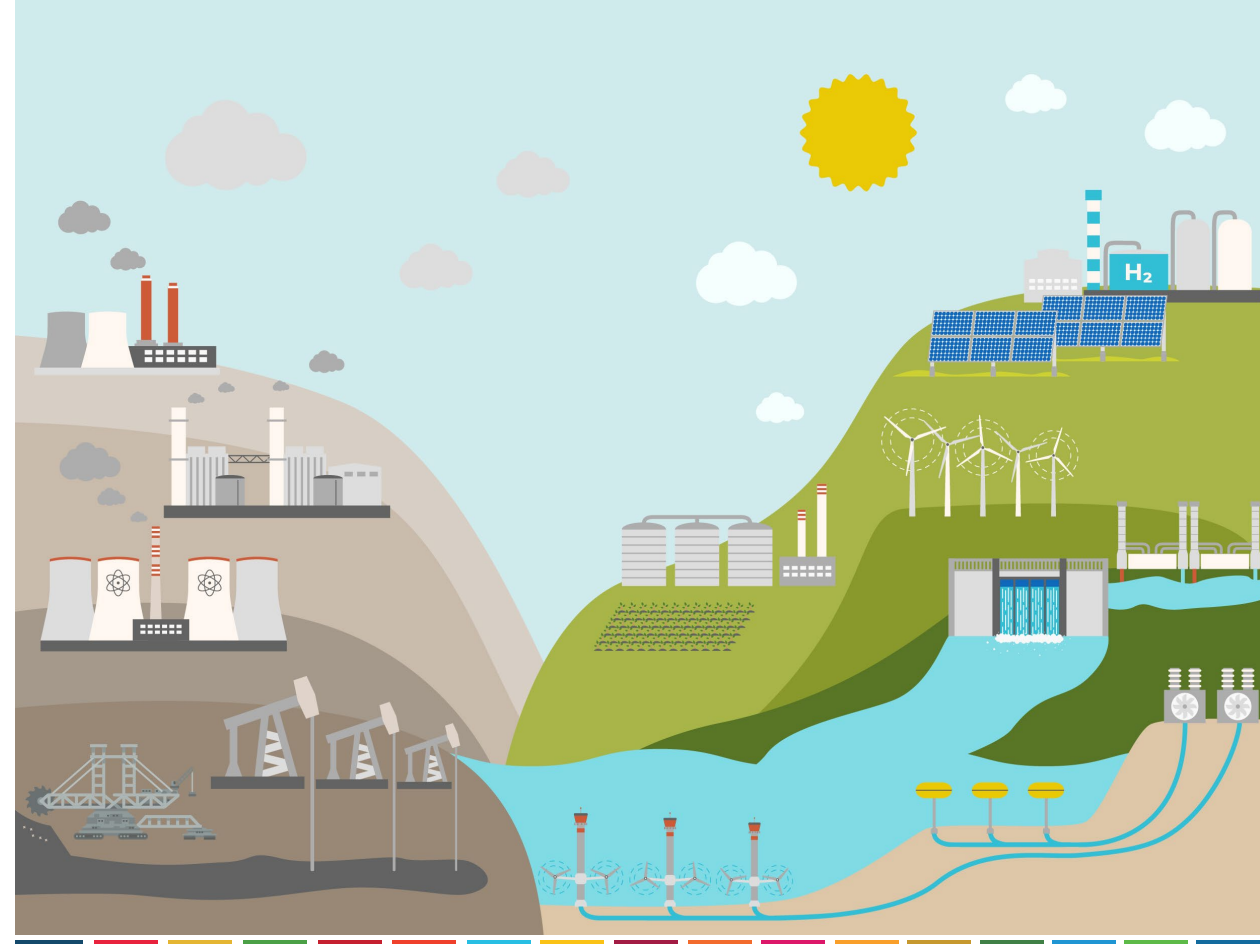




AGEMERA – University Courses: UNFC as Reporting Standard in Raw Material Sector

22nd April 2024

Md Ariful Islam, Georg Meissner, Helmut Mischo
TU Bergakademie Freiberg, Germany



RESOURCE MANAGEMENT WEEK
2024



UNECE

This project has received funding under the European Union's Horizon Europe research and innovation programme under grant agreement No 101058178.

