste electrical and electronic equipment. ¹³³	Secondary	No direct relevance to the CRMs,

¹²⁹ STEP (2017). France: Requirements for Authorised Representatives of WEEE Producers, Order, October 2014 - STEP. [online] Available at: <http://www.step-initiative.org/france-requirements-for-authorised-representatives-of-weee-producers-draft-order-april-2014.html> [Accessed 7 Oct. 2017].

¹³⁰ Legifrance (2017). Arrêté du 6 décembre 2005 relatif aux agréments et approbations prévus aux articles 9, 10, 14 et 15 du décret n° 2005-829 du 20 juillet 2005 relatif à la composition des équipements électriques et électroniques et à l'élimination des déchets issus de ces équipements | Legifrance. [online] Available at: <http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000609260&dateTexte> [Accessed 7 Oct. 2017].

¹³¹ Anon (2017). [online] Available at: http://www.ineris.fr/aida/?q=consult_doc/version_imprimable/2.250.190.28.8.1223/false/pdf [Accessed 7 Oct. 2017].

¹³² Anon (2017). [online] Available at: http://www.ineris.fr/aida/?q=consult_doc/version_imprimable/2.250.190.28.8.1223/false/pdf [Accessed 6 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	Treatment of WEEE, Ministerial Order, November 2005	(More text available in French)		more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
France	WEEE & RoHS Implementation, Environmental Code Articles R543-172 to 206, 2007	This applies to waste which result from electrical and electronic equipment, including all the components, parts and consumables forming an important part of the product when it is scrapped. ¹³⁴	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Germany	Federal Mining Act (Bundesberggesetz)	Securing supply of raw materials, main legislative framework for mining activity in the Federal Republic of Germany. Dealing with exploration, extraction, mineral and metallurgical processing, mine closure and waste management. The Act include permitting issues for of all mining related activities and covering also deep sea mining. ¹³⁵	Primary	General mining act, for all raw materials, including CRMs, but the act doesn't allocate CRM as special group.
Germany	Regulations by the federal states (for the development of mineral extraction projects)	Information in national level, not available in English.	Primary	N/A
Germany	Closed Cycle Management Act (in German Kreislaufwirtschaftsgesetz) (KrWG)	Turning waste management into resource management. ¹³⁶	Secondary	Dealing with recycled wastes describing as other (metals, electrical and electronic equipment, batteries). Such waste contains also CRMs
Germany	Act on the placing on the market, the return and the environmentally sound disposal of batteries and	The first version came into force in 2009, battery producers have to be registered and they must report information about their products and also waste management responsibility to the German Environment Agency (Umweltbundesamt, UBA) via electronic BattG-Melderegister. ¹³⁷	Secondary	Helping with more effective secondary use of batteries, which can contain CRMs (e.g. cobalt)

¹³³ Legifrance (2017). Arrêté du 23 novembre 2005 relatif aux modalités de traitement des déchets d'équipements électriques et électroniques prévues à l'article 21 du décret n° 2005-829 du 20 juillet 2005 relatif à la composition des équipements électriques et électroniques et à l'élimination des déchets issus de ces équipements | Legifrance. [online] Available at: <http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000424637&fastPos=19&fastReqId=1187226515&categorieLien=id&oldAction=rechTexte> [Accessed 6 Oct. 2017].

¹³⁴ STEP (2017). France: WEEE & RoHS Implementation, Environmental Code Articles R543-172 to 206, 2007 - STEP. [online] Available at: <http://www.step-initiative.org/france-weee-rohs-implementation-environmental-code-articles-r543-172-to-206-2007.html> [Accessed 6 Oct. 2017].

¹³⁵ Mineral Policy Guide: Mineral Policy Guidance for Europe (2016). <http://www.min-guide.eu/>. Accessed 29 Sep. 2017

¹³⁶ Nelles M, Grünes J, Morscheck G (2016) Waste Management in Germany – Development to a Sustainable Circular Economy? *Procedia Environmental Sciences* 35:6-14. doi: 10.1016/j.proenv.2016.07.001

¹³⁷ The BattG-Melderegister. In: The Umweltbundesamt. <http://www.umweltbundesamt.de/en/topics/waste-resources/product-stewardship-waste-management/batteries/the-battg-melderegister>. Accessed 29 Sep. 2017

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	accumulators (Battery regulation - BattG)			
Germany	Act governing the Sale, Return and Environmentally Sound Disposal of Electrical and Electronic Equipment of 20 October 2015 (ElektroG)	Implements the legal obligation of producers of electrical and electronic equipment to assume responsibility for the end of life of their products. The aims of the Act are to protect health and the environment against harmful substances from electrical and electronic equipment, and reduce the amount of waste through recovery or recycling. ¹³⁸	Secondary	Electrical waste contains numerous critical raw materials, the act does not specify individual CRM
Germany	Electrical and Electronic Equipment Act Cost Ordinance, BGBl. 2020, 2005	Regulate charges and fees collected according the Electrical and Electronic Equipment Act. ¹³⁹	Secondary	Electrical waste contains numerous critical raw materials, the act does not specify individual CRM
Germany	Clearing House Fees for WEEE, Ordinance, BGBl. 1776, 2015	Fee Ordinance for Electrical and Electronic Equipment Act (details only in German language). ¹⁴⁰	Secondary	Electrical waste contains numerous critical raw materials, the act doesn't specifying individual CRM
Greece	Mining Code (Legislative Decree, L.210/1973)	Main legislative regulated exploration, mining, processing and mine closure. Dividing raw materials into two categories – metalliferous ores and quarry products. ¹⁴¹	Primary	Focusing on all raw materials, the Act is mentioning the CRMs, but has his own division of Metallic Raw Materials (important for national economy).
Greece	WEEE & RoHS Implementation, Decree 117, 2004	Main purpose is to prevent of creation of waste electrical and electronic equipment; restriction to use certain hazardous substances in the equipments. ¹⁴²	Secondary	Primary focus of the law is not the extraction of CRM from WEEE, rather preventing of creation of such waste.
Greece	Implementation of Waste Electrical and Electronic	Regulate conditions and rules for alternative use of WEEE. ¹⁴³	Secondary	Focusing also on re-using, extracting of materials from WEEE (but the act

¹³⁸ Electrical and Electronic Equipment Act. In: The Umweltbundesamt. <http://www.umweltbundesamt.de/en/topics/waste-resources/product-stewardship-waste-management/electrical-electronic-waste/electrical-electronic-equipment-act>. Accessed 29 Sep. 2017

¹³⁹ STEP (2017) Germany: Electrical and Electronic Equipment Act Cost Ordinance, 2020, 2005. STEP: Solving the e-waste problem. <http://www.step-initiative.org/germany-electrical-and-electronic-equipment-act-cost-ordinance-bgbl-2020-2005.html>. Accessed 29 Sep. 2017

¹⁴⁰ STEP (2017) Germany: Clearing House Fees for WEEE, Ordinance, BGBl. 1776, 2015. STEP: Solving the e-waste problem. <http://www.step-initiative.org/germany-clearing-house-fees-for-weee-ordinance-bgbl-1776-2015.html>. Accessed 29 Sep. 2017

¹⁴¹ Ministry of Environment Energy & Climate Change (2016) Greek Extractive Industry: International Environment Profile – prospects. Ministry of Environment Energy & Climate Change. Greece.

¹⁴² STEP (2017) Greece: WEEE & RoHS Implementation, Decree, 2004. STEP: Solving the e-waste problem. <http://www.step-initiative.org/greece-weee-rohs-implementation-decree-117-2004.html>. Accessed 29 Sep. 2017

¹⁴³ STEP (2017) Greece: Implementation of Waste Electrical and Electronic Equipment (WEEE) Recast Directive 2012/19/EU, Decision, 23615/651/E.103, 2014. STEP: Solving the e-waste problem. <http://www.step-initiative.org/greece-weee-rohs-implementation-decree-117-2004.html>. Accessed 29 Sep. 2017

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	Equipment (WEEE) Recast Directive 2012/19/EU, Decision, 23615/651/E .103, 2014			dosen't specifying individual CRM)
Hungary	Mining Law No. XLVIII of 1993 as amended by Law No. CXXXIII of 2007	General mining act, regulate permitting, exploaration, mining, mineral processing. Establish royalties from mining and recovering of geothermal energy. ¹⁴⁴	Primary	General mining act, for all raw materials, including CRMs, but the act doesn't allocate CRM as special group.
Hungary	GKM Ministerial Decree No. 14/2008 on mining waste managment	Act regulating waste generated directly from exploration, extraction and mineral processing.	Secondary	No direct relation to CRMs, the act is not dealing with secondary extraction from mining waste.
Hungary	Waste Management of Electrical and Electronic Equipment, Decree 443/2012	The decree is dealing with handling of electric, electronic equipment and waste orginate from them. It sets the rules for collection, reuse and disposal. ¹⁴⁵	Secondary	Act is dealing with reuse of electronic equipment, but not directly mentioning extraction of CRM from it.
Hungary	Management of Waste Electrical and Electronic Equipment (WEEE), Decree 197/2014	Management of WEEE, collection, treatment, taking back, reusing, bin logo requirements. Details available only in national language. ¹⁴⁶	Secondary	Act is dealing with reuse of electronic equipment, but not directly mentioning extraction of CRM from it.
Ireland	Minerals Development Act 2017	The act regulates mineral prospecting, developing of mining, payment of rents and royalites. Setting the rehabilitation plans for abandoned mine sites. ¹⁴⁷	Primary	General mining act, for all raw materials, including CRMs, but the act doesn't allocate CRM as special group.
Ireland	Waste Management (Management of Waste from the Extractive Industries) Regulations 2009	These Regulations provide for measures and procedures to prevent or reduce as far as possible any adverse effects on the environment, in particular water, air, soil, fauna and flora and landscape, and any resultant risks to human health, brought about as a result of the management of waste from the extractive industries and transpose Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the	Secondary	No direct relation to CRMs, the act is not dealing with secondary extraction from extractive industires waste.

¹⁴⁴ Ibid. (Min-Guide).

¹⁴⁵ ECOLEX (2015) Decree No. 443 of 2012 (XII. 29.) Korm of the Government on waste management activities related to electric and electronic equipments. ECOLEX: The gateway to environmental law. <https://www.ecolex.org/details/legislation/decreo-no-443-of-2012-xii-29-korm-of-the-government-on-waste-management-activities-related-to-electric-and-electronic-equipments-lex-faoc123524/>. Accessed 30 Sep. 2017

¹⁴⁶ IBM (2016) Recovery and Recycling of Waste Electrical and Electronic Equipment (WEEE). IBM. <https://www.ibm.com/ibm/recycle/hu-hu/weee-en/index.shtml>. Accessed 30 Sep. 2017

¹⁴⁷ Exploration and Mining Division (EMD) (2017). Acts and Regulations. [online] Mineralsireland.ie. Available at: <http://www.mineralsireland.ie/legislation+fees+and+policy/Acts+and+Regulations.htm> [Accessed 30 Sep. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
		management of waste from the extractive industries into Irish legislation.		
Ireland	Statutory Instrument (SI) Batteries and accumulators 283/2014	Legislation regulate handling with batteries and accumulators, its composition, hazardous substances, obligations for producers and market, collection, disposal, treatment and recycling of waste batteries. ¹⁴⁸	Secondary	Act is dealing also with recycling of batteries, but not directly mentioning extraction of CRM from it.
Ireland	European Union (Waste Electrical and Electronic Equipment) Regulations, SI 149/2014	Incorporation of European Parliament and Council Directive 2012/19/EU into national legislative act. Prevention of creation of WEEE and preparing for re-use, recycling and retrieval of secondary raw materials. ¹⁴⁹	Secondary	Only mentioning of secondary extraction of raw materials from electronic equipment. Equipment which can contain the CRMs.
Italy	Mining Law (Royal Decree) No. 1443 of 1927	General mining law covering, exploration, mining activities (mines and quarries). Concessions are governed by the Ministry of Industry. ¹⁵⁰	Primary	General mining act, for all raw materials, including the CRMs, but the act doesn't allocate the CRM as special group.
Italy	Constitutional Law 3/2001: passing of competence from State to Regions	General law, coming from constitutional referendum, give stronger mandate for decision to the regions. Applying also for decisions in mining and raw materials. ¹⁵¹	Primary	Related also to the first category minerals, the category including the CRMs.
Italy	Legislative Decree no. 117/08 on mining waste	Transposing EU Directive 2006/21/EC and important for the management of waste from extractive industry. Act is dealing with preventing or reducing the waste as much as possible. Regulate also abandoned mining sites. ¹⁵²	Secondary	No direct relevance to the CRMs.
Italy	Waste Electrical and Electronic Equipment (WEEE), Legislative Decree, No. 49/2014	Implementing of European Parliament and Council Directive 2012/19/EU into national legislative act. Waste management of WEEE, preventing and reducing negative impact to the environment and human health (including steps in design and production of EEE). ¹⁵³	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Italy	Promoting the Design and	Details for implementing the environmentally friendly design and production of EEE (no	Secondary	Design of EEE is playing an important

¹⁴⁸ eISB (2017). S.I. No. 283/2014 - European Union (Batteries and Accumulators) Regulations 2014. [online] Irishstatutebook.ie. Available at: <http://www.irishstatutebook.ie/eli/2014/si/283/made/en/print> [Accessed 30 Sep. 2017].

¹⁴⁹ eISB (2017). S.I. No. 149/2014 - European Union (Waste Electrical and Electronic Equipment) Regulations 2014. [online] Irishstatutebook.ie. Available at: <http://www.irishstatutebook.ie/eli/2014/si/149/made/en/print> [Accessed 30 Sep. 2017].

¹⁵⁰ Ibid. (Min-Guide)

¹⁵¹ Willan, P. (2017). Italians vote on extending rights to the regions. [online] the Guardian. Available at: <https://www.theguardian.com/world/2001/oct/08/philipwillan> [Accessed 2 Oct. 2017].

¹⁵² ISPRA (2009). Soil and Land. Rapporti annuario 2008. Istituto Superiore per la Protezione e la Ricerca Ambientale.

¹⁵³ STEP (2017). Italy: Waste Electrical and Electronic Equipment (WEEE), Legislative Decree, No. 49/2014 - STEP. [online] Step-initiative.org. Available at: <http://www.step-initiative.org/italy-promoting-the-design-and-environmentally-friendly-production-of-eee-ministerial-decree-no-140-2016-copy.html> [Accessed 2 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	Environmentally Friendly Production of EEE, Ministerial Decree No. 140/2016	official English translation, only in Italian language).		role in secondary extraction of raw materials, including some of the CRMs.
Italy	Simplifying the Take back and Handling of Small Waste Electrical and Electronic Equipment (WEEE), Decree No. 121/2016	Additional law setting rules for collecting of WEEE, collection centres and sites for public and private entities (no official English translation, only in Italian language).	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Italy	Fees for Monitoring and Management of Waste Electrical and Electronic Equipment, Decree, June 2016	Tha act establishes fees for EEE producers, to cover cost of handling with WEEE. The act also monintors the achivment of segregation and recovery targets of WEEE. ¹⁵⁴	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Italy	Extension of Deadlines for Legal Requirements, Law 25/2010	No official English translation, only in Italian language.	Secondary	N/A
Italy	Implementation of Community Obligations, Law 166/2009	The act is setting new rules in implementation of End of Life Vehicles Directive 2000, obligations for the public, main object is to simplify WEEE reporting rules. ¹⁵⁵	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Italy	Legislative Decree on batteries and accumulators 188/08	Imolementing Directive 2006/66 / EC of the European Parliament and of the Council to the national level. The act regulates placing of batteries and accumulators to the market, dealing also with collection, treatment, recycling and disposal of wast batteries and accumulators. ¹⁵⁶	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Italy	Postponement of WEEE Obligations, Law 228, 2006	No official English translation, only in Italian language.	Secondary	N/A
Italy	Relationship between Distributors and Managers of WEEE Collection Facilities, Memorandum of Understanding, June 2010	Memorandum of Undstanding in management of WEEE, in force since 2010, was signed by three parties – ANCI (National Association of Italian Municipalities), WEEE Coordination Centre and Associations of retailers ¹⁵⁷	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the

¹⁵⁴ STEP (2017). Italy: Fees for Monitoring and Management of Waste Electrical and Electronic Equipment, Decree, June 2016 - STEP. [online] Step-initiative.org. Available at: <http://www.step-initiative.org/italy-fees-for-monitoring-and-management-of-waste-electrical-and-electronic-equipment-decree-june-2016.html> [Accessed 2 Oct. 2017].

