



#### **DG JRC's Vision:**

"To play a central role in creating, managing and making sense of the collective scientific knowledge for better EU policy."

#### **DG JRC's Mission:**

"As the science and knowledge service of the Commission our mission is to support EU policies with independent evidence throughout the whole policy cycle." The Joint Research Centre (EC's science and knowledge service) at a glance



#### DG JRC Role: facts & figures







- JRC contribution to criticality methodology
- JRC analysis on CRMs and the Circular Economy
- Conclusions



## JRC contribution to criticality methodology



#### METHODOLOGY FOR ESTABLISHING THE EU LIST OF CRITICAL RAW MATERIALS

Guidelines





EU list of CRMs

**JRC's role** 



#### **Revised methodology**

→ December 2015

→ External Contractor implemented 2016-2017 Available via

https://publications.europa.eu

#### **Background Report**

 → Complements and expands Guidelines
 → Published with Guidelines in July 2017



## **Revised methodology** (Approach)

- → Ensure highest possible level of comparability with the 2010 and 2014 lists
- → Intense and active dialogue with stakeholders since an early-stage in the revision
- >Non-forward looking approach in the assessment,
  - i.e. criticality as a "*snapshot in time*"
- Best quality data / average of last 5 years





# **Economic Importance**





#### Main novelties of the refined EI component include:

# (1)MEGASECTORS → NACE-2 (2)More detailed and precise allocation of RM uses to their corresponding NACE-2 sectors (3)Use of a RM-specific substitution index in the calculation of Economic Importance





# **Supply Risk**





Supply Risk

**Several novelties of the refined SR component include:** 

- (1)Systematic **Supply chain** approach (bottleneck)
- (2)More precise picture of **Supply concentration**
- (3)Incorporation of **Import dependency**
- (4) Trade adjustment
- (5)Better quality data for **Recycling** (EU based)
- (6)More objective calculation of **Substitution**





#### **<u>Revised</u>** method to calculate the SUPPLY RISK





# ->Additional Influences





#### **X**= not investigated in2015



Ļ	Exploration/ Planning	Mining/ Harvesting	-	Post-Mining/ Harvesting		Environmental/ Social Issues	
Minerals (M)	<i>1 M+B</i> . Land use	2 M. Mining governance		<i>3 M</i> . By-products <i>4 M+B</i> . Supply Chain approach	_	5M.Environmental /Social (Natural Disasters)	
Biotics (B)	competition	2 B. Sustainable Biomass Management	e	(Bottleneck) <i>3 B</i> . End-use competition		<i>5 B</i> . Natural Disasters Bio-threats	



Commission's Communication on the 2017 list of Critical Raw Materials for the EU, COM(2017)490, 13 September 2017

2017 CRMs (27)									
Antimony	Fluorspar	LREEs	Phosphorus						
Baryte	Gallium	Magnesium	Scandium						
Beryllium	Germanium	Natural graphite	Silicon metal						
Bismuth	Hafnium	Natural Rubber	Tantalum						
Borate	Helium	Niobium	Tungsten						
Cobalt	HREEs	PGMs	Vanadium						
Coking coal	Indium	Phosphate rock							

\*HREEs=heavy rare earth elements, LREEs=light rare earth elements, PGMs=platinum group metals





# JRC analysis on CRMs and the Circular Economy





- Report = Commitment of the Circular Economy Action Plan (2015); to be issued in December
- Provide key data sources and identify best practices and options for further action

#### Covering

- Background
- Current circular use of CRM and benefits
- EU policy measures
- Key actors in the EU
- Data sources and monitoring
- Key sectors







#### Current circular use of CRMs





**End-Of-Life recycling Input Rate (EOL-RIR) - JRC elaboration** (EOL-RIR measures recycling's contribution to meeting materials demand, i.e. how much of the total material input into the production system comes from recycling)



#### Current circular use of CRMs



Commission

End-of-life recycling input rate (EOL-RIR) [%]																	
Н		> 50% > 25-50%														He 1%	
Li 0%	Be 0%	Be         > 10-25%           0%         1-10%										B* 0.6%	С	N	0	F* 1%	Ne
Na	Mg 13%	g %										Al 12%	Si 0%	P* 17%	S 5%	Cl	Ar
K* 0%	Са	Sc 0%	Ti 19%	V 44%	Cr 21%	Mn 12%	Fe 24%	Co 35%	Ni 34%	Cu 55%	Zn 31%	Ga 0%	Ge 2%	As	Se 1%	Br	Kr
Rb	Sr	Y 31%	Zr	Nb 0%	Mo 30%	Тс	Ru 11%	Rh 9%	Pd 9%	Ag 55%	Cd	In 0%	Sn 32%	Sb 28%	Te 1%	I	Хе
Cs	Ba 1%	La-Lu <sup>1</sup>	Hf 1%	Ta 1%	W 42%	Re 50%	Os	lr 14%	Pt 11%	Au 20%	Hg	TI	Pb 75%	Bi 1%	Ро	At	Rn
Fr	Ra	Ac-Lr <sup>2</sup>	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Uut	Fl	Uup	Lv	Uus	Uuo
<sup>1</sup> Group of Lanthanide		hanide	La 1%	Ce 1%	Pr 10%	Nd 1%	Pm	Sm 1%	Eu 38%	Gd 1%	Tb 22%	Dy 0%	Ho 1%	Er 0%	Tm 1%	Yb 1%	Lu 1%
<sup>2</sup> Gro	<sup>2</sup> Group of Actinide		Ac	Th	Ра	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
Aggregates         Bentonite         Coaking Coal         Diatomite         Feldspar         Gypsum         Kaolin Clay         Limestone         Magnesite         Natural Cork         Natural Rubber         Natural Rubber         Natural Wood         Natural Sand         Natural Sand         Natural Sand         Natural Rubber         Natural Rubber         Natural Rubber         Natural Sand         Natural Sand         Natural Sand         Natural Sand         Natural Rubber         Natu							Talc 5%										
* F = Fluorspar; P = Phosphate rock; K = Potash, Si = Silicon metal, B=Borates.																	



### Sectorial analysis



- Several sectors have been analysed by JRC concerning:
  - Available data
  - Data sources
  - Best practices
- Sectors analysed:
  - Extractive waste
  - Landfills
  - Electr(on)ic equipment
  - Batteries
  - Automotive sector (mainly e-vehicles)
  - Renewable energy
  - Defence equipment
  - Chemical and fertilisers



# JRC background report





#### JRC SCIENCE FOR POLICY REPORT

- JRC background report also to be published in December
- Looking at CRMs in the Circular Economy proves to be very rich when sectors are considered

Critical Raw Materials and the Circular Economy

Background report

Fabrice Mathieux, Fulvio Ardente, Silvia Bobba, Philip Nuss, Gian Andrea Blengini, Patricia Alves Dias, Darina Blagoeva, Cristina Torres de Matos, Dominic Wittmer, Claudiu Pavel, Tamas Hamor, Hans Saxeyn, Bernd Gawlik, Glenn Orxeillon, Dries Huygens, Elena Garbarino, Evangelos Tzimas, Faycal Bouraoui, Slavko Solar

November 2017 (draft)





# Conclusions





#### **RMIS 2.0 launch on 9NOV2017**







# Thank you!

## JRC Raw Materials Information System (RMIS): <u>http://rmis.jrc.ec.europa.eu/</u>

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