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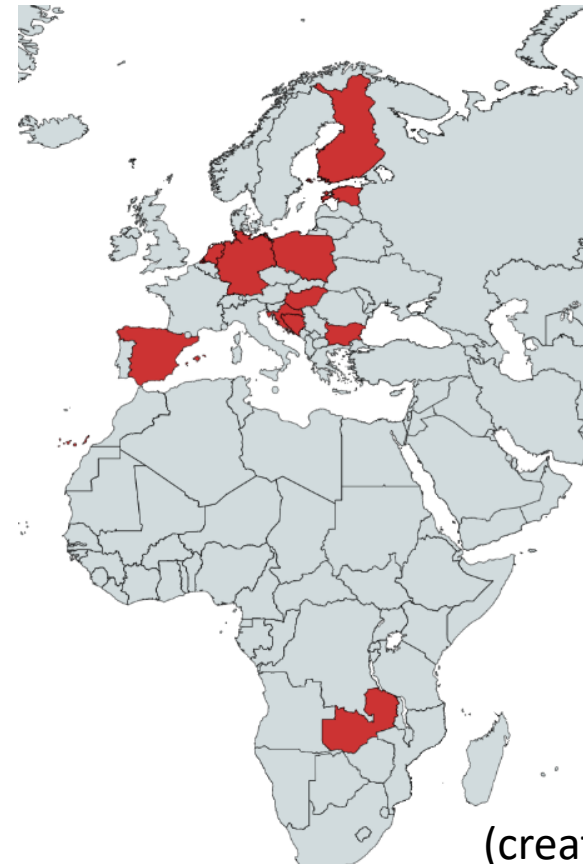
4

Feedback of Students

AGEMERA

AGEMERA - Agile Exploration and Geo-modelling for European Critical Raw materials

- HORIZON-CL4-2021-RESILIENCE-01-06 - Innovation for responsible EU sourcing of primary raw materials, the foundation of the Green Deal (RIA)
- Project number / Grant agreement number: 101058178
- 36 months, started in August - 2022, Ending July – 2025
- 20 Partners from 11 Countries
7 Universities, 2 Research Institutions, 5 SMEs, 6 Industry
- Coordinator - University of Oulu, Kerttu Saalasti Institute
- Budget – 7.5 M€



(created with mapchart)

AGEMERA



Geological CRM Potential Database
in EDGI Compatible GIS Format



Improving Knowledge
based on CRMs

Novel, Non-invasive Mineral
Exploration Methods



Accelerate Development
of RM Exploration
Projects

CRM Educational Material for
Student and General Public



Increase the Awareness of
the Importance of CRMs

UNFC and UNRMS as Evaluation
Tools for Future Experts

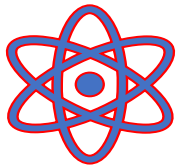


Promoting the Utilization
of UNFC and UNRMS

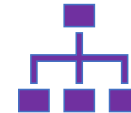
University Courses



ECRMs - European Critical Raw Materials for the Green and Digital Transition



Future scientists and engineers: wide spectrum of the CRMs' value chain



United Nations Framework Classification for Resources (UNFC)



Rare earth elements (REEs) and battery raw materials



United Nations Resource Management System (UNRMS)



Geology, engineering, geopolitics, mineral economics, social and environmental considerations



Sustainable and socially acceptable: application of innovative technologies

University Courses



Opal – Bildungsportal Sachsen



Eight Chapters



73 Students

- ECRMs
 - How to Navigate this Course
 - Frequently Asked Questions
 - Enrolment Students
 - Enrolment Tutors
 - News
 - Course Schedule
 - Profiles
 - Virtual Classroom
 - 1 Geology & Exploration of CRMs
 - 2 Geo-Politics & Challenges
 - 3 Extraction of CRMs in a Global Environment
 - 4 Social Assessment
 - 5 Environmental Assessment
 - 6 Mineral Economics
 - Assignments
 - 7 International Frameworks
 - 8 Bonus Content