¹⁵⁵ STEP (2017). Italy: Implementation of Community Obligations, Law 166/2009 - STEP. [online] Step-initiative.org. Available at: <http://www.step-initiative.org/italy-implementation-of-community-obligations-law-1662009.html> [Accessed 2 Oct. 2017].

¹⁵⁶ SAFE (2017). SAFE | Batteries and battery - Battery: legislation. [online] Gruppo-safe.it. Available at: <http://www.gruppo-safe.it/portable-batteries-norm> [Accessed 2 Oct. 2017].

¹⁵⁷ Bernocchi, F. (2013). How can we reach the new WEEE collection targets? Wednesday, 27 February 2013, Brussels.

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
Italy	WEEE & RoHS Implementation, Decree 151, 2005	Implementing two EU Directives (2002/95/EC and 2002/96/EC), the act is prohibiting usage of several hazardous substances in EEE. ¹⁵⁸	Secondary	CRMs. No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Italy	Decree on the establishment and operation of the national register for the management of WEEE 185/07	The act is establishing the national WEEE Register, a Steering Committee and Coordinating Centre for WEEE management. ¹⁵⁹	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Latvia	Law on Subterranean Depths (1996) Ammended 2000	Main Mining Law ¹⁶⁰	Primary	Extraction of mineral resources including CRMs.
Latvia	Cabinet Regulation No 570 of 2012 Procedures for the Extraction of Mineral Resource	Procedures for the extraction of mineral resources and procedures how LV-E3 accept mineral resources ¹⁶¹	Primary	Procedures for extraction of all mineral resources including CRMs
Latvia	Cab. Reg. 470 of 2011 Management of waste from extractive industries	Management of wastes from extractive industries ¹⁶²	Secondary	It facilitates the recovery of extractive waste by reusing or recycling. It covers all waste generated from extraction industries.
Latvia	Management of Waste Electrical and Electronic Equipment (WEEE), Regulation No. 388, 2014	Implements the Waste Electrical and Electronic Equipment (WEEE), Directive 2012/19/EU ¹⁶³	Secondary	It covers labelling requirements for products, their disposal and recovery. CRMs can be recovered.
Latvia	Data Maintenance Registration and Payment for EEE and Battery	Implements several EU directives (2006/66 EC, 2013/56/EU, 2012/19/EU) and the Latvian Waste Management Law 2010 ¹⁶⁴	Secondary	It covers data registrations from manufacturers who are involved in

¹⁵⁸ STEP (2017). Italy: WEEE & RoHS Implementation, Decree 151, 2005 - STEP. [online] Step-initiative.org. Available at: <http://www.step-initiative.org/italy-weee-rohs-implementation-decree-151-2005.html> [Accessed 2 Oct. 2017].

¹⁵⁹ ERP Italy (2017). WEEE. [online] En.erp-recycling.it. Available at: <http://www.en.erp-recycling.it/what-do-you-need/the-system/weee/> [Accessed 2 Oct. 2017].

¹⁶⁰ LIKUMI.LV. (1996). Par zemes dziļēm. [online] Available at: <https://likumi.lv/doc.php?id=40249> [Accessed 10 Oct. 2017].

¹⁶¹ LIKUMI.LV. (2012). Derīgo izrakteņu ieguves kārtība. [online] Available at: <http://likumi.lv/ta/id/251021-derigo-izraktenu-ieguves-kartiba> [Accessed 10 Oct. 2017].

¹⁶² LIKUMI.LV. (2011). Derīgo izrakteņu ieguves atkritumu apsaimniekošanas kārtība. [online] Available at: <http://likumi.lv/ta/id/232278-derigo-izraktenu-ieguves-atkritumu-apsaimniekosanas-kartiba> [Accessed 10 Oct. 2017].

¹⁶³ elektronisko iekārtu kategorijas un marķēšanas prasības un šo iekārtu atkritumu apsaimniekošanas prasības un kārtība. [online] Available at: <http://likumi.lv/doc.php?id=267716> [Accessed 10 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	Producers, Regulation No. 331, 2014			battery production and their disposal and recovery. CRMs can be recovered.
Latvia	Data Registration and Fee Obligations for Electronic Equipment and Battery Manufacturers, Regulation 323/2011	Implements EU directives 2006/66/EC and 2002/96/EC ¹⁶⁵	Secondary	It covers data registrations from manufacturers who are involved in battery production and their disposal and recovery. CRMs can be recovered.
Latvia	Electrical and Electronic Equipment Waste Management, Regulation No. 897, 2011	Implements EU directive (EU: Batteries and Accumulators and Waste Batteries and Accumulators Directive 2006/66/EC) and the Latvian Waste Management Law 2010 ¹⁶²	Secondary	It covers collection and treatment of wastes from electrical and electronic equipment. CRMs can be recovered.
Latvia	Waste Electrical and Electronic Equipment Categories and Labelling Information Requirements, Regulation No. 861, 2011	Implements EU directive (EU: Batteries and Accumulators and Waste Batteries and Accumulators Directive 2006/66/EC) and the Latvian Waste Management Law 2010 ¹⁶⁶	Secondary	It covers labelling requirements from producers for consumer products which range from how to separate wastes to necessary steps for recycling and recovery. CRMs could be recovered.
Lithuania	Underground Law No. I-1034/1995 and its implementing Government Resolutions (No. 1433/2001, No. 198/2002, No. 584/2002)	The Law covers the rights and obligations of any institutions or persons with respect to the exploration, exploitation and protection of the underground of the land territory, of the Continental Shelf and of the economic zone of Lithuania in the Baltic Sea ¹⁶⁷	Primary	Includes all underground resources including mineral and water resources, including CRMs.
Lithuania	Waste Management Law No. VIII-787, 1998	This Law shall establish the basic requirements for the prevention, record keeping, collection, sorting, storage, transportation, utilization and disposal of waste with a view to prevent its negative effects on the environment and human health ¹⁶⁸	Secondary	Primarily concerned with waste management from all economic-commercial activities. Waste

¹⁶⁴ LIKUMI.LV. (2014). Elektrisko un elektronisko iekārtu un bateriju vai akumulatoru ražotāju reģistrācijas kārtība un samaksas kārtība par datu uzturēšanu. [online] Available at: <http://likumi.lv/doc.php?id=267141> [Accessed 10 Oct. 2017].

¹⁶⁵ LIKUMI.LV. (2011). Zaudējis spēku - Noteikumi par elektrisko un elektronisko iekārtu ražotāju un bateriju vai akumulatoru ražotāju reģistrācijas kārtību un samaksu par datu uzturēšanu. [online] Available at: <http://www.likumi.lv/doc.php?id=229382&from=off> [Accessed 10 Oct. 2017].

¹⁶⁶ Step-initiative.org. (2011). Latvia: Waste Electrical and Electronic Equipment Categories and Labeling Information Requirements, Regulation No. 861, 2011 - STEP. [online] Available at: <http://www.step-initiative.org/latvia-waste-electrical-and-electronic-equipment-categories-and-labeling-information-requirements-regulation-no-861-2011.html> [Accessed 10 Oct. 2017].

¹⁶⁷ Fao.org. (1995). details | FAOLEX Database | Food and Agriculture Organization of the United Nations. [online] Available at: <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC005257/> [Accessed 10 Oct. 2017].

¹⁶⁸ Extwprlegs1.fao.org. (1998). [online] Available at: <http://extwprlegs1.fao.org/docs/texts/lit28121.doc> [Accessed 10 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
				utilization is also mentioned which could involve CRMs recovery.
Lithuania	National Strategic Waste Management Plan, Resolution 1252, 2004	Implements EU directives EU: WEEE Directive 2002 - Amendment - Derogations for Czech Rep., Estonia, Hungary, Latvia, Lithuania, Slovakia, Slovenia, Council Decision 2004 and EU: Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC ¹⁶⁹	Secondary	It covers waste collection from several electronics, E-wastes and other materials. CRMs could be recovered from these wastes.
Lithuania	Reporting Obligations of Producers and Importers, Order D1-57, 2006	Implements EU directives (EU: WEEE Directive 2002 - Amendment - Derogations for Czech Rep., Estonia, Hungary, Latvia, Lithuania, Slovakia, Slovenia, Council Decision 2004 and EU: Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC) ¹⁷⁰	Secondary	It covers reporting procedures for producers and importers to quickly identify products for waste management. CRMs could be recovered from these wastes.
Lithuania	Rules on Licensing of Producers and Importers, Resolution 18, 2006	Implements EU directions (EU: WEEE Directive 2002 - Amendment - Derogations for Czech Rep., Estonia, Hungary, Latvia, Lithuania, Slovakia, Slovenia, Council Decision 2004 and EU: Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC) ¹⁷¹	Secondary	It covers licensing rules for organisations of taxable waste management. CRMs could be recovered by these organisations.
Lithuania	Rules on Waste Management of WEEE, Order D1-481, 2004	Implements EU directives (EU: WEEE Directive 2002 - Amendment Derogations for Czech Rep., Estonia, Hungary, Latvia, Lithuania, Slovakia, Slovenia, Council Decision 2004 and EU: Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC) ¹⁷²	Secondary	It covers labeling of equipment, the collection, storage and processing of waste equipment and its waste accounting requirements and procedures. CRMs could be recovered.
Luxembourg	Law of 21 April 1810 (and other mining Laws from the 19 th century such as the Law of 21 April 1810, of 14 October of 1842 and of 30	Main mining acts ¹⁷³	Primary	Law which covers all mineral resources including CRMs.

¹⁶⁹ Wwww3.lrs.lt. (2004). 1252 Dėl Lietuvos Respublikos Vyriausybės 2002 m. balandžio 12 d. nutarimo Nr. 519 "Dėl valstybinio st.... [online] Available at: http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=242606 [Accessed 10 Oct. 2017].

¹⁷⁰ Wwww3.lrs.lt. (2006). D1-57 Dėl Gamintojų ir importuotojų organizacijos veiklos organizavimo plano, finansavimo schemos ir šv.... [online] Available at: http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_e?p_id=270393 [Accessed 10 Oct. 2017].

¹⁷¹ Wwww3.lrs.lt. (2006). 18 Dėl Gaminių ir (ar) pakuočių atliekų tvarkymo organizavimo licencijavimo taisyklių patvirtinimo. [online] Available at: http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_e?p_id=269093&p_query=&p_tr2= [Accessed 10 Oct. 2017].

¹⁷² E-seimas.lrs.lt. (2004). D1-395 Dėl aplinkos ministro 2004 m. rugsėjo 10 d. įsakymo Nr. D1-481 "Dėl Elektros ir elektroninės įran.... [online] Available at: <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.260920> [Accessed 10 Oct. 2017].

¹⁷³ concernant les mines, minières et carrières et instructions ministérielles du 3 août 1810. (2017). [ebook] Available at: http://www.itm.lu/files/live/sites/itm/files/legislation/securite/mines/loi_21_avril_1810.pdf [Accessed 10 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	April 1890)			
Luxembourg	WEEE and RoHS Regulation, 18 January 2005	The purpose of this regulation is the prevention of waste from electrical and electronic equipment, and the reuse, recycling and transformation of such equipment with a view to reducing the waste to be disposed of ¹⁷⁴	Secondary	It covers waste collection from several electronics, E-wastes and other materials. CRMs could be recovered from these wastes.
Luxembourg	Law of 20 July 2017 on the exploration and use of space resources.	Future act dealing with exploration and use of space resources ¹⁷⁵	Primary	Space resources could have some CRMs.
Malta	Act XXIII of 2009 - Malta Resources Authority Act (Chapter 423)	Main mining act ¹⁷⁶	Primary	Law which covers all mineral resources including CRMs.
Malta	S.L.549.63 - Waste Regulations	These regulations bring into effect the provisions of Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 ¹⁷⁷	Secondary	General regulations for waste management and recovery. CRMs could be recovered from wastes.
Malta	(S.L. 435.82 - Management of Waste from Extractive Industries and Backfilling) Regulations 2009	These regulations bring into effect the provisions of Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries and amending Directive 2004/35/EC ¹⁷⁸	Secondary	General waste management from extractive industries.
Malta	Waste Management (Electrical and Electronic Equipment) Regulations, 2014	These regulations bring into effect the provisions of Directive 2012/19/EC of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment and repealing Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 ¹⁷⁹	Secondary	Regulations for reducing the environmental impacts of wastes from electrical and electronic equipment and improving their efficiency. CRMs could be recovered from these wastes.
Malta	Waste Management (Packaging and Packaging Waste) (Amendment) Regulations, 2014, L.N. 444 of 2014	Waste management from packaging ¹⁸⁰	Secondary	Waste management plan for reducing waste and eliminating packaging not certified for use in Malta. Some CRMs could be recovered from such wastes.

¹⁷⁴ Legilux.public.lu. (2005). Mémorial A n° 13 de 2005 - Legilux. [online] Available at: <http://www.legilux.public.lu/leg/a/archives/2005/0013/a013.pdf#page=2> [Accessed 10 Oct. 2017].

¹⁷⁵ Legilux.public.lu. (2017). Loi du 20 juillet 2017 sur l'exploration et l'utilisation des ressources de l'espace. - Legilux. [online] Available at: <http://legilux.public.lu/eli/etat/leg/loi/2017/07/20/a674/jo> [Accessed 10 Oct. 2017].

¹⁷⁶ Justiceservices.gov.mt. (2009). [online] Available at: <http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lom&itemid=8889&l=1> [Accessed 10 Oct. 2017].

¹⁷⁷ Justiceservices.gov.mt. (2011). [online] Available at: <http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lom&itemid=11514&l=1> [Accessed 10 Oct. 2017].

¹⁷⁸ Justiceservices.gov.mt. (2009). [online] Available at: <http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lom&itemid=10927&l=1> [Accessed 10 Oct. 2017].

¹⁷⁹ Justiceservices.gov.mt. (2014). [online] Available at: <http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lp&itemid=26115&l=1> [Accessed 10 Oct. 2017].

¹⁸⁰ Justiceservices.gov.mt. (2014). [online] Available at: <http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lp&itemid=26530&l=1> [Accessed 10 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
Netherlands	Mining act (<i>Mijnbouwwet</i>) (last amended in 2012)	Main mining law ¹⁸¹	Primary	Law which covers all mineral resources including CRMs.
Netherlands	Mining decree (<i>Mijnbouwbesluit</i>) (last amended in 2011)	Main mining decree ¹⁸²	Primary	Decree which covers all mineral resources including CRMs.
Netherlands	Waste management act (March 2003, last amended 2009)	Waste management act ¹⁸³	Secondary	General waste management act. CRMs could be recovered in the recycling stage.
Netherlands	Regulation on batteries and accumulators 2008088170/2008	Regulations on batteries and accumulators ¹⁸⁴	Secondary	Regulations for batteries and accumulators from manufactures and their waste management program. CRMs could be recovered from batteries.
Netherlands	Repealing Decree on Management of Electrical and Electronic Equipment, Decree, 19 June 2014	Implements EU: Waste Electrical and Electronic Equipment (WEEE), Directive 2012/19/EU ¹⁸⁵	Secondary	Sustainable production and consumption of EEE. This plan may include recycling of CRMs.
Netherlands	Waste Electrical and Electronic Equipment (WEEE), Regulation, No. IENM/BSK-2014/14758, 2014	Implements EU directive (EU: Waste Electrical and Electronic Equipment (WEEE), Directive 2012/19/EU) ¹⁸⁶	Secondary	It covers waste collection from several electronics, E-wastes and other materials. CRMs could be recovered from these wastes.
Netherlands	WEEE and RoHS Implementation Decree, 6 July 2004	Implements EU: RoHS Directive 2002/95/EC, EU: Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC, EU: Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC Amendment (on Article 9 financing of WEEE from users other than private households), Directive 2003/108/EC and Netherlands: Environmental Management Act, 1979 ¹⁸⁷	Secondary	Decree covering waste collection from several electronics, E-wastes and other materials. CRMs could be recovered from these wastes.