TU Bergakademie Freiberg | Semester overlapping

ECRMs

Tutor: [Yulia Dolganova](#) | [Md Ariful Islam](#) | [Georg Meißner](#) | [Astrid Thomas](#)

European Critical Raw Materials for the Green and Digital Transition



University Courses

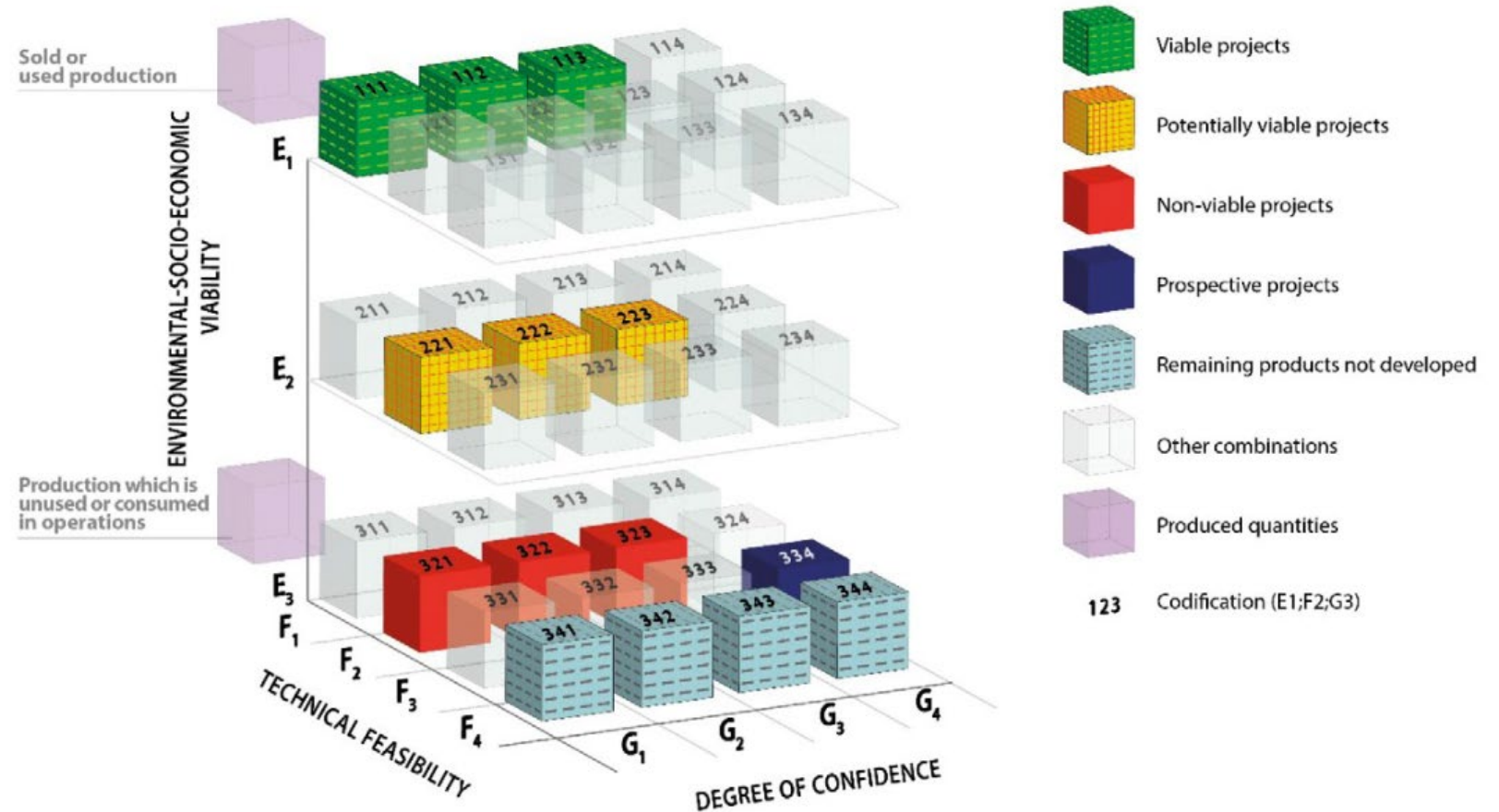
- 1 Geology & Exploration of CRMs
- 2 Geo-Politics & Challenges
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University Courses

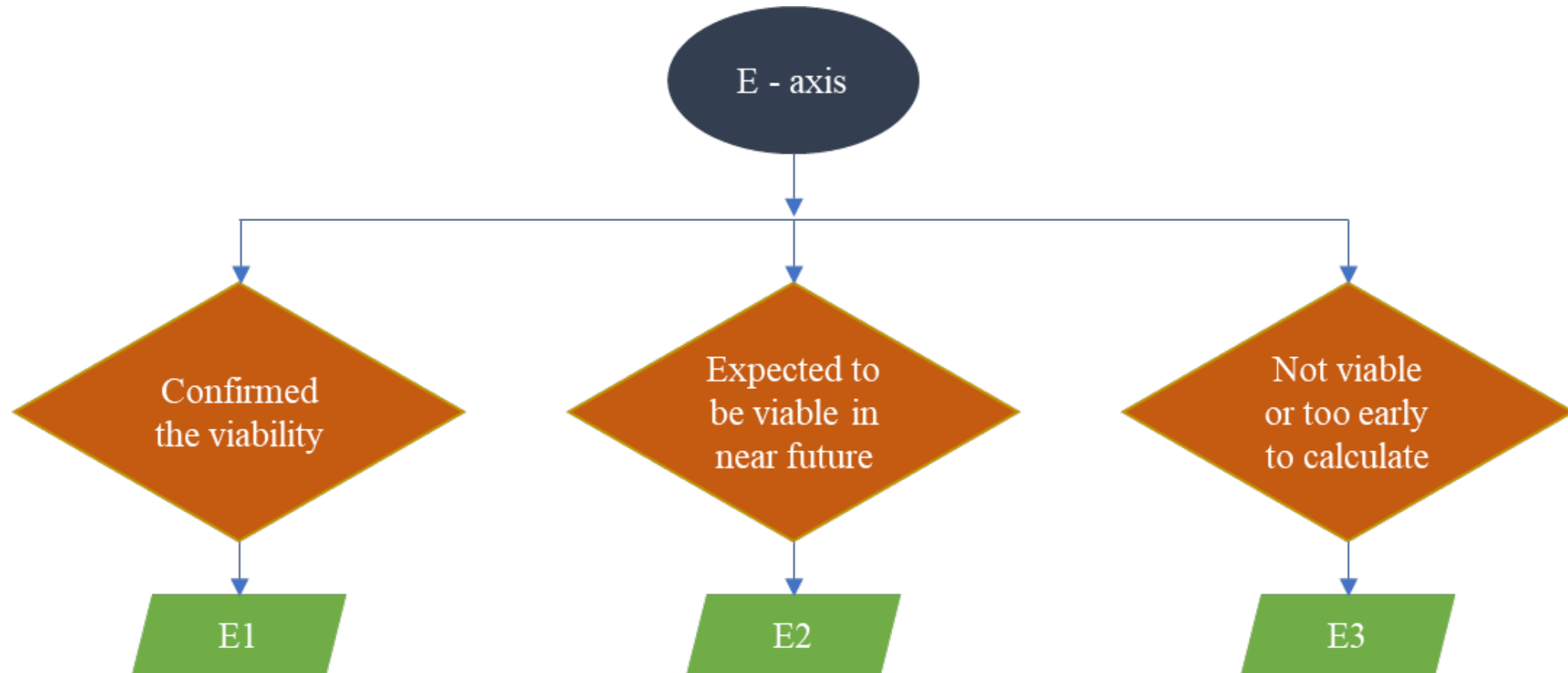
United Nations Framework Classification for Resources (UNFC)