¹⁸¹ Wetten.overheid.nl. (2012). wetten.nl - Regeling - Mijnbouwwet - BWBR0014168. [online] Available at: <http://wetten.overheid.nl/BWBR0014168/2016-05-01> [Accessed 10 Oct. 2017].

¹⁸² Wetten.overheid.nl. (2011). wetten.nl - Regeling - Mijnbouwbesluit - BWBR0014394. [online] Available at: <http://wetten.overheid.nl/BWBR0014394/2016-07-01> [Accessed 10 Oct. 2017].

¹⁸³ Environmental Management Act. (2004). [ebook] The Hague: Ministry of Housing, Spatial Planning and the Environment. Available at: <http://www.asser.nl/upload/eel-webroot/www/documents/national/netherlands/EMA052004.pdf> [Accessed 10 Oct. 2017].

¹⁸⁴ Regulation on WEEE 14758/2014 [Dutch]. (2014). [ebook] Available at: http://www.weee-europe.com/files/pdf-2016/NL_Batt-K-K-2008088170.pdf [Accessed 10 Oct. 2017].

¹⁸⁵ Zoek.officielebekendmakingen.nl. (2014). Besluit van 19 juni 2014, houdende intrekking van het Besluit beheer elektrische en elektronische apparatuur en wijziging van enkele andere besluiten. [online] Available at: <https://zoek.officielebekendmakingen.nl/stb-2014-239.html> [Accessed 10 Oct. 2017].

¹⁸⁶ Waste Electrical and Electronic Equipment (WEEE) [Dutch]. (2014). Available at: <https://zoek.officielebekendmakingen.nl/stcrt-2014-2975.pdf>.

¹⁸⁷ STEP (2004). Netherlands: WEEE and RoHS Implementation Decree, 6 July 2004 - STEP. [online] Available at: <http://www.step-initiative.org/netherlands-weee-and-rohs-implementation-decree-6-july-2004.html> [Accessed 10 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
Poland	Geological and Mining Law (unif. text J.L. of 2015, item 196)	Article 1 of the Geological and Mining Law states that "The Act defines the terms and conditions for undertaking, execution and completion of activities in the scope of: 1) geological works; 2) minerals exploitation from deposits; 3) non-reservoir storage of substances in the subsurface; 4) storage of waste in the subsurface" Also the Act shall set out requirements for the protection of mineral deposits, groundwater, and other components of the environment in connection to all the activities mentioned above ¹⁸⁸	Primary	Any CRM which may be mined
Poland	Act on Extractive Wastes (unif. text J.L. 2013, item 1136)	Present Act amends provisions concerning management of mining waste. In this act the holder of mining waste is obliged to reduce the negative impact of mining waste on the environment, human life and health and to prevent or reduce any adverse effects resulting from the management of extractive waste, even after the closure of the mine ¹⁸⁹	Secondary	Possible CRM Recovery from Mine Waste
Poland	Regulation of the Minister of the Environment on Detailed Criteria for the Classification of Extractive Waste Facilities (J.L. 2011, No. 86, item 477)	Waste Management – Detailed provisions for classification of Waste Facilities in Extractive Industry.	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Poland	Regulation of the Minister of the Environment on the Criteria for Assigning Extractive Waste into Inert Waste (J.L. 2011, No.175, item 1048)	Waste Management. Classification of Extractive Waste and criteria for categorisation of waste (into inert/hazardous etc. waste).	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Poland	Regulation of the Minister of the Environment on Extractive Waste Characterization (J.L. 2013, item	Waste Management. Provision for Characterization of Extractive Waste.	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and

¹⁸⁸ Ministerstwo Środowiska (2017). Geological and Mining Law Act of June 2011 Available at https://www.mos.gov.pl/g2/big/2012_06/e1fd8f256cbc5cefb421364232bf09dc.pdf [Accessed on 02.10.2017]

¹⁸⁹ Ecolex (2017). Act amending the Mining Wastes Act. [online] Ecolex.org Available at <https://www.ecolex.org/details/legislation/act-amending-the-mining-wastes-act-lex-faoc129565/> [Accessed on 02.10.2017]

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	759)			secondary extraction of raw materials, including some of the CRMs.
Poland	Regulation of the Minister of the Environment on the Monitoring of Extractive Waste Facility (J.L. 2014, item 875)	Provisions for Monitoring of Waste Facilities.	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Poland	Regulation of the Minister of the Environment on the Financial Guarantee and its Equivalent for a Disposal of Extractive Waste (J.L. 2015, item 311)	Provisions for Financial Guarantee in case of Disposal of Waste.	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Poland	Act on Wastes (J.L. 2013, item 21)	Waste management rules, plans, recordings and reporting Special Rules on Waste Management, Provisions for Conduct of Waste Recycling ¹⁹⁰	Secondary	Possible CRM Recovery from General Waste.
Poland	Law on Batteries and accumulators 2009/79	Aim of this law is to limit negative impact of batteries and accumulators and waste batteries and accumulators on environment Also includes promoting high rates of collecting of waste portable batteries and accumulators. ¹⁹¹	Secondary	Possible CRM Recovery from Waste Batteries.
Poland	WEEE Act 2005	This act is influenced by the European Directive 2002/96/EC with aims including the prevention of waste from electrical and electronic equipment, reduction of waste volumes through reuse, the introduction of provisions for collection, recovery and recycling quotas and the reduction of the content of hazardous substances in the equipment. ¹⁹²	Secondary	Possible CRM Recovery from WEEE.
Poland	Law on WEEE 2015/1688	Law contains General Provisions related to protecting the environment and people's health by preventing unfavourable effects of generating waste electronic and electrical equipment.	Secondary	Possible CRM Recovery from WEEE

¹⁹⁰ Karpus, K (2013). Polish Yearbook of Environmental Law “The new Polish Act on Waste of 2012” Available at <http://dx.doi.org/10.12775/PYEL.2013.003> [Accessed on 02.10.2017]

¹⁹¹ b2bwsee (2015). The Law of 24 April 2009 on batteries and accumulators (Unofficial Translation) Available at http://www.b2bwsee.com/files/legislation/polandbatteries_en.pdf [Accessed on 02.10.2017]

¹⁹² Valpak 2017 A Quick Guide to WEEE Legislation in Poland

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
		Also, there are Provisions for Obligation on economic operators that place equipment on the market. Provisions for Financial guarantee in case of equipment recovery; collecting and transporting WEEE; Activities regarding recycling and recovery from WEEE. ¹⁹³		
Poland	Templates for Certificate for Verification of WEEE Recycling and Other Processes, Regulation No. 2213, 2016	Provisions for Verification of Certificate for WEEE Recycling.	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Poland	Specific Product Fee Rates for Electrical Equipment, Regulation Nr. 2230, 2016	Listing of Product Fee Rates.	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Poland	Scope and Design of Annual Report on Processing of WEEE, Regulation Nr. 2184, 2016	Designing of Report on WEEE Processing.	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Poland	Reporting Template for Management of WEEE, Regulation Nr. 2186, 2016	Provisions for template for Management of WEEE.	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Poland	Model Templates for Registration of Manufacturers for Placing Electrical and Electronic Equipment on the Market and Authorised Representatives,	Provisions for Model Templates for Registration of Manufacturers for Placing Electrical and Electronic Equipment. Provisions for Regulation of Authorised Representatives.	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the

¹⁹³ Ministerstwo Środowiska (2017). Act dated September 11, 2015 on waste electrical and electronic equipment Available at https://www.mos.gov.pl/g2/big/2015_10/3375d84bb2d58d652c9a71e6344c4882.pdf [Accessed on 02.10.2017]

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	Regulation 2353/2015			CRMs.
Poland	Templates for Certificate for Verification of WEEE Recycling and Other Processes, Regulation Nr. 112, 2015	Provisions for Verification of Certificate for WEEE Recycling.	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Portugal	Law 54/2015, defining the legal bases for mining activities, 2015-06-22	Legal Framework for the Discovery and Use of the Geological Resources Located in Portugal (including National Maritime Space). ¹⁹⁴	Primary	Any CRM which may be mined.
Portugal	Decree-law 544/99, regulating mining waste management, 1999-12-13	This Decree lays down provisions for the construction, operation and closure of landfills of waste resulting from the mining activity. ¹⁹⁵	Secondary	Possible CRM Recovery from mining waste.
Portugal	Decree-law n. ° 10/2010, of February 4, waste management of mineral deposits exploration and mineral masses, amended by Decree-Law n.° 31/2013	Provisions for legal regime of waste management including recycling.	Secondary	Possible CRM Recovery from mining waste.
Portugal	Management of Electrical and Electronic Waste, Decree-Law No. 67/2014	This Law approves the legal regime for the management of waste electrical and electronic equipment (WEEE), and establishes measures to protect the environment and human health This law also looks into management of these wastes, reducing overall impacts of resource use and improving the efficiency and contributing to sustainable development, transposing into national law Directive 2008/98/EC of EU Parliament. ¹⁹⁶	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Portugal	Determination of Annual Fee Payable to WEEE Managing Entity,	Full Text not Available in English.	Secondary	No direct relevance to the CRMs, more efficiency design of electrical

¹⁹⁴ The International Comparative Legal Guide to Mining Law 2018 5th Edition; Global Legal Group, Available at http://www.vda.pt/xms/files/Publicacoes/2017/ML18_Chapter-25_Portugal_MP_e_MXF.pdf [Accessed on 02.10.2017]

¹⁹⁵ Richer, E. (2017). *The Mining Law Review*. [online] <http://www.newslettercra.com>. Available at: http://www.newslettercra.com/cra_lisbon/assts/downloads/Portugal2014.pdf [Accessed 2 Oct. 2017]

¹⁹⁶ STEP (2017). Portugal: Management of Electrical and Electronic Waste, Decree-Law No. 67/2014 Available at <http://www.step-initiative.org/portugal-management-of-electrical-and-electronic-waste-draft-decree-law-february-2014.html> [Accessed on 02.10.2017]

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	Order No. 8002/2011			equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Romania	Mining Law 85/2003	This Law regulates all the aspects related to mining activities in Romania. ¹⁹⁷	Primary	Any CRM which may be mined.
Romania	Government Decision no. 856/2008 on extractive industries waste management Order no. 2042/2934/180/2010 approving the procedure for approving the plan for managing waste from extractive industries and its normative content, issued by: THE MINISTRY OF ENVIRONMENT AND FORESTS, MINISTRY OF ECONOMY, TRADE AND BUSINESS ENVIRONMENT and NATIONAL AGENCY FOR MINERAL RESOURCES	This Decision/order is a direct transposition of EU Directive 2006/21/EC It contains legal framework concerning the guidelines, measures and procedures to prevent or reduce as far as possible any adverse effects on the environment and any health risks to the population, arising because of waste management in extractive industries. ¹⁹⁸	Secondary	Possible CRM recovery from mining waste.
Romania	Approving Procedure and Criteria for Licensing of Collective Organizations for WEEE Management, Order 1494/2016	Licensing of Collective organisation for WEEE Management.	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Romania	Waste Electrical and Electronic Equipment (WEEE), Ordinance No. 5/2015	Implements EU: Waste Electrical and Electronic Equipment (WEEE), Directive 2012/19/EU No English Translation Available of the Ordinance. ¹⁹⁹	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and

¹⁹⁷ Ropecpa (2012). Mining Law 85/2003 Available at http://www.ropecpa.ro/en/legislatie_oil_gas/mining-law-85-2003/2/ [Accessed on 02.10.2017]

¹⁹⁸ Maftei, R., Filipciuc, C. and Tudor, E. (2014). *Mine waste management legislation. Gold mining areas in Romania*. [Online] <http://meetingorganizer.copernicus.org>. Available at: <http://meetingorganizer.copernicus.org/EGU2014/EGU2014-5695.pdf> [Accessed 2 Oct. 2017].

¹⁹⁹ STEP (2017). Romania – Ordinance No. 5/2015. Available at <http://www.step-initiative.org/romania-waste-electrical-and-electronic-equipment-weee-draft-decision-january-2014.html> [Accessed on 02.10.2017]

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
				secondary extraction of raw materials, including some of the CRMs.
Romania	Authorisation of WEEE Collectors, Order 1225/2005	Provisions for Authorising collectors.	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Romania	Marking of Electrical and Electronic Equipment, Order No. 556/2006	No English Translation available.	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Romania	Methodology for Providing a Financial Guarantee for Manufacturers of Electrical and Electronic Equipment, Order No. 1441/2011	Financial Guarantee Methodology for Electrical and Electronics Equipment Manufacturers.	Secondary	No direct relevance to the CRMs, more efficiency design of electrical equipments can help in recycling and secondary extraction of raw materials, including some of the CRMs.
Slovakia	Mining Law (Law No. 44/1988 Coll. with amendments)	General mining act, regulate condition for mining activities and activities executed in mining way, dealing also with mineral processing (rational utilisation), safety of mining operations and workers. ²⁰⁰	Primary	Law which covers all mineral resources including CRMs.
Slovakia	Geological Law (Law No. 569/2007 Coll. with amendments)	Act is dealing with reporting, penalties, conditions and rules of all geological works including exploration of raw materials. ²⁰¹	Primary	No direct relevance to the CRMs, act is dealing generally with all raw materials.
Slovakia	Law No. 514/2008 Coll. on the treatment of waste from mining	The right and obligations of legal entities and physical persons - entrepreneurs responsible for the management of extractive waste, the role of the state	Secondary	No direct relevance to the CRMs, more efficient management of waste

²⁰⁰ Min-Guide (2016). Minerals Policy Country Profile Slovakia. [online] MIN GUIDE. Available at: http://www.min-guide.eu/sites/default/files/project_result/Minerals_Policy_Country_Profile_SK.pdf [Accessed 5 Oct. 2017].

²⁰¹ Ibid (Min-Guide)

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	industry, as amended by the laws 255/2011 Coll., 563/2009 Coll., 180/2013 Coll. and 79/2015 Coll.	administration in the management of extractive waste, liability for the breach of duties are stated this law. ²⁰²		from mining industry can help in secondary extraction of raw materials, including some of the CRMs.
Slovakia	Waste, Act 79/2015	Novelization of waste act 223/2001, mostly dealing with management, production of WEEE and waste from processing of WEEE. ²⁰³	Secondary	No direct relevance to the CRMs, more efficient management of the WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Slovakia	Waste Act, 223/2001	General waste law, implement many EU directives including RHoS (Restriction of the use of certain Hazardous Substances) and partly also WEEE. ²⁰⁴	Secondary	No direct relevance to the CRMs, more efficient management of the waste can help in secondary extraction of raw materials, including some of the CRMs.
Slovakia	Contributions to the Recycling Fund Order 359/2005	Regulation determines rates of payments to the Recycling Fund, setting registration of goods, materials and devices for which is obligated to contribute to the fund. ²⁰⁵	Secondary	No direct relevance to the CRMs, more efficient management of the waste can help in secondary extraction of raw materials, including some of the CRMs.
Slovakia	WEEE Collection and Recovery Targets, Order 388/2005	The act is in force since 2005, it sets rates and recovery targets for WEEE, reuse items and recycling components. ²⁰⁶	Secondary	No direct relevance to the CRMs, more efficient management of the WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Slovakia	WEEE Management and RoHS	In the force since June 2010, the act is dealing with management of EEE and WEEE. ²⁰⁷	Secondary	No direct relevance to the CRMs,

²⁰² MŽP SR (2015). 79 ACT of 17 March 2015 on waste and on amendments to certain acts. [online] Available at: https://www.minzp.sk/files/sekcia-enviromentalneho-hodnotenia-riadenia/odpady-a-obaly/registre-a-zoznamy/act-no-79_2015-on-waste.pdf [Accessed 9 Oct. 2017].

²⁰³ STEP (2017). Slovak Republic: Waste, Act 79/2015. [online] Step-initiative.org. Available at: <http://www.step-initiative.org/slovak-republic-waste-act-79-2015.html> [Accessed 9 Oct. 2017].