Reporting Standard



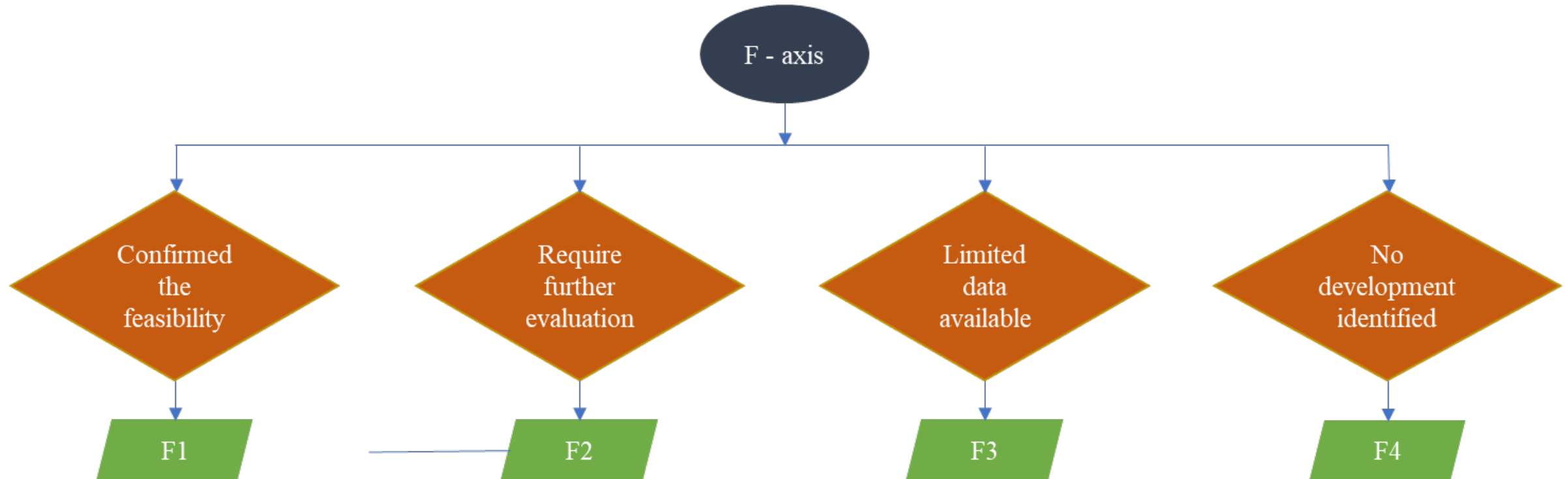
University Courses

E Axis – Environmental-Socio-Economic Viability



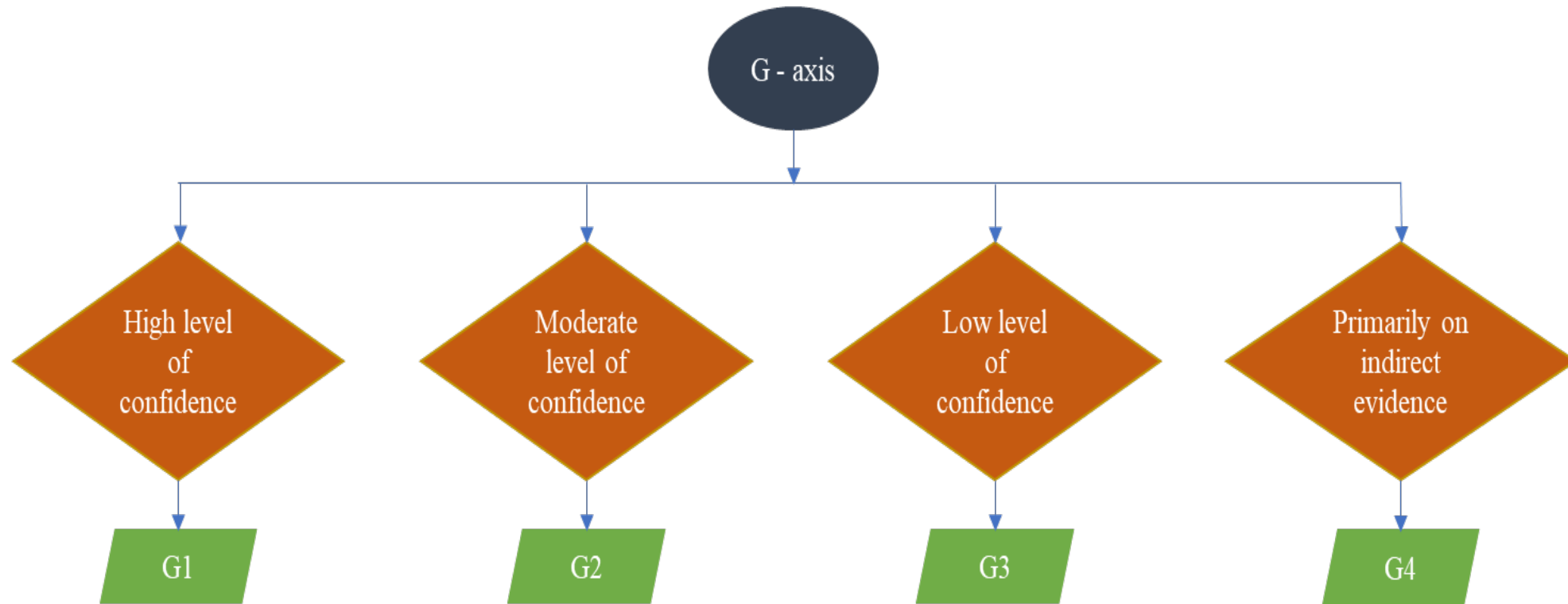
University Courses

F Axis – Technical Feasibility and Maturity



University Courses

G Axis – Degree of Confidence



University Courses

UNFC Classes, Sub-Classes, Categories and Sub-Categories (from UNECE, 2021)

UNFC Classes Defined by Categories and Sub-categories

	Produced	Sold or used production				
		Production which is unused or consumed in operations				
		Class	Sub-class	Categories		
E	F			G		
Total Products	Known Sources	Viable Projects	On Production	1	1.1	1, 2, (3) ^b
			Approved for Development	1	1.2	1, 2, (3) ^b
			Justified for Development	1	1.3	1, 2, (3) ^b
		Potentially Viable Projects	Development Pending	2 ^a	2.1	1, 2, 3
			Development on Hold	2	2.2	1, 2, 3
			Non-Viable Projects	Development Unclassified	3.2	2.2
	Development not Viable	3.3		2.3	1, 2, 3	
		Remaining products not developed from identified projects	3.3	4	1, 2, 3	
	Potential Sources	Prospective Projects	[No Sub-classes defined]	3.2	3	4
		Remaining products not developed from prospective projects		3.3	4	4

University Courses

CRIRSCO Template and UNFC Categories

CRIRSCO Template			Corresponding UNFC Category ^f			UNFC Class	
Public Report and Study Types ^a	Standard Definitions						
Feasibility Study or Life of Mine Plan ^b (for an operating mine)	Mineral Reserves	Proved	E1	F1	G1	Viable Projects	
		Probable			G2		
Pre-feasibility Study ^d	Mineral Reserves	Proved	E2	F2	G1	Potentially Viable Projects	
		Probable			G2		
Feasibility Study, Life of Mine Plan ^b (for an operating mine) or Pre-feasibility Study ^e	Mineral Resources (exclusive of Mineral Reserves)	Measured	E2	F2	G1		
		Indicated			G2		
		Inferred			G3		
Scoping Study report or other Public Report on a Mineral Resource estimate ^f	Mineral Resources	Measured	E2	F2	G1		
		Indicated			G2		
		Inferred			G3		
Public Report on exploration stage projects	Exploration Target		E3	F3	G4		Prospective Projects
	Exploration Results		Estimates not published				
Not applicable ^g	Estimates obtained from historical reports ^h					Non-viable Projects	

University Courses

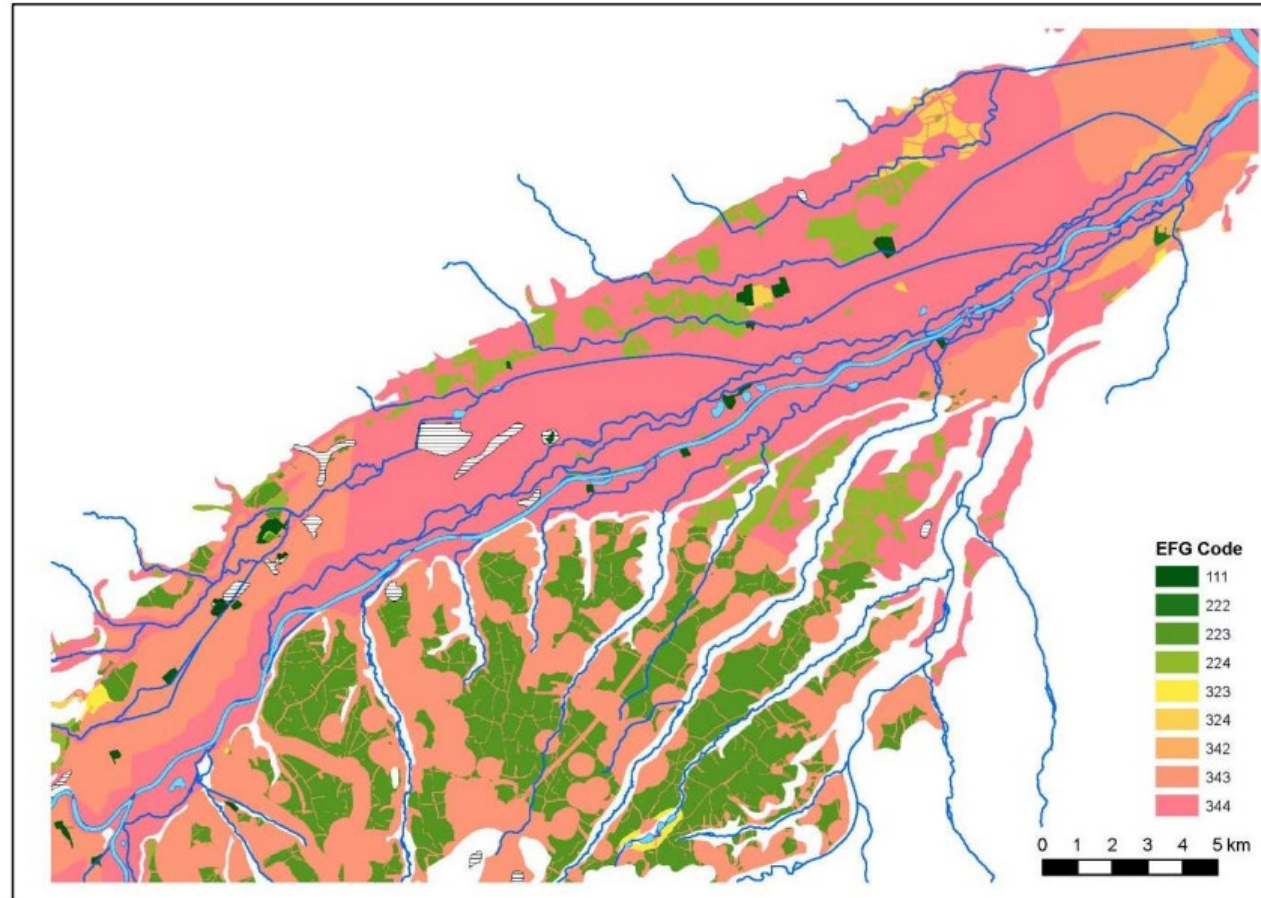
UNFC - Case Studies

- ❖ Mineral Intelligence for Europe (Mintell4EU)
 - ✓ UNFC application to sand and gravel resources in an Austrian pilot area
 - ✓ UNFC Case study – phosphates, Belgium
 - ✓ UNFC application to aggregates (limestone; gravel and sand) resources in the Croatia, Koprivnica - Križevci County case study
 - ✓ UNFC Case study – Marine aggregates, Denmark