²⁰⁴ STEP (2017). Slovak Republic: Waste Act, 223/2001. [online] Step-initiative.org. Available at: <http://www.step-initiative.org/slovak-republic-waste-act-2232001.html> [Accessed 9 Oct. 2017].

²⁰⁵ MŽP SR (2005). State of the Environment Report Slovak Republik. [online] Available at: <https://enviroportal.sk/uploads/spravy/2005-8-I-enviro-care.pdf> [Accessed 9 Oct. 2017].

²⁰⁶ STEP (2017). Slovak Republic: WEEE Collection and Recovery Targets, Order 388/2005 - STEP. [online] Step-initiative.org. Available at: <http://www.step-initiative.org/slovak-republic-weee-collection-and-recovery-targets-order-3882005.html> [Accessed 9 Oct. 2017].

²⁰⁷ STEP (2017). Slovak Republic: WEEE Management and RoHS Exemptions, Ministerial Decree, 315/2010 - STEP. [online] Step-initiative.org. Available at: <http://www.step-initiative.org/slovak-republic-weee-management-and-rohs-exemptions-ministerial-decree-3152010.html> [Accessed 9 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	Exemptions, Ministerial Decree, 315/2010			more efficient management of the WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Slovenia	Mining Act No. 56/1999 as amended by Law 68/2008, Law No. 61/10, 62/2010 corr., 76/2010, 57/2012, 111/2013, 14/2014	General mining act setting rules for exploration, mining rights. No CRM mention, only energetic raw materials has the 'strategic importance' label. ²⁰⁸	Primary	Law which covers all mineral resources including CRMs.
Slovenia	Regulation on the management of waste from extractive industries (Official Gazette No. 43/2008)	ECOLEX:"This Regulation of the Government of the Republic of Slovenia (implementing the Environmental Protection Act and Directive 2006/21/EC on the management of waste from extractive industries), which is composed of 25 articles and three Annexes, establishes measures and procedures to prevent or reduce as far as possible any adverse effects on the environment, water, air, soil, fauna, flora, cultural heritage and landscape, and any risks to human health, brought about because of the management of waste from the extractive industries." ²⁰⁹	Secondary	No direct relevance to the CRMs, more efficient management of waste from mining industry can help in secondary extraction of raw materials, including some of the CRMs.
Slovenia	Implementation of the Decree on Taxation of Environmental Pollution Caused by the Generation of Waste Electrical and Electronic Equipment (WEEE), Guidelines No. 7/2015	This act implements payments, taxes for producers of WEEE. ²¹⁰	Secondary	No direct relevance to the CRMs, more efficient management of the WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Slovenia	Waste Electrical and Electronic Equipment, Decree 2350, UL 55/2015	This act implements EU Directive 2002/96/EC (WEEE) and 2012/19/EU (WEEE Recast) into national level. The act is dealing with collection, treatment, disposal and finance issues regarding WEEE. ²¹¹	Secondary	No direct relevance to the CRMs, more efficient management of the WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Slovenia	Conditions on Public Services of	The act is dealing with implementation of WEEE management services for public. ²¹²	Secondary	No direct relevance to the CRMs,

²⁰⁸ Rokavec, D. and Mezga, K. (2017). Mineral Deposits of Public Importance (MDoPI) in Slovenia. *Geologija*, 60(1), pp.117-128.

²⁰⁹ ECOLEX (2017). Regulation on the management of waste from extractive industries. [online] Ecoler.org. Available at: <https://www.ecolex.org/details/legislation/regulation-on-the-management-of-waste-from-extractive-industries-lex-faoc097945/> [Accessed 9 Oct. 2017].

²¹⁰ STEP (2017). Slovenia: Implementation of the Decree on Taxation of Environmental Pollution Caused by the Generation of Waste Electrical and Electronic Equipment (WEEE), Guidelines No. 7/2015. [online] Step-initiative.org. Available at: <http://www.step-initiative.org/slovenia-implementation-of-the-decree-on-taxation-of-environmental-pollution-caused-by-the-generation-of-waste-electrical-and-el.html> [Accessed 9 Oct. 2017].

²¹¹ IBM Slovenia (2017). IBM Recovery and Recycling of Waste Electrical and Electronic Equipment (WEEE) - Slovenia. [online] Ibm.com. Available at: <https://www.ibm.com/ibm/recycle/si-sl/weee-en/index.shtml> [Accessed 9 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
	WEEE Management Decree 4863, 2004	No official translation available.		more efficient management of the WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Slovenia	Environmental Tax for Waste Electrical and Electronic Equipment (WEEE), Order 5824, UL 110/2010	The act is setting payment ("environmental fees") for pollution caused by generation of WEEE. ²¹³	Secondary	No direct relevance to the CRMs, more efficient management of the WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Spain	Mining Law 22/1973 (and its regulations approved by Royal Decree 2857/1978, of 25 August.)	General mining law, which is frameworking prospection, extraction of mineral resources in Spain (onshore and offshore, continental shelf). The law is not mentioning the CRMs. ²¹⁴	Primary	Law which covers all mineral resources including CRMs.
Spain	Royal Decree 975/2009 of 12th June on management of extractive industries wastes and protection and reclamation of land affected by mining operations. Royal Decree 777/2012 of 4th May, modifying Royal Decree 975/2009.	The act is setting rules for waste management generated from mining and extractive industry. Act regulates also protection and remediation of the land affected by mining activities. ²¹⁵	Secondary	No direct relevance to the CRMs, more efficient management of waste from mining industry can help in secondary extraction of raw materials, including some of the CRMs.
Spain	Royal decree on batteries and accumulators 106/2008	Decree dealing with management of waste betteries and accumulators. Law contains mentions about favourable design of batteris, allowing secondary extraction of contained materials. Orders also reporting on amount of the materials in waste batteries. ²¹⁶	Secondary	No direct mentions of the CRMs, the act is mentioning secondary extraction of materials contained in waste batteries

²¹² STEP (2017). Slovenia: Conditions on Public Services of WEEE Management Decree 4863, 2004. [online] Step-initiative.org. Available at: <http://www.step-initiative.org/slovenia-conditions-on-public-services-of-weee-management-decree-4863-2004.html> [Accessed 9 Oct. 2017].

²¹³ STEP (2017). Slovenia: Environmental Tax for Waste Electrical and Electronic Equipment (WEEE), Order 5824, UL 110/2010. [online] Step-initiative.org. Available at: <http://www.step-initiative.org/slovenia-environmental-tax-for-waste-electrical-and-electronic-equipment-weee-order-5824-ul-1102010.html> [Accessed 10 Oct. 2017].

²¹⁴ MIN-GUIDE (2016). Minerals Policy Country Profile Spain. [online] MIN GUIDE. Available at: http://www.min-guide.eu/sites/default/files/project_result/Minerals_Policy_Country_Profile_ES.docx.pdf [Accessed 5 Oct. 2017].

²¹⁵ Ibid. (Min-Guide, Spain).

²¹⁶ Global-Regulation (2017). Machine Translation of "Royal Decree 106/2008 Of 1 February On Batteries And Accumulators And Their Waste Environmental Management." (Spain). [online] Global-regulation.com. Available at: <https://www.global-regulation.com/translation/spain/1444744/royal-decree-106-2008-of-1-february-on-batteries-and-accumulators-and-their-waste-environmental-management.html> [Accessed 10 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
Spain	Royal decree on WEEE 110/2015	Decree regulate management of WEEE (prevention, collection, treatment and reduction of impact on human health and environment). Mentioning also "eco-design" of EEE and extraction of secondary raw materials. ²¹⁷	Secondary	No direct mentions of the CRMs, the act is mentioning secondary extraction of valuable raw materials (which can be by CRMs as well).
Spain/Andalusia	Approving Waste Regulation, Decree 73/2012	The act is valid for Autonomous Community of Andalusia setting rules for production, possession and management of waste. It promotes recycling and reuse; waste landfill is approved only if there is no other viable option. ²¹⁸	Secondary	No direct relevance to the CRMs, more efficient management of waste can help in secondary extraction of raw materials, including some of the CRMs.
Sweden	Minerals Act (1991:45) as amended subsequently	Act regarding application, Decision, Extension of the Period, Transfer, Fee, Mineral Rights for an Exploration Permit Few amendments were abolition of the rules giving the state a half share in mines (1993:690), introduction of protection zone rules for mines (1998:165) and adapted to the new Environmental Code (1998:808), which entered into force on the same date. ²¹⁹	Primary	Any CRM which may be mined
Sweden	Environmental Code (Chapter 15) and Ordinance about extraction waste (2013:319)	This regulation lays down provisions on precautions to prevent or, as far as possible limit the harmful effects on human health and the environment may arise because of the management of waste from the industrial that extracts topics and materials by breaking or at otherwise remove them from the Earth's crust or processing or otherwise handles quarried materials (extractive industries). Linked to chapter 15 in the Environmental Code - Waste. (EC Directive on the management of waste from the extractive industries) ²²⁰	Secondary	No direct relevance to the CRMs, more efficient management of waste can help in secondary extraction of raw materials, including some of the CRMs.
Sweden	Ordinance of producer responsibility for electrical and electronic products (Swedish Code of Statutes SFS 2014 : 1075)	The producer responsibility implies an obligation to accept returned products when they have become waste as well as covering the management of WEEE (waste electrical and electronic equipment) and financial responsibility for such activities. A producer is obliged to register with the Swedish Environmental Protection Agency (EPA). The registration is mandatory independent of if the producer has joined a	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.

²¹⁷ STEP (2017). Spain: Waste Electrical and Electronic Equipment (WEEE), Royal Decree 110/2015. [online] Step-initiative.org. Available at: <http://www.step-initiative.org/spain-weee-rohs-decree-2082005.html> [Accessed 10 Oct. 2017].

²¹⁸ Lozano, B. and Cogilniceanu, D. (2013). Environmental Legislation Annual Report - 2012 - Spain. [online] IUS Publicum. Available at: http://www.ius-publicum.com/repository/uploads/01_04_2013_14_26_B_Lozano_Environmental_legislation.pdf [Accessed 9 Oct. 2017].

²¹⁹ Sgu (2017). Legislation. [online] Available at: <https://www.sgu.se/en/mining-inspectorate/legislation/> [Accessed 8 Oct. 2017].

²²⁰ Global-regulation (2017). Machine Translation of "Regulation (2013:319) Of Extractive Waste" (Sweden). [online] Available at: <https://www.global-regulation.com/translation/sweden/2987621/regulation-%25282013%253a319%2529-of-extractive-waste.html> [Accessed 8 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
		collective waste collection scheme for WEEE. One should register as a producer in the EEB register (Register of electrical and electronic equipment and batteries). ²²¹		
Sweden	Ordinance on producer responsibility for batteries (Swedish Code of Statutes SFS 2008:834)	The purpose of this Ordinance is to ensure that batteries are designed and manufactured in a way that prevents waste and, about waste that is nevertheless generated, that producers provide systems for waste collection, that the batteries can be recycled and that the targets set out in this Ordinance for collection, specific treatment and recycling, are achieved. ²²²	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Sweden	Ordinance on hazardous substances in electrical and electronic equipment (SFS 2012 : 861), amended by SFS 2016 : 1191	The Swedish implementation of the RoHS directive (2011/65/EU). The decree specifies the chemical substances whose use is limited and banned within electrical and electronic equipment and how such products must be marked. ²²³	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
Sweden	Swedish Waste Ordinance (SFS 2011: 927)	The overarching ordinance regulating waste collection and treatment in Sweden. ²²⁴	Secondary	No direct relevance to the CRMs, more efficient management of waste can help in secondary extraction of raw materials, including some of the CRMs.
United Kingdom	Schedule 1, Part 1. Section 17 of The Town and Country Planning (General Permitted Development)	The act states: "The section in The Town and Country Planning which described as conservation area as (a) an area designated as a conservation area under section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990 (designation of conservation areas) (b) an area of outstanding natural beauty (c) An area specified by the Secretary of State for the purposes of section 41(3) of the Wildlife and Countryside Act 1981 (enhancement and protection of the natural beauty and amenity of the countryside) (d) the Broads (e) a National Park	Primary	No direct relevance to CRM.

²²¹ Swedish Environmental Protection Agency. (2017). *Guidance for producers of electrical and electronic equipment*. [online] Available at: <http://www.swedishepa.se/Guidance/Guidance/Waste/Guidance-for-producers/Producers-electrical-and-electronic-equipment/> [Accessed 8 Oct. 2017].

²²² Swedish Code of Statutes (2008). "Purpose and objectives of the ordinance" [online] Available at: <http://eeb.naturvardsverket.se/Global/Lagar%20och%20Regler/SFS%202008%20834%20engelsk.pdf> [Accessed 8 Oct. 2017].

²²³ Riksdagen.se. (2017). Förordning (2012:861) om farliga ämnen i elektrisk och elektronisk utrustning Svensk författningssamling 2012:2012:861 t.o.m. SFS 2016:1191 - Riksdagen. [online] Available at: http://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/forordning-2012861-om-farliga-amnen-i_sfs-2012-861 [Accessed 8 Oct. 2017].

²²⁴ Riksdagen (2017). Avfallsförordning (2011:927) Svensk författningssamling 2011:2011:927 t.o.m. SFS 2017:802 - Riksdagen. [online] Available at: http://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/avfallsforordning-2011927_sfs-2011-927 [Accessed 8 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
United Kingdom/Northern Ireland	Waste Electrical and Electronic Equipment (Charges) Regulations, SI 2014/202	(f) a World Heritage Site. ²²⁵ In the regulation is written: “These Regulations prescribe the charges to be paid to the Department of the Environment under the Waste Electrical and Electronic Equipment Regulations 2013.” “Regulation 4: This regulation also provides that charges paid relating to the approval of schemes and registration as a small producer will not be refunded if approval is refused or withdrawn.” Regulation 5: This regulation also provides that the charges paid relating to the approval of authorised treatment facilities and exporters will not be refunded if approval is refused, suspended or cancelled. Regulation 6 revokes The Waste Electrical and Electronic Equipment (Charges) Regulations (Northern Ireland) 2006”. ²²⁶	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
United Kingdom	Collection of Waste Electrical and Electronic Equipment from Designated Collection Facilities, Code of Practice, March 2014	The purpose of the code is that the Code contains guidance on compliance with the minimum standards which must be met by PCSs and the operators of DCFs under the Regulations and not complying with these minimum standards may result in an enforcement action taken against the PCS or removal of DCF status under the Regulations. ²²⁷	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
United Kingdom	Statutory Instruments the WEEE Regulations 2013/3113	The purpose of this statutory is the protection of the environment from electrical and electronic waste by restriction of the use of certain hazardous substances in electrical and electronic equipments and recovery of waste electrical and electronic waste. ²²⁸	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
United Kingdom	Statutory Instruments the Waste Batteries and Accumulators Regulations 2009/890	Overarching objective: maximising collection of portable batteries The major objective of this regulation is to maximize the separate collection of portable batteries. ²²⁹	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of

²²⁵ The Town and Country Planning (General Permitted Development) (England) Order 2015, Schedule 1, Part 1, p.13. [online] Available at: <https://planningjungle.com/wp-content/uploads/SI-2015-No.-596-The-Town-and-Country-Planning-General-Permitted-Development-England-Order-2015.pdf> [Accessed 8 Oct. 2017].

²²⁶ (2014) The Waste Electrical and Electronic Equipment (Charges) Regulations (Northern Ireland) ,2014 No. 202, p.3,. [online] Available at: https://www.legislation.gov.uk/nisr/2014/202/pdfs/nisr_20140202_en.pdf [Accessed 9 Oct. 2017].

²²⁷ (2014). Code of Practice for the Collection of Waste Electrical and Electronic Equipment (WEEE) from Designated Collection Facilities (DCF), Purpose of the Code of Practice. [online] Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/493059/bis-14-603-code-of-practice-collection-weee-1.pdf [Accessed 9 Oct. 2017].

²²⁸ Legislation.gov.uk. (2013). The Waste Electrical and Electronic Equipment Regulations 2013. [online] Available at: <http://www.legislation.gov.uk/uksi/2013/3113/made> [Accessed 9 Oct. 2017].

Country	Regulation (name in English and/or in original language)	Purpose	Type of CRM targeted	Relevant to CRM
				raw materials, including some of the CRMs.
United Kingdom	On WEEE Regulations SI 2006/3289, Repic and others v. Secretary of State for Business Enterprise and Regulatory Reform and others, Case [2009] EWHC 2015 (Admin)	The purpose of this directive is prevention of waste electrical and electronic equipment by re-use, recycling, improve the environmental performance of all operators involved in life cycle of these equipments. ²³⁰	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
United Kingdom	Reuse of WEEE and Used Electrical and Electronic Equipment, Specification, PAS 141:2011	The main aims of PAS are: To encourage the reuse of WEEE, to reduce WEEE to landfill and incineration, assure and protect consumers of the quality and safety of REEE, provide a tool for identifying REEE and constituent components, encourage job creation in organizations involved in WEEE and UEEE reuse etc. ²³¹	Secondary	No direct relevance to the CRMs, more efficient management of WEEE can help in secondary extraction of raw materials, including some of the CRMs.
United Kingdom	Collection of WEEE from Designated Facilities, Code of Practice, February 2007	This code sets the guidance for for local contracts or service agreements between producers and local authorities or independent persons running DCFs. The code may provide aid for the interpretation of such contracts or service agreement. The code does not have authority for modification of any requirement of legislation. ²³²	Secondary	This code of practice does not have direct relevance to CRM but indirectly the code uses the terms like recycling, treatment and re-use. Hence, indirect relevance to CRMs

Source: compiled from the MINLEX database, and complemented with the databases of WEEE and the Step project (legislation on e-waste)

9.3 STANDARDS

²²⁹ 2009 No. 890 ENVIRONMENTAL PROTECTION The Waste Batteries and Accumulators Regulations 2009. [online] Available at: http://www.legislation.gov.uk/ukxi/2009/890/pdfs/ukxi_20090890_en.pdf [Accessed 9 Oct. 2017].

²³⁰ Bailii.org. (2009). Repic Ltd, R (on the application of) v The Scottish Environment Protection Agency & Anor [2009] EWHC 2015 (Admin) (31 July 2009). [online] Available at: [http://www.bailii.org/cgi-bin/markup.cgi?doc=/ew/cases/EWHC/Admin/2009/2015.html&query=title+\(+repic+\)+and+wEEE&method=boolean](http://www.bailii.org/cgi-bin/markup.cgi?doc=/ew/cases/EWHC/Admin/2009/2015.html&query=title+(+repic+)+and+wEEE&method=boolean) [Accessed 9 Oct. 2017].

²³¹ Step-initiative.org. UK: Reuse of WEEE and Used Electrical and Electronic Equipment, Specification, PAS 141:2011 - STEP. [online] Available at: <http://www.step-initiative.org/uk-reuse-of-weee-and-used-electrical-and-electronic-equipment-specification-pas-1412011.html> [Accessed 9 Oct. 2017].

²³² (2007). Code of Practice for collection of Waste Electrical and Electronic Equipment from Designated Collection Facilities, URN 07/657, p.2. [online] Available at: <http://webarchive.nationalarchives.gov.uk/20090609015917/http://www.berr.gov.uk/files/file37922.pdf> [Accessed 9 Oct. 2017].

9.3.1 PRIMARY CRMS

In Table 5 below there is a wide screening of standards which may be relevant for CRMs along their value chain (stages of exploration, extraction and trading/transportation, recycling not included). The standards in the table below may not pertain to CRMs as such as each country has to define for itself what is critical. However, these standards shape the mode of production, the markets, and hence their availability. They can also serve as role models.

Type of standard – linternational/European/national

Relevance to CRMs - the standards listed in the table below are specific to raw material and could be applicable to CRM

Aim, description – what are the objectives aims/ short description

Observations, remarks – any additional info that should be specified e.g. which stage or value chain is related to

Table 5: List of standards with relevance to primary critical raw materials (CRMs)

Name of standard	Type of standard	Aim, description	Relevance to CRMs	Observations/Remarks
JEITA RC-8105A -Dimensions of rare earth magnet for electro-acoustic transducers	Japanese standard	Standard only available in Japanese	Directly to CRM	
ISO 2353:1972 -Magnesium and its alloys -- Determination of manganese in magnesium alloys containing zirconium, rare earths, thorium and silver -- Periodate photometric method	International standard	This International Standard specifies a photometric method for the determination of manganese in magnesium alloys containing zirconium, and/or rare earths, and/or thorium, and/or silver. The method is applicable to the determination of manganese contents between 0.002% and 0,2%.	Chemical determination CRM	
ISO 2355:1972 -Chemical analysis of magnesium and its alloys -- Determination of rare earths -- Gravimetric method	International standard	This International Standard specifies a gravimetric method for the determination of rare earths in magnesium alloys. The method is applicable to the determination of contents of rare earths	Chemical determination CRM	

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Name of standard	Type of standard	Aim, description	Relevance to CRMs	Observations/Remarks
		between 0.2 and 10 %, in the absence of thorium.		
JIS M 8514 -Metallurgical grade fluorspar - Methods for chemical analysis / Note: Approved 2012-10-22 JIS, 2008-02-20 JIS	Japanese standard	Different method of analysis for the determination of lead, antimony, silicon, phosphorus, sulfur.	Directly to CRM	
ASTM E 508 -Standard Test Method for Determination of Calcium and Magnesium in Iron Ores by Flame Atomic Absorption Spectrometry	American standard	This test method covers the determination of calcium and magnesium in iron ores, concentrates, and agglomerates in the mass fraction (%) range from 0.05 % to 5 % of calcium and 0.05 % to 3 % of magnesium. The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.	Chemical determination CRM	
JIS M 8511 -Methods for industrial analysis and testing of natural graphite	Japanese standard		Chemical determination CRM	
ISO 4293:1982 -Manganese ores and concentrates. Determination of phosphorus content. Extraction-molybdovanadate photometric method.	International standard	This International Standard specifies an extractionmolyb- dovanadate photometric method for the determination of the phosphorus content of manganese ores and concentrates. The method is applicable to products having phosphorus contents from 0,02 to 0,5 % m/m.	Directly to CRM	
ASTM E 463A -Standard Test Method for Determination of Silica in Fluorspar by Silico-Molybdate Visible Spectrophotometry	American standard	This test method covers the determination of silica in fluorspar in concentrations from 0.5 % to 10 %. The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.	Directly to CRM	
ASTM E 815A -Standard Test Method for Determination of Calcium Fluoride in Fluorspar by EDTA Complexometric Titrimetry	American standard	This test method is intended to be used for compliance with compositional specifications for calcium fluoride content. It is assumed that all who use these procedures will be trained analysts capable of performing common laboratory procedures skillfully and safely. It is expected that work will be performed in a properly equipped laboratory and that proper waste disposal procedures will be followed.	Directly to CRM	
JIS K 1468-1 -Acid-grade fluorspar - Method for chemical analysis - Part 1: Determination of moisture content of a lot / Note: Approved 2015-10-20 JIS, 2010-10-01 JIS, 2006-03-25 JIS	Japanese standard	This International Standard specifies a method of determining the mean value of the moisture content of a lot of fluorspar. This method is applicable to all grades of fluorspar, i.e. acid-grade, ceramic-grade and the three metallurgical- grades (concentrate, briquettes)	Chemical determination CRM	
JIS K 1468-2 -Acid-grade fluorspar - Method for chemical analysis Part 2: Determination of available fluorine content - Potentiometric method after distillation / Note: Approved 2015-10-20 JIS, 2010-10-01 JIS, 2006-03-25 JIS	Japanese standard	This International Standard specifies a potentiometric titration method, using an ion-selective electrode, after distillation, for the determination of the available fluorine content of acid-grade fluorspar. The method is applicable to products having a Calcium fluoride content equal to or greater than 90 % (m/m).	Chemical determination CRM	
JIS K 1468-3 -Acid-grade fluorspar - Method for chemical analysis Part 3: Determination of silica content / Note: Approved 2015-10-20 JIS,	Japanese standard	This International Standard specifies a reduced molybdosilicate spectrometric method for the determination of the silica content of acid-grade and ceramic-grade fluorspar.	Chemical determination CRM	

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Name of standard	Type of standard	Aim, description	Relevance to CRMs	Observations/Remarks
2010-10-01 JIS, 2006-03-25 JIS		The method is applicable to products having silica contents, expressed SiO ₂ in the range 0,05 % (m/m) to 4,0 % (m/m)		
JIS K 1468-4 -Acid-grade fluorspar - Method for chemical analysis - Part 4: Determination of total phosphorus content / Note: Approved 2015-10-20 JIS, 2010-10-01 JIS, 2006-03-25 JIS	Japanese standard	This International Standard specifies a reduced- molybdophosphate spectrometric method for the determination of the total phosphorus content of acid-grade and ceramic-grade fluorspar. The method is applicable to products having total phosphorus contents, in the range 0,01 % (m/m) to 1,0 % (m/m).	Chemical determination CRM	
JIS K 1468-5 -Acid-grade fluorspar - Method for chemical analysis - Part 5: Determination of arsenic content / Note: Approved 2015-10-20 JIS, 2010-10-01 JIS, 2006-03-25 JIS	Japanese standard	This International Standard specifies a silver diethyldithiocarbamate spectrometric method for the determination of the arsenic content of all grades of fluorspar. The method is applicable to products having arsenic (As) contents which are equal to or greater than 0,000 1 % (m/m).	Chemical determination CRM	
ISO 6467 -Ferrovanadium — Determination of vanadium content — Potentiometric method	International standard	This document specifies a potentiometric method for the determination of the vanadium content of ferrovanadium. The method is applicable to vanadium contents between 35,0 % and 85,0 % (mass fraction) in ferrovanadium.	Directly to CRM	
ISO 126:2005 -Natural rubber latex concentrate -- Determination of dry rubber content	International standard	This International Standard specifies a method for the determination of the dry rubber content of natural rubber latex concentrate. The method is not necessarily suitable for latices preserved with potassium hydroxide, latices from natural sources other than Hevea brasiliensis , or for compounded latex, vulcanized latex or artificial dispersions of rubber and it is not applicable to synthetic rubber latices.	Directly to CRM	
ISO 12243:2003 -Medical gloves made from natural rubber latex -- Determination of water-extractable protein using the modified Lowry method	International standard	This International Standard specifies a method for the determination of the amount of water-extractable protein in natural rubber (NR) gloves for medical use. The method is potentially suitable for the determination of extractable protein in other articles made from NR latex; however the extraction procedures and times have not been validated and will vary with the type of article to be tested. Other methods for the determination of specific proteins in medical gloves exist (see Annex C) but they are not of general applicability. This International Standard is concerned solely with the method of assay. It is not concerned with sampling nor does it purport to address the safety implications of the values obtained or requirements for labelling.	Directly to CRM	
ISO 498:1992 -Natural rubber latex concentrate -- Preparation of dry films	International standard	This International Standard specifies a method for preparing dry, homogeneous films, substantially free of air bubbles, from natural rubber latex concentrate. The procedure is not necessarily suitable for latices from natural sources other than Hevea brasiliensis or for compounded latex, vulcanized latex or	Directly to CRM	

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Name of standard	Type of standard	Aim, description	Relevance to CRMs	Observations/Remarks
		artificial dispersions of rubber or synthetic rubber latices.		
ISO 123:2001 -RUBBER LATEX SAMPLING	International standard	This International Standard specifies procedures for sampling natural rubber latex concentrate and for sampling synthetic rubber latices and artificial latices. It is also suitable for sampling rubber latex contained in drums, tank cars or tanks. The procedures may also be used for sampling plastics dispersions.	Directly to CRM	
ISO 17403:2014 -Rubber -- Determination of magnesium content of field and concentrated natural rubber latices by titration (cyanide-free method)	International standard	This International Standard specifies a cyanide-free titration method for the determination of the magnesium content in field and concentrated natural rubber latex.	Directly to CRM	
ISO 35:2004 -Natural rubber latex concentrate -- Determination of mechanical stability	International standard	This International Standard specifies a method for the determination of the mechanical stability of natural rubber latex concentrate. It is also applicable to prevulcanized natural rubber latex concentrate. The method is not necessarily suitable for latices or prevulcanized latex preserved with potassium hydroxide, latices from natural sources other than Hevea brasiliensis, or for compounded latex or artificial dispersions of rubber, and it is not applicable to synthetic rubber latices.	Directly to CRM	
ISO 11852:2017 -Rubber -- Determination of magnesium content of field natural rubber latex by titration	International standard	This International Standard specifies titration methods for the determination of the magnesium content of field and concentrated natural rubber latex, respectively.	Directly to CRM	
ISO 2930:2017 -Rubber, raw natural -- Determination of plasticity retention index (PRI)	International standard	This document specifies a method for determining the plasticity retention index (PRI) of raw natural rubber. The PRI is a measure of the resistance of raw natural rubber to thermal oxidation. A high resistance to thermal oxidation is shown as a high value of the index. PRI is not an absolute value and cannot give an absolute classification of plasticity number of different natural rubber after oxidation.	Directly to CRM	
ISO 2004:2017 -Natural rubber latex concentrate -- Centrifuged or creamed, ammonia-preserved types -- Specifications	International standard	This document gives specifications for natural rubber latex concentrate types which are preserved wholly or in part with ammonia and which have been produced by centrifuging or creaming.	Directly to CRM	
ISO/TS 16095:2014 -Reclaimed rubber derived from products containing mainly natural rubber -- Evaluation procedure	International standard	This Technical Specification defines — the physical and chemical tests on raw reclaimed natural rubber, and — the standard materials, standard test formulations, equipment, and processing methods for evaluating the vulcanization characteristics, and the mechanical properties of reclaimed natural rubber.	Directly to CRM	
ISO 125:2011 -Natural rubber latex concentrate -- Determination of alkalinity	International standard	This International Standard specifies a method for the determination of the alkalinity of natural rubber latex concentrate.	Directly to CRM	ISO 125:2011 -Natural rubber latex concentrate --

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Name of standard	Type of standard	Aim, description	Relevance to CRMs	Observations/Remarks
		The method is not necessarily suitable for latices from natural sources other than <i>Hevea brasiliensis</i> or for synthetic rubber latices, compounded latex, vulcanized latex or artificial dispersions of rubber. NOTE A method for the determination of the alkalinity of polychloroprene latex is specified in ISO 13773 (see the Bibliography).		Determination of alkalinity
ISO 19043:2015 -Natural rubber latex concentrate -- Determination of total phosphate content by spectrophotometric method	International standard	This International Standard specifies a method for the determination of total phosphate content of natural rubber latex concentrate. This method is not necessarily suitable for latex from natural sources other than the <i>Hevea brasiliensis</i> .	Directly to CRM	ISO 19043:2015 -Natural rubber latex concentrate -- Determination of total phosphate content by spectrophotometric method
ISO 2027:1990 -Natural rubber latex concentrate, evaporated, preserved -- Specification	International standard	This International Standard gives specifications for natural rubber latex concentrate which has been concentrated by evaporation. It does not apply to natural rubber latex concentrates which have been concentrated by centrifuging or creaming, or to latices from natural sources other than <i>Hevea brasiliensis</i> , or to compounded latex or vulcanized latex.	Directly to CRM	ISO 2027:1990 -Natural rubber latex concentrate, evaporated, preserved -- Specification
ISO 1434:2016 -Natural rubber in bales -- Amount of bale coating -- Determination	International standard	This International Standard specifies two methods for the determination of the amount of bale coating present on the outside wrapper sheets of bales of natural rubber: — ashing method; — brushing or scraping method. The ashing method is the preferred method.	Directly to CRM	ISO 1434:2016 -Natural rubber in bales -- Amount of bale coating -- Determination
ISO 20299-2:2017 -Film for wrapping rubber bales -- Part 2: Natural rubber	International standard	This document specifies the material and physical property requirements for non-strippable low density polyethylene film for wrapping natural rubber bales comprising of block natural rubber of 33,33 kg or 35 kg and natural rubber ribbed smoked sheets including bales of 33,33 kg, 35 kg, 50 kg and 111,11 kg, or any other bale weights as mutually agreed between the parties, and intended to keep the bales separate during transportation and storage.	Directly to CRM	ISO 20299-2:2017 -Film for wrapping rubber bales -- Part 2: Natural rubber
ISO 1802:1992 -Natural rubber latex concentrate -- Determination of boric acid content	International standard	This International Standard specifies a procedure for the determination of boric acid in natural rubber latex concentrate. The procedure is not necessarily suitable for latices from natural sources other than <i>Hevea brasiliensis</i> or for latices of synthetic rubber, compounded latex, vulcanized latex or artificial dispersions of rubber.	Directly to CRM	ISO 1802:1992 -Natural rubber latex concentrate -- Determination of boric acid content
ISO 1658:2015 -Natural rubber (NR) -- Evaluation procedure	International standard	This International Standard specifies — physical and chemical tests on raw natural rubbers; — standard materials, standard test formulae, equipment and processing	Directly to CRM	ISO 1658:2015 -Natural rubber (NR) -- Evaluation procedure

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Name of standard	Type of standard	Aim, description	Relevance to CRMs	Observations/Remarks
		methods for evaluating the vulcanization characteristics of natural rubber (NR).		
ISO 3116:2007 -Magnesium and magnesium alloys -- Wrought magnesium alloys	International standard	This International Standard specifies the chemical composition and mechanical properties of magnesium alloys for wrought products in the form of bars and solid sections, tubes and hollow sections, forgings, and plate and sheet.	Directly to CRM	ISO 3116:2007 - Magnesium and magnesium alloys -- Wrought magnesium alloys
ISO 11707:2011 -Magnesium and its alloys -- Determination of lead and cadmium	International standard	This International Standard specifies the level of competence required of a scuba diver in order to be awarded an enriched air nitrox (EAN) diver certification by a training organization. This International Standard also specifies the conditions under which training is to be provided, which supplement the general requirements for recreational diving services specified in ISO 24803.	Directly to CRM	ISO 11707:2011 - Magnesium and its alloys - - Determination of lead and cadmium
ISO 26202:2007 -Magnesium and magnesium alloys -- Magnesium alloys for cast anodes	International standard	This European Standard specifies the chemical composition of magnesium alloy ingots for anodes and chemical composition of magnesium alloy anode castings	Directly to CRM	ISO 26202:2007 - Magnesium and magnesium alloys -- Magnesium alloys for cast anodes
ISO 16220:2017 -Magnesium and magnesium alloys -- Magnesium alloy ingots and castings	International standard	This document specifies the chemical composition of magnesium alloy ingots and castings. It also specifies the mechanical properties of separately cast samples of these alloys (see Clause 7). By agreement, it also specifies the mechanical properties of magnesium alloy castings determined from samples cut from a casting.	Directly to CRM	ISO 16220:2017 - Magnesium and magnesium alloys -- Magnesium alloy ingots and castings
ISO 16374:2016 -Evaluation method for cleanliness of magnesium and magnesium alloy ingots	International standard	This document describes a method to evaluate the cleanliness and the quality of magnesium and magnesium alloys ingots. The method includes naked eye inspection, the composition analysis and a brightness evaluation procedure based on an ISO standard.	Directly to CRM	ISO 16374:2016 - Evaluation method for cleanliness of magnesium and magnesium alloy ingots
ISO 8287:2011 -Magnesium and magnesium alloys -- Unalloyed magnesium -- Chemical composition	International standard	This International Standard specifies the chemical composition of cast unalloyed magnesium. It specifies classification, designation, testing rules, marking, packing, transportation, storage, and information contained in the contract. This International Standard is for cast unalloyed magnesium produced by the silicon-thermo process or molten salt electrolysis process.	Directly to CRM	ISO 8287:2011 - Magnesium and magnesium alloys -- Unalloyed magnesium -- Chemical composition
ISO 9001:2015 -Quality management systems — Requirements	International standard	This International Standard specifies requirements for a quality management system when an organization: a) needs to demonstrate its ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements, and	To be considered as guide in management	ISO 9001:2015 -Quality management systems — Requirements

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Name of standard	Type of standard	Aim, description	Relevance to CRMs	Observations/Remarks
		b) aims to enhance customer satisfaction through the effective application of the system, including processes for improvement of the system and the assurance of conformity to customer and applicable statutory and regulatory requirements. All the requirements of this International Standard are generic and are intended to be applicable to any organization, regardless of its type or size, or the products and services it provides.		
ISO 14001:2015 -Environmental management systems — Requirements with guidance for use	International standard	This International Standard specifies the requirements for an environmental management system that an organization can use to enhance its environmental performance. This International Standard is intended for use by an organization seeking to manage its environmental responsibilities in a systematic manner that contributes to the environmental pillar of sustainability.	To be considered as guide in management	ISO 14001:2015 - Environmental management systems — Requirements with guidance for use
ISO 14040:2006 -Environmental management — Life cycle assessment — Principles and framework	International standard	This International Standard describes the principles and framework for life cycle assessment (LCA)	To be considered as guide in management	ISO 14040:2006 - Environmental management — Life cycle assessment — Principles and framework
ISO 26000:2010 -This International Standard describes the principles and framework for life cycle assessment (LCA)	International standard	This International Standard provides guidance to all types of organizations, regardless of their size or location, on: a) concepts, terms and definitions related to social responsibility; b) the background, trends and characteristics of social responsibility; c) principles and practices relating to social responsibility; d) the core subjects and issues of social responsibility; e) integrating, implementing and promoting socially responsible behaviour throughout the organization and, through its policies and practices, within its sphere of influence; f) identifying and engaging with stakeholders; and g) communicating commitments, performance and other information related to social responsibility.	To be considered as guide in management	ISO 26000:2010 -This International Standard describes the principles and framework for life cycle assessment (LCA)
ISO/Guide 31 -Reference materials — Contents of certificates, labels and accompanying documentation	International standard	This Guide is intended to help reference material (RM) producers in preparing clear and concise documentation to accompany an RM. It lists and explains mandatory, recommended and other categories of information to be considered in the preparation of product information sheets and RM certificates. This information can be used by RM users and other stakeholders in confirming the suitability of an RM or certified reference material (CRM). This Guide also contains the minimum requirements for a label attached to the RM container.	This guide applies to all reference materials as critical raw materials	ISO/Guide 31 -Reference materials — Contents of certificates, labels and accompanying documentation

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Name of standard	Type of standard	Aim, description	Relevance to CRMs	Observations/Remarks
NF GA X30-012 -Waste - recycling terminology	French standard	This guide presents the follow-up and monitoring of European reflections and the issuing of opinions and proposals on aspects of terminology related to recycling	This guide presents the general terminology on recycling, and this applies to CRMs	NF GA X30-012 -Waste - recycling terminology
Alliance for Responsible Mining (Fairmined Standard)	Responsible Mining Standard under the RJC Chain of Custody (CoC) Standard for precious metals. version 2.0 of the Fairmined Standard Not a voluntary standard as defined by the EC	Pioneering initiative established in 2004 to enhance equity and wellbeing in artisanal and small-scale mining (ASM) communities through improved social, environmental and labour practices, good governance and the implementation of ecosystem restoration practices.	ARM's scope of operation is the extractive industries, with special emphasis on artisanal and small-scale mining, value chain from mine to market of mineral raw materials, with special emphasis on gold. ARM primarily works in standard setting, producer support and communications. Version 2.0 of the Fairmined Standard for Gold from Artisanal and Small-scale Mining, including associated precious metals (including PGMs)	The release of version 2.0 RC, the new standard offers an improved structure to make the document cleaner and user-friendlier compared to the previous version 1.1. It also includes some important changes to provide new opportunities for artisanal and small-scale miners globally and for the market.
Bettercoal Initiative (Bettercoal Code)	Bettercoal Code (Version 1) was launched in June 2013 Not a voluntary standard as defined by the EC	Covers ethical, social and environmental principles and provisions that are relevant to coal mining companies and it is grouped into four areas: General Implementation Expectations, Business Ethics, Human Rights and Social Performance and Environment Bettercoal Initiative → it aims to positively impact on the livelihoods of communities and to promote continuous improvement in the areas of ethical, social and environmental performance of global supply chains.	Coal (coking coal is a CRM)	Bettercoal developed the Bettercoal Code in close consultation with the Stakeholder Advisory Group. Bettercoal performed the global consultation process in line with good practice as defined by ISEAL Code of Good Practice for Setting Social and Environmental Standards .
Ministry of Mines of the Democratic Republic of Congo/BGR (Certified Trading Chains)	CTC principle and standards Not a voluntary	Improve the living conditions of the population of the mining areas through formalizing mineral supply chains, increasing government tax revenue, improved safety in the mines and increased local investment by mining cooperatives. In its first phase (2009-2013), the project aimed at the	Tin, tungsten (CRM), tantalum and gold	Aimed at strengthening of control in the mining sector.

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Name of standard	Type of standard	Aim, description	Relevance to CRMs	Observations/Remarks
	standard as defined by the EC	development and implementation of a mineral certification system focused on gold and the 3Ts, integrating it into national legislation and applying the standards to a volunteer set of producers on first pilot sites in Eastern DRC		CTC is a voluntary system of self-commitment of the partners in the trading chain.
The Conflict-Free Sourcing Initiative (Conflict-Free Smelter Program)	Private (CFSP) Not a voluntary standard as defined by the EC	To help companies make informed choices about conflict minerals in their supply chains. Uses an independent third-party audit of smelter management systems and sourcing practices to validate compliance with CFSP protocols and current global standards.	Conflict minerals (tin, tantalum, tungsten , gold)	
Global Reporting Initiative (Principles and Standards Disclosure and Sector Supplement)	International Independent Standard Voluntary Not a voluntary standard as defined by the EC	The Global Reporting Initiative (known as GRI) is an international independent standards organization that helps businesses, governments and other organizations understand and communicate their impacts on issues such as climate change, human rights and corruption. GRI Sustainability Reporting Standards (GRI Standards) help businesses, governments and other organizations understand and communicate the impact of business on critical sustainability issues . Some of the distinctive elements of the GRI Standards – and the activity that creates them – include: 1. Multi-stakeholder input 2. A record of use and endorsement 3. Governmental references and activities: Independence	Relevant for whole Mining and Metal sector	NGO
International Council on Mining and Metals (Sustainable Development Framework)	International org / voluntary Not a voluntary standard as defined by the EC	Objectives: 1. Implement and maintain ethical business practices and sound systems of corporate governance. 2. Integrate sustainable development considerations within the corporate decision-making process. 3. Uphold fundamental human rights and respect cultures, customs and values in dealings with employees and others who are affected by our	It is applicable for whole mineral sector. As it is dealing with sustainability in the mining and metal sector it is implicitly connected to the criticality of raw materials (e.g. CRMs)	The ICMM has adopted the Brundtland Commission's definition of sustainable development: “development that meets the needs of the present without compromising the ability of future

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Name of standard	Type of standard	Aim, description	Relevance to CRMs	Observations/Remarks
		<p>activities.</p> <p>4. Implement risk management strategies based on valid data and sound science.</p> <p>5. Seek continual improvement of our health and safety performance. 6. Seek continual improvement of our environmental performance.</p> <p>7. Contribute to conservation of biodiversity and integrated approaches to land use planning.</p> <p>8. Facilitate and encourage responsible product design, use, re-use, recycling and disposal of our products.</p> <p>9. Contribute to the social, economic and institutional development of the communities in which we operate. 10. Implement effective and transparent engagement, communication and independently verified reporting arrangements with our stakeholders.</p>		<p>generations to meet their own needs". In the mining and metals sector, this means that investments should be financially profitable, technically appropriate, environmentally sound and socially responsible.</p>
Initiative for Responsible Mining Assurance (Standard for Responsible Mining)	<p>International /Voluntary</p> <p>Not a voluntary standard as defined by the EC</p>	<p>The Standard for Responsible Mining is an integral piece of the IRMA certification system. It outlines a set of best-practice requirements that were developed and are being revised through multi-stakeholder processes. IRMA encourages mining companies to adhere to these responsible mining practices, and to demonstrate compliance by participating in IRMA's independently verifiable responsible mining assurance system.</p> <p>The Initiative for Responsible Mining Assurance (IRMA) seeks to recognize mine sites practicing environmental and social responsibility and create further value and incentive for this effort. IRMA envisions a world where the mining industry respects the human rights and aspirations of affected communities, provides safe, healthy and supportive workplaces, minimizes harm to the environment, and leaves positive legacies.</p> <p>Objectives:</p> <ol style="list-style-type: none"> 1. Business Integrity 2. Social Responsibility 	Generally for mining not direct relevance to CRM	<p>http://www.responsiblemining.net/irma-standard/principles-and-objectives/</p> <p>Yet to be implemented in late 2017</p>

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Name of standard	Type of standard	Aim, description	Relevance to CRMs	Observations/Remarks
		3. Environmental Responsibility 4. Planning and Managing for Positive Legacies		
Responsible Jewellery Council (Code of Practices and Chain-of-Custody Standard)	International/NGO /Voluntary Not a voluntary standard as defined by the EC	<p>The (Chain of Custody) CoC Standard aims to support claims for responsible sourced jewellery materials (known as CoC material), produced, processed and traded through the supply chain. The standard requires companies to have a policy and risk management frameworks for conflict sensitive sourcing practices, drawing on the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict Affected and High-Risk Areas. It also sets out requirements for confirming the eligibility of CoC materials and its segregation and transfer.</p> <p>The standards apply for human rights, labour standards, environmental impact, and business ethics: as articulated in the (Responsible Jewellery Council) RJC Code of Practices, applicable to the jewellery supply chain from mine to retail. RJC can also recognise comparable standards from other initiatives under the CoC Standard, and has already done so for gold refiner due diligence audits and the artisanal mining sector.</p>	Applicable to Gold and PGMs	https://www.responsiblejewellery.com/files/S002_2012_RJC_CoC_Standard_PM.pdf
Xertifix (XertifiX Criteria)	German association Voluntary Its Standards abides by International Labour Organizational (ILO) standards	<p>XertifiX has been inspecting quarries and natural stone companies in India, since 2014 in China and Vietnam. The controls are used to check compliance with the XertifiX standard. XertifiX ensures that no child labour or slavery is carried out, that all ILO core labour standards are observed, the working conditions of adult workers are progressively improved and basic environmental protection measures are observed. When the requirements are met, the imported natural stones can be certified by XertifiX.</p> <p>The XertifiX compulsory criteria include:</p> <ol style="list-style-type: none"> 1. Compliance with ILO core labor standards 2. Fair working hours (ILO Conventions No. 1 and No. 14) 3. Payment of statutory minimum wages according to national legislation 4. Provision and use of personal protective equipment (e.g., boots, 	Potentially applicable	http://www.xertifix.de/en/standard/

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Name of standard	Type of standard	Aim, description	Relevance to CRMs	Observations/Remarks
		helmets, eye protection, ear protection, mouthguards)		
Sustainability Reporting – TSM standard (Canadian sustainability reporting standard)	Not a voluntary standard as defined by the EC	The TSM is Mining Association of Canada's (MAC) commitment to responsible mining. It is a set of tools and indicators to drive performance and ensure that key mining risks are managed responsibly at our members' facilities.	All minerals extracted in Canada and where implemented, applicable to CRMs	Besides in Canada, currently implemented in Finland and in Argentina
OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas	International/For OECD member states	<p>OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas ("the Guidance") is a collaborative government-backed multi-stakeholder initiative on responsible supply chain management of minerals from conflict-affected areas.</p> <p>Its objective is to help companies respect human rights and avoid contributing to conflict through their mineral sourcing practices. The Guidance is also intended to cultivate transparent mineral supply chains and sustainable corporate engagement in the mineral sector with a view to enabling countries to benefit from their mineral resources and preventing the extraction and trade of minerals from becoming a source of conflict, human rights abuses, and insecurity. With its Supplements on Tin, Tantalum, Tungsten and Gold, the OECD Guidance provides companies with a complete package to source minerals responsibly in order for trade in those minerals to support peace and development and not conflict.</p>	Tin, Tantalum, Tungsten Gold	
Standard for sustainable exploration – Finland (guiding principles and 4 protocols)	National Finland	<p>The standard is comprised of guiding principles and four protocols, which cover the entire lifecycle of exploration activities.</p> <p>Four Protocols:</p> <ol style="list-style-type: none"> 1. Stakeholder involvement 2. Biodiversity conservation, 3. Safety and health, 4. Crisis management. <p>Guiding Principles:</p>	All mineral exploration (including CRMs)	Relevant for exploration stage

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Name of standard	Type of standard	Aim, description	Relevance to CRMs	Observations/Remarks
		<ol style="list-style-type: none"> The operations of the companies are transparent. The companies will adhere to best practices in exploration and commit to the continuous improvement of their operations. The companies will minimise any negative impacts of their operations on local communities, the environment and biodiversity. The companies will respect the surrounding community and its culture and ways of life. The companies will engage in active dialogue with their communities of interest and involve these in the development of the principles for sustainable exploration. The companies will not jeopardise the health and safety of their employees or local communities. The companies will complete any aftercare measures of their exploration activities responsibly. 		

9.3.2 SECONDARY CRMS

Table 6 : Standards relevant to (secondary) CRMs

Name of standard	Type of standard	Aim, description	Relevant to CRMs	Observations/Remarks
EN 50625-1:2014 Collection, logistics & Treatment requirements for WEEE — Part 1: General treatment requirements; March 2014	Developed under m518 mandate	Aims to assist organisations in: <ul style="list-style-type: none"> • achieving effective and efficient treatment and disposal of WEEE in order to prevent pollution and minimise emissions; • promoting increased material recycling; • promoting high quality recovery operations; • preventing inappropriate disposal of WEEE and fractions thereof; • assuring protection of human health and safety, and the environment; • preventing shipments of WEEE to operators whose operations fail to comply with this normative document or a comparable set of requirements. 	All CRMs contained in WEEE, including batteries and accumulators	

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Name of standard	Type of standard	Aim, description	Relevant to CRMs	Observations/Remarks
CLC/TS 50625-3-1:2015 Collection, logistics & Treatment Requirements for WEEE Technical specification for WEEE de-pollution January 2015	Developed under m518 mandate	Aims to assist organisations in a standardised way of monitoring de-pollution of WEEE.	All CRMs contained in WEEE	
EN 50625-2-1 Collection, logistics & Treatment requirements for WEEE — Part 2-1: Treatment requirements for lamps December 2014	Developed under m518 mandate	<p>Aims to assist organisations in achieving effective and efficient treatment and disposal of WEEE (focus on lamps) in order to prevent pollution and minimise emissions, promote increased material recycling and promote high quality recovery operations, i.a.</p> <p>This European Standard applies to the treatment of lamps until end-of-waste status is fulfilled, or lamp fractions are recycled, recovered, or disposed of.</p> <p>Lamps, as defined in Annex IV of the WEEE Directive, include straight fluorescent lamps, Compact fluorescent lamps, Fluorescent lamps, High intensity discharge lamps - including pressure sodium lamps and metal halide lamps, Low pressure sodium lamps, LED.</p>	All CRMs contained in lamps (HREE, Ga, Ge, In etc)	
EN 50574:2012 Treatment standard for refrigerators Collection, logistics & treatment requirements for end-of-life household appliances containing volatile fluorocarbons or volatile hydrocarbons	Developed under m518 mandate	<p>This document establishes requirements for the transportation, sorting and treatment of household appliances containing volatile fluorocarbons or volatile hydrocarbons after they have been discarded as WEEE.</p> <p>The European Standard describes requirements for the removal of volatile fluorocarbons and volatile hydrocarbons. These substances can be found as refrigerant in the refrigerating system (partly dissolved in the oil) and as blowing agent in the insulating foam of discarded household appliances.</p> <p>This European Standard does not generally cover collection facilities, nor does it cover how appliances arrive at these facilities. However, this standard does address the sorting of heat-pump tumble dryers from other types of tumble dryer, a task that could be performed at a collection facility.</p>	All CRMs contained in refrigerators	
CLC/TS 50574-2 Technical specification for de-pollution of refrigerators Collection, logistics & treatment requirements for end-of-life household	Developed under m518 mandate	The technical specification aims to support the standard EN 50574:2012 by providing further normative requirements for the assessment of de-pollution for treatment of end-of-life household appliances containing volatile fluorocarbons or volatile hydrocarbon	All CRMs contained in refrigerators	

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Name of standard	Type of standard	Aim, description	Relevant to CRMs	Observations/Remarks
appliances containing volatile fluorocarbons or volatile hydrocarbons - Part 2: specification for de-pollution e-stewards Standard				
for Responsible Recycling and Reuse of Electronic Equipment Review version 2.0, Nov. 1 st 2013	Private (BAN)	The standard development was led by the Basel Action Network (BAN), a non-profit Organisation working globally to prevent the illegal and unjust trafficking of hazardous waste. The aim of the e-Stewards standard is to provide rigorous, yet practical operational criteria for globally responsible recycling and refurbishing of Electronic Equipment. The complete Standard represents minimum requirements to attain e-Stewards certification.	All contained in electronic equipment	It has also a registered ISO 14001. The certification is available to all electronics recyclers and refurbishes.
R2 Standard Responsible Recycling Standard for Electronics Recyclers 2013, effective date: Sept. 1 st 2014	Private (SERI)	The document establishes responsible recycling ("R2") practices for the recycling of electronics globally. By certifying to this Standard through an accredited third party Certification Body, electronics recyclers can help prospective purchasers of their services (customers) make informed decisions and have increased confidence that used and end-of-life electronic equipment are managed in an environmentally responsible manner, protective of the health and safety of workers and the public, and that all data on all media devices is secure until destroyed.	All contained in electronic equipment	R2:2013 now requires facilities to obtain certification to one or more generally accepted environmental, health and safety management systems.
R2 Guidance R2:2013 Standard Version Sept. 1 st 2014	Private (SERI)	It provides clarification On conformance To the R2:2013 Standard (R2:2013 Or Standard). The guidance was designed as a tool that can aid recyclers in both preparing for an R2:2013 audit and in maintaining ongoing conformance. Specifically, the Guidance offers explanations about how the provisions of R2:2013 can be put into practice and what activities constitute conformance.	All contained in electronic equipment	Two forms of guidance are offered throughout this document. The first form is General Guidance and the second form is Clarifications.
WEEELABEX (WEEE LABoratory of EXcellence) standard Adopted in April 2011 Latest version: V9.0 Normative documents on: - Collection - Logistics	Private	The WEEELABEX standard consists of a series of normative (as opposed to descriptive) requirements (and documents) which concern all steps in the WEEE chain, including collection and preparation for re-use. The requirements lay down measures related to the protection of the environment and human health and safety through the prevention and mitigation of the adverse impacts of collection, storage and handling of WEEE. Such requirements are embedded in legislative requirements of Directive 2002/96/EC and its transposing legislation. The standard defines both technical and management requirements for operators, which can be integrated into other management requirements and assist	All contained in WEEE	The WEEELABEX standards will result in less pollution, higher levels of recovery of secondary raw materials, better occupational health and safety conditions for workers and a more transparent

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Name of standard	Type of standard	Aim, description	Relevant to CRMs	Observations/Remarks
<ul style="list-style-type: none"> - Treatment Documentation to measure de-pollution 		<p>organisations achieving demands with respect to correct handling of WEEE.</p> <p>Three constituent bodies make up the WEEELABEX organisation: the WEEELABEX General Assembly, composed by all member WEEELABEX systems, the WEEELABEX Government Council (WGC), which is the executive body, and the WEEELABEX Office, that functions as Secretariat and WEEELABEX notary.</p>		material flow management
ISO 23079 Magnesium and magnesium alloys -- Returns -- Requirements, classification and acceptance	International standard	This International Standard specifies general requirements, classification and acceptance for the different classes of magnesium returns.	Example of collect of magnesium for second raw materials	
CLC/prTR 45551 -Guide on how to use generic material efficiency standards when writing energy related product specific standardization deliverables	Development in progress under m543 mandate		Definition of the terminology including CRM	Under development
CLC/prTR 45550 -Definitions related to material efficiency	Development in progress under m543 mandate	<p>This Technical Report “Definitions related to material efficiency” constitutes a collection of common terms used in deliverables prepared in accordance with Standardisation Request M/543. The purpose of such a collection is to provide a single definition of key terms used in different deliverables from the CEN-CENELEC TC10.</p> <p>The source of the terms and definitions can be documents developed in the various working groups of the CEN-CENELEC TC10 or any text referenced by such documents.</p> <p>Whenever possible, the proposed definitions are consistent with the ones given in European and International standards dealing with environmental aspects of products in scope of M/543.</p>	Definition of the terminology including CRM	Under development
prEN 45554 -General methods for the assessment of the ability to repair, reuse and upgrade energy related products	Development in progress under m543 mandate	<p>Definition of parameters and methods relevant for assessing ability to repair and reuse products. Definition of parameter and methods relevant for assessing the ability to upgrade products, excluding remanufacturing.</p> <p>Ability to access or remove certain components, consumables or assemblies from products to facilitate repair, reuse or upgradability.</p> <p>Reusability indexes or criteria.</p>	Aspect of circular economy	Under development
prEN 45553 -General method for the assessment of the ability to re-manufacture energy related products	Development in progress under m543 mandate	<p>This European Standard (EN) provides a general methodology for the assessment of the ability to re-manufacture energy related products.</p> <p>This EN will elaborate the assessment and process on re-manufacturability in a horizontal, cross-product, way. However, a correct assessment can only be done in a product-specific way, taking into account specific parameters of a specific energy related product.</p>	Circular economy	Under development
prEN 45558 -General method to declare the use of critical raw materials in energy related products	Development in progress under m543 mandate	This European Standard specifies the basis for definition of a procedure, content and form relating to declarations on the use of critical raw materials in energy-related products. Process chemicals and emissions during product manufacturing are not in	Highly relevant to CRM	Under development

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Name of standard	Type of standard	Aim, description	Relevant to CRMs	Observations/Remarks
		<p>the scope of this standard and also packaging is not in scope of this standard.</p> <p>The main intended use of this European Standard is to provide a means for which information on the use of CRMs can be exchanged up and down the supply chain that:</p> <ul style="list-style-type: none"> • Allows organizations to assess energy-related products against the use of critical raw materials, as to answer to compliance requirements in European legislation • Allows organizations to use this information in support of the collection or recycling process of energy-related products to obtain/extract these critical raw materials • Allows organizations to use this information in the life-cycle management across all product life cycle phases, by reducing or replacing certain CRMs by non-critical materials • Support policy makers in the preparation of policy around the use or import of critical raw materials, e.g. tax incentive <p>Potential users of this standard are any public, private and social enterprises involved in the treatment of waste of energy-related products as well as manufacturers of energy-related products (including SME's) and other players involved in the product supply chain, other than commercial driven players. Last, it is also relevant to European surveillance and trade authorities as well as European policy makers.</p> <p>This standard does not include product-specific provisions, and instead, it can be applied directly to any energy-related type of product. It is intended that product-specific provisions that are related to CRM will be fully based on and use the principles and procedures of this standard.</p> <p>This standard does not override, or in any way change, legally required critical raw materials information, claims or labelling, or any other applicable legal requirements.</p> <p>This European Standard proposes a standardised format for reporting use of critical raw materials in energy-related products by applying the IEC 62474 materials declaration standard. It however, does not provide or determine any specific method or tool to capture critical raw material data. Organizations have the flexibility to choose the most appropriate method/tool to capture declaration data of critical raw materials without compromising data utility and quality.</p>		
prEN 45559 -Methods for providing information	Development in progress under	This European Standard establishes a common methodology for the provision of information related to material efficiency aspects of energy related products.	Include CRM	Under development

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Name of standard	Type of standard	Aim, description	Relevant to CRMs	Observations/Remarks
relating to material efficiency aspects of energy related products	m543 mandate	This European Standard does not include product-specific provisions, which shall be dealt with in product specific standards. It is intended that product specific provisions that are related to material efficiency aspects be based on and use the principles and procedures of this European Standard.		
prEN 45556 -General method for assessing the proportion of re-used components in an energy related product	Development in progress under m543 mandate		Include CRM	Under development
prEN 45555 -General methods for assessing the recyclability and recoverability of energy related products	Development in progress under m543 mandate	<p>A general methodology for:</p> <ul style="list-style-type: none"> Assessing the recyclability of energy related products Assessing the recoverability of energy related products Assessing the ability to access or remove certain components or assemblies from energy related products to facilitate their potential for recycling or other recovery operations. Assessing the recyclability of critical raw materials from energy related products. <p>This EN will elaborate on recyclability and recoverability in a horizontal, cross-product, way. However, a correct assessment can only be done in a product-specific way, taking into account specific parameters of a specific product group. This standard defines a series of parameters which may be considered to calculate product specific recycling and recoverability rates.</p> <p>To be completed: general statement elaborating on different environmental beneficial product characteristics that may not be taken into account by recyclability/recoverability assessment, e.g. bio degradable plastics, lightweighting, multi-functionality, use of recycled content, etc. Highlight the fact that recyclability/recoverability is an indicator related to a single stage of products' life-cycle and is not an environmental impact indicator → in a eco-design perspective, outcomes from RR assessment should be integrated in a broader environmental analysis, based for instance on life-cycle analysis methods not addressed here.</p>	Include CRM	Under development
prEN 45557 -General method for assessing the proportion of recycled material content in energy related products	Development in progress under m543 mandate	A general methodology for assessing the proportion of recycled material in an energy related product.	Include CRM	Under development
prEN 45552 -General method for the assessment of the durability of energy-related products	Development in progress under m543 mandate	The standard will cover a set of parameters for assessing durability of energy-related products (ErP) and a general method to describe and assess the durability of ErP, i.e. both electrotechnical and non-electro technical products, respectively it shall be applicable to all energy-related products, that is, all products covered by the Ecodesign Directive 2009/125/EC.	Include CRM	Under development

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9.4 EUROPEAN COMPANIES / CRM VALUE CHAIN

Table 7: European Companies active in the CRM value chain

UPSTREAM MARKET					
Exploration					
Exploration REE, cobalt	Leading Edge Material Corp.		Canadian public company with principal assests in Scandinavia. Exploring projects in Swedne and Finland. Norra Karr REE (heavy REE) deposit in Sweden. Kontio cobalt project (Finland) Vena cobalt project (Sweden)		http://leadingedgematerials.com/
Exploration for lithium-borate	Rio Tinto	Jadar, Serbia	Forecast: Rio Tinto plans to examine the Lithium-borate deposit in Jadar.		http://www.riotinto.com/energyandminerals/jadar-4643.aspx
Exploration for boron	Erin Ventures	Piskanja deposit, Serbia	Canadian company, early stage exploration for boron in Piskanja deposit, Serbia.		http://www.erinventures.com/
Exploration for tin-tungsten and coking coal	New Age Exploration Limited	Redmoor tin-tungsten (Cornwool), Lochinvar coking coal (Scottish/English border)	Australian based company conduting two prospects in the United Kingdom.		http://nae.net.au/
Exploration for tungsten	Almonty Industries	Valtreixal tungsten project, Spain	Canadian based company focusing on tungsten exploration and production		http://www.almonty.com/projects/valtreixal/
Extraction					

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Extraction of chromium	Outokumpu Chrome Oy	Kemi Mine, Finland	Government of Finland is a large shareholder at Outokumpu listed company		http://www.outokumpu.com
Extraction of magnesium	SLOVMAG, a.s.	Lubenik, Slovakia	Major stakeholder is Russina Magneizit Group, mining and processing of magnesium		http://www.slovmag.sk/en/
Extraction of magnesium	RHI AG	Two underground and one open pit mine, Austria	RHI is a global player on market with refractory products		http://www.rhi-ag.com/internet_en/products_solutions_en/raw_materials_en/
Extraction of magnesium	Styromag GmbH	5 minig operations in Austria	Austrian company, mining of magnesite, processing to caustic calcined magnesite		http://www.styromag.at/
Extraction of magnesium	SMZ, a.s. Jelesava	Dubrava deposit, Slovakia	The largest mining and manufacturing plant on magnesium in Slovakia		http://www.smzjelsava.sk/en
Extraction of tungsten	Wolfram Bergbau- und Hüttengesellschaft m.b.H.	Mittersill/Felbertauern (mining), Austria	<p>Motto: “mining, refining, recycling”</p> <p>Scheelite extraction (calcium tungstate = CaWO_4) in underground mining since 1976;</p> <p>Production of tungsten carbide, tungsten metal, tungsten oxide.</p> <p>Recycling of tungsten-containing secondary raw materials.</p> <p>Dissolution of tungsten from the raw materials, purification and processing into the high-purity intermediate ammonium paratungstate (APW).</p> <p>Production of finest tungsten oxide, tungsten metal and tungsten carbide powders for the powder metallurgical industry.</p>		www.wolfram.at
Extraction of tungsten	Almonty Industries Inc	Los Santos open pit, Spain and	Canadian based company focusing on tungsten mining – beside Los Santos, the company also developing Valtrexial		http://www.almonty.com/projects/

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		Panasqueira mine in Portugal	exploration project in Spain		
Extraction of tungsten	WV Resources	La parrilla mine in Spain	United Kingdom based company operating mine in Spain and exploring tungsten in Portugal		http://wvresources.co.uk/
Start of production stage – exploitation of tungsten and tin	Wolf Minerals Ltd.	Hemerdon deposit, Drakelands Mine, Cornwall, United Kingdom	British-Australian company successful in developing an open pit mining for tungsten		http://www.wolfminerals.com.au
connection to CRM	COBRE LAS CRUCES SA (CLC)	Spain	Copper mine		www.cobrelascruces.com/
connection to CRM	KGHM POLSKA MIEDZ SA (KGHM)	Poland	Copper, silver extraction and enrichment		www.kghm.com/
Exploitation and trading of fluorite	MINERA DE ORGIVA SL (MINERA ORGIVA)	Spain	Exploitation and marketing of fluorites for the steel and cement industries		www.mineradeorgiva.com/index.php/es/
Mining and steel production, iron ore, coal, coking coal	Accelor Mittal	Gent, Belgium	Steel production in Bosnia, Czech Republic, France, Germany, Luxembourg, Poland, Romania, Spain, Ukraine		
Extraction of coking coal	Jastrzębska Spółka Węglowa S.A. (state-owned)	Poland, Borynia-Zofiówka-Jastrzębie coal mine, region Katowice		10,560 employees, average daily net extraction of around 21,700 tonnes of coking coal.	
Extraction of coking coal	Pokrovs'ke Coal Company	Ukraine	largest coking coal mine in Ukraine		http://donetsksteel.com/en/company/coal/pokrovscoe
Extraction of coking coal	Raspidskaya Coal	Mezhdurechensk, Russia	Russia's largest coal mine producing coking coal		http://www.raspidskaya.com/compa

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	Mine				ny/
Exploration, mining, smelting and metals recycling PGM as by-products	Boliden AB (publ)	Sweden	Mining and smelting ; Zinc, Copper, Lead and Nickel concentrates containing platinum and palladium in different quantities.	Boliden has a total of just over 5,500 employees and a turnover of SEK 40 billion.	www.boliden.com
Smelting, refining, concentration					
Cobalt refinery	Freeport Cobalt (Lundin Mining, Canada)	Finland	The refinery, located on the Baltic Sea in Finland, processes unrefined cobalt and related metals and manufactures advanced inorganic products for use in a variety of applications in fast-growing end use markets. Freeport Cobalt is one of the world's largest suppliers of cobalt chemicals and powders for use in batteries, pigments and ceramics and powder metallurgy. Cobalt purchase from the Tenke Fungurume mine in DR Congo.		http://www.lundinmining.com/s/FreeportCobalt.asp
Production, Smelters, refineries, processing plants Borate	Rio Tinto	Coudekerque Plant -	Borate operating site		
Chemistry REE	Treibacher Industrie AG	Austria	Supplying the basis for manufacturing high-quality products with very special properties. Catalysts, Water purification, Pigments, frits and ceramic stains, Glass fusion and polishing agents, Foundry industry, Flints. <ul style="list-style-type: none"> • Rare earths • Rare earth salts such as nitrates, chlorides, oxalates, acetates and carbonates and rare earth solutions for catalysis 		https://www.treibacher.com/en/business-units/rare-earths-and-chemicals.html

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			<ul style="list-style-type: none"> • Vanadium chemicals • Mixed compounds • Mixed oxides • Refractory metal oxides • Rare earth oxides • Refractory metals (salts & solutions) 		
Processing technologies	Deloro HTM GmbH	Biel, Switzerland	<ul style="list-style-type: none"> • Hot Isostatic Pressing technology • Powder Metallurgical Steels and Bi-Metallics. Service of Densification, Bi-Metallic Parts and Near Net Shape Components made by HIP Technology. 		www.deloro.com
Trading					
Technology and trading Indium, Antimony, Niobium, Tungsten	IMR Metal Powder Technologies GmbH	Austria	<ul style="list-style-type: none"> • technology and trading company, • integrated into the processing chain of non-ferrous metal industry, from mining to metal-working and semi-finished product processing. • Provider of industrial metals and special metals (e.g. Indium), concentrates (e.g. Antimony, Niobium, Tungsten), semi-finished products and chemical products. 		http://www.imr-metalle.com/IMR/IMR_Metal_Powder_Home_Englisch.html
Metals trading antimony, chromium, cobalt, gallium, germanium, indium, magnesium, niobium, tungsten	William Rowland Ltd	Sheffield, UK	<ul style="list-style-type: none"> • international metals trading company • providing copper master alloys (e.g. copper boron, copper chrome, copper phosphorus) • high purity metals (e.g. antimony, chromium, cobalt, gallium, germanium, indium, magnesium, niobium, tungsten) 		http://www.william-rowland.com/pages/high-purity-metals
Trade of high-melting metals Tungsten, beryllium	E. WAGENER GmbH	Heimsheim, Germany	Trade of high-melting metals, standard parts - such as (TZM, Alloys Invar, Alloys Kovar, Inconel), as well as parts made of molybdenum, tantalum, tungsten, titanium and their alloys (screws, nuts and threaded rods); beryllium.		www.ewagener.de
Cobalt trade	AMFORA PORCELANOVA	Chodov, Czech Republik			www.manufaktury.cz

	MANUFAKTURA				
Indium, Niobium, Germanium, Gallium	Buss Projects & Trading GmbH	Sassnitz, Germany			www.buss-projectstrading.com
Indium, Niobium, Germanium	Buss & Buss Spezialmetalle GmbH	Sagard, Germany			www.buss-spezialmetalle.de
Cobalt, Gallium, Beryllium	Fox-Chemicals GmbH	Pfinztal, Germany			www.foxchemicals.com
Gallium etc.	GMH Jost-Hinrich Stachow GmbH Metallhandel	Goslar, Germany			www.stachow-metall.de
Gallium, Antimon etc.	Haines & Maassen Metallhandelsgesellschaft mbH	Bonn, Germany			www.haines-maassen.com
Indium, Germanium, Gallium	MetaErden GmbH	Frankfurt / Main			www.metaerden.com
Niobium, Germaniumdioxid, Germanium, Gallium, Chromium, Antimony	MET - CHEM HANDEL	Travemünde, Germany			www.met-chem.de
DOWNSTREAM MARKET					
Manufacturing					
Antimony trioxide manufacturer	SICA (Société Industrielle et Chimique de l'Aisne) –	France	Products: Oxidation – Antimony Trioxide Extra Neige, dispersion, extrusion, research and development	Established in 1925, SICA is the first European manufacturer of ATO with a	http://www.amg-antimony.com/

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	AMG group			working capacity of about 10 000 tons per year. In 1999, SICA was acquired by the American investment fund "Safeguard International". In 2007, SICA became part of the AMG group.	
Antimony products and industrial applications	Campine Antimony	Beerse, Belgium	Campine Antimony is a leading, semi-integrated company producing antimony oxide as synergist for the flame retardant industry, as well as catalyst for the PET industry. Offering Antimony products and its industrial applications	non-ferrous and plastics industry since 1912.	www.campine.biz
	Chemox Pound Ltd.	Guildford, Surrey, United Kingdom	Chemox Pound represents several major multinational chemical companies		http://www.chemoxpound.com
Production of specialty metal and chemical products - antimony, gallium, germanium, indium.	5NPlus	Head-quartered in Montreal, Quebec, Canada and operates manufacturing facilities and sales offices in Europe, the Americas and Asia.	Producer of specialty metal and chemical products. Fully integrated with closed-loop recycling facilities, the Company is 5N Plus manufactures critical precursors and key enablers used in a number of industries such as clean energy, electronic, pharmaceutical, medical imaging, paint pigments, security and surveillance.		www.5nplus.com
Beryllium products	Materion (Europe)	Materion Advanced Materials Technologies and Services, Ireland, England Materion Brush GmbH, Stuttgart, Germany Materion Brush Ltd., Berkshire, UK Materion Aerospace Metal Composites, England	<ul style="list-style-type: none"> Alloys Beryllium Products Composite and Clad Metals Composites Compounds Ceramics Inorganic Chemicals Microelectronics Packaging Materials Precision Optics Thin Film Coatings Thin Film Deposition Materials Products include precious and non-precious specialty metals, inorganic chemicals and powders, specialty coatings, specialty		https://materion.com/products

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			engineered beryllium and copper-based alloys, beryllium composites, ceramics and engineered clad and plated metal systems.		
Borate	Buehler	France - Headquarter Germany	Buehler is a premier manufacturer of scientific equipment and supplies for use in materials analysis with offices in nine countries, sales distribution in over 100 countries, and over 45 Buehler Solutions Centers.		https://www.buehler.fr/
Completion for final consumption					
Beryllium-copper products	NGK Berylco Europe NGK Berylco UK Ltd. NGK DEUTSCHE BERYLCO GmbH	Couéron, France (Headquarter) Salford, UK Kronberg, Germany	NGK Berylco France is specialised in the manufacture and marketing of copper-beryllium alloys such as strips, plates, rods, wires, plates and lingots. NGK Berylco France is also in charge of the promoting and distribution of its high-end products in Europe and worldwide, being supported in the European market place by sister companies in England and Germany.		http://www.ngkbf.com/ enquiries@ngkberylco.co.uk sales@ngkdbg.de
Chromium	Betz Chrom	Germany	Aerospace engineering and surface technology		http://www.betz-chrom.de/de/
Chromium	ChromCorp	United Kingdom	Chromium Corporation specialised in plating and finishing reciprocating engine components and service offerings to customers.		http://www.chromcorp.com/index.shtml
	SSAB	Sweden	Global steel company developing high-strength steels, provider of services.		https://www.ssab.com/
Gallium	Alfa Aesar GmbH & Co KG	Karlsruhe, Germany	Gallium, Metallpulver, Metallhalbzeuge, Metalle, Feindrähte		www.alfa.com
Trading and manufacturing - tungsten	WOLFTEN Sp. z o.o.	Wrocław, Poland	Supplier of nonferrous metal products: such as Titanium, Nickel, Tungsten sintered products. Offer: sheets, bars, flat bars, wires, foils, strips, nuts and bolts,		http://www.wolften.pl/kontakt

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			pipes, tubes, elbows, reducers, tees, stub ends and flanges.		
Semi-finished goods and high quality finished parts Tungsten	DELTA METAL	MUNSTER, France	Tungsten production; dealing with copper alloys and special bronzes up to 420HB, active in all sectors of industrial activity such as the army, marine, steel industry, automotive, mechanical, turning industries, etc		www.deltametal.fr
Semi-finished goods, components, engineering Niobium	CRONUS Industrial Solutions GmbH	Vienna, Austria	Advanced technologies, semi-finished products made of titanium, tantalum, and niobium.		http://www.cronus-is.at/home_en.html
Semi-finished goods and high quality finished parts Tungsten, niobium	BIMO TECH Sp. z o.o.	Wrocław, Poland	Production of raw materials for industry; products made of titanium, tungsten, niobium etc.; bars, sheets, tubes for precision-machined parts.		http://www.bimotech.pl
Refining, concentration of fluorspar	FLUORIT TEPLICE, s.r.o.	Teplice, Czech Republik	Fluorspar (from China, Mexico, South Africa) in form of flotation filter cake, as well as metallurgical grade. Fluorspar concentrate, metallurgical grade fluorspar, feldspar/sintermagnesite etc.; welding powders and electrodes, glass fibres, casting powders.		www.flourit.cz
Trading in chemicals graphite, metallurgical fluorspar, chrome ore and chromite sand	COFERMIN Chemicals GmbH & Co. KG	Essen, Germany	Supplier of high-grade products for a wide range of applications; graphite, metallurgical fluorspar, chrome ore and chromite sand. Variety of sources, mostly China.		www.cofermin.de
Concentrates and semi-finished goods – tungsten	Duro Metall GmbH	Kornwestheim, Germany	Supplier of high-conductivity copper alloys and refractory metals; tungsten in form of sheets, wire, bars, machined parts.		www.duro-metall.de
Concentrates and semi-finished goods – niobium, beryllium	TECHNOLOGICA GmbH	Bad Homburg, Germany	High-tech metals; supplier of niobium and tantalum concentrates or in alloyed semi-finished products as plates, rods, bolts or wire. beryllium		www.technologica.de

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Concentrates, primary metals – antimony, tungsten, rare earths	SCMG Europe GmbH	Bad Harzburg, Germany	Supplier of metal-based chemicals, powders, primary metals and alloys, alternative raw materials and specialty products; antimony, tungsten, rare earths		www.scmgeurope.com
Rare metal and rare earth metal manufacturer	NPM Silmet AS (former: Molycorp Silmet AS)	Estland	Neo Performance Materials - NPM, is organized along three business segments: Neo Chemicals and Oxides, Neo Magnequench, and Neo Rare Metals. It is engaged in the production, processing and development of rare earth and zirconium based engineered materials; magnetic powders; and rare metals.		http://www.sillamae.ee/web/eng/molycorp-silmet
Recycling					
Chemical Industry, REE Recycling (France)	SOLVAY	Headquarter: Brussels France	In general: Products and solutions for planes, cars, smart and medical devices, batteries, mineral and oil extraction; lightweighting materials. France: Solvay is operating two rare earth recycling units in France. In order to diversify its sources of supply and preserve resources, the Group has developed a process for recovering rare earths contained in end-of-life equipment such as low-energy light bulbs, batteries or magnets. This original recycling channel derived from the Group's research programmes opens up new growth opportunities for Solvay's "Rare Earths" activity.	Risks: e.g. legal and political risks http://annualreports.solvay.com/2016/en/risks/other-risks/regulatory-political-and-legal-risk.html 27,000 employees in 58 countries. Net sales were €10.9 billion in 2016, with 90% from activities where Solvay ranks among the world's top three leaders.	http://www.solvay.com/en http://www.solvay.com/en/media/press_releases/20120927-coleopterre.html
Gallium Recycling	GRAMET GmbH & Co. KG	Würzburg, Germany	Gallium, Recycling		www.gramet.de
	MAL Magyar Alumínium Termelő és Kereskedelmi Zrt.	Budapest, Hungary	Gallium, Recycling		www.mal.hu

Recycling	Jacomij Metalen B.V.	Duurstede, Netherlands	Electronics Recycling, recycling of non-ferrous metals and alloys.		jacomij@jacomij.com
Extraction and Recycling of tungsten	Wolfram Bergbau- und Hüttengesellschaft m.b.H.	Mittersill/Felbertauern (mining), St. Martin (recycling), Austria	<ul style="list-style-type: none"> Motto: "mining, refining, recycling" Scheelite extraction (calcium tungstate = CaWO_4) in underground mining since 1976; <p>Production of tungsten carbide, tungsten metal, tungsten oxide.</p> <ul style="list-style-type: none"> Recycling of tungsten-containing secondary raw materials. Dissolution of tungsten from the raw materials, purification and processing into the high-purity intermediate ammonium paratungstate (APV). <p>Production of finest tungsten oxide, tungsten metal and tungsten carbide powders for the powder metallurgical industry.</p>		www.wolfram.at