- ❖ T. Bide, T.J. Brown, A.G. Gunn, E. Deady, (2022). Development of decision-making tools to create a harmonised UK national mineral resource inventory using the United Nations Framework Classification. Resources Policy, Volume 76, June 2022, 102558.
<https://doi.org/10.1016/j.resourpol.2022.102558>

University Courses

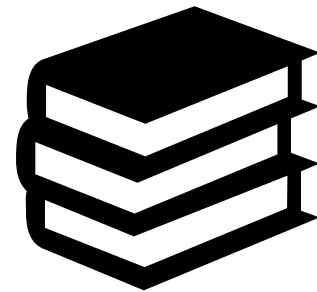
UNFC application to sand and gravel resources in an Austrian pilot area



University Courses

Assignment/Feedback from Students

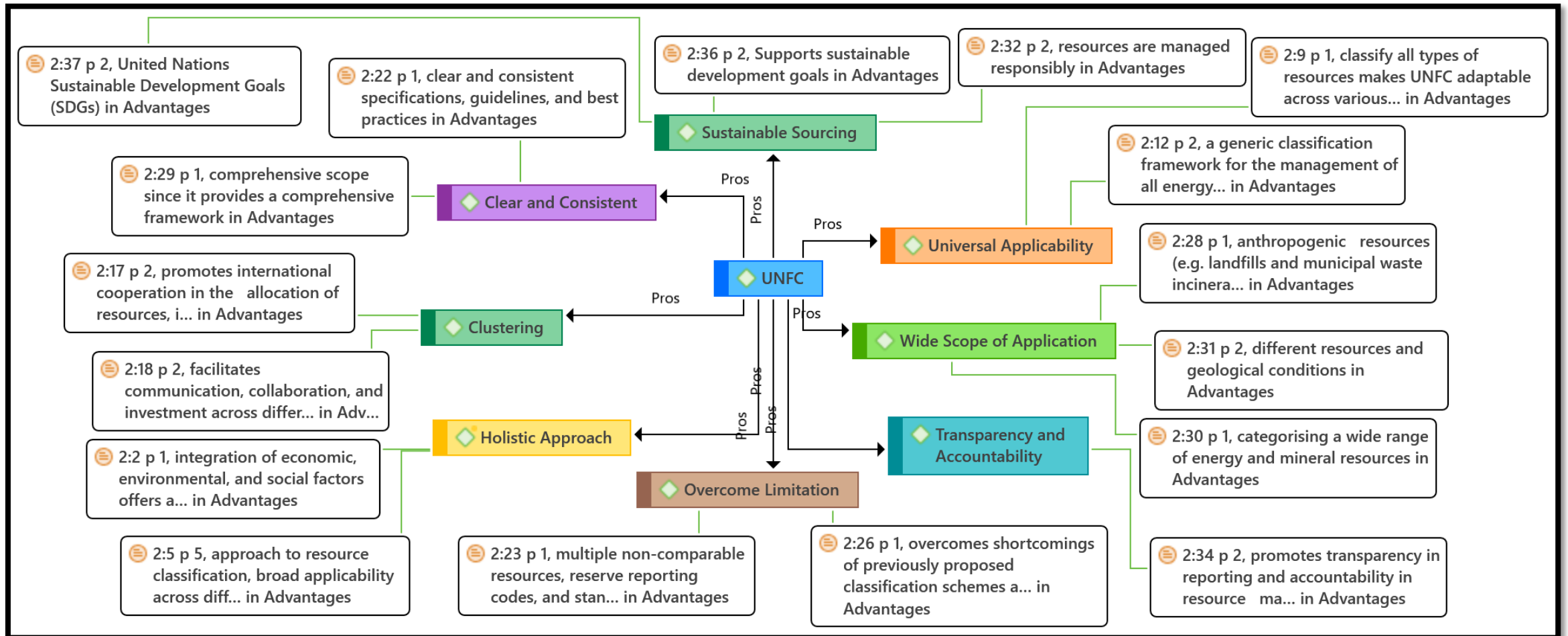
- What is your opinion about the application of CRIRSCO and UNFC in achieving sustainability standards in the raw materials sector?
- Advantages and limitations of UNFC principles during classification of raw materials



31 students – handed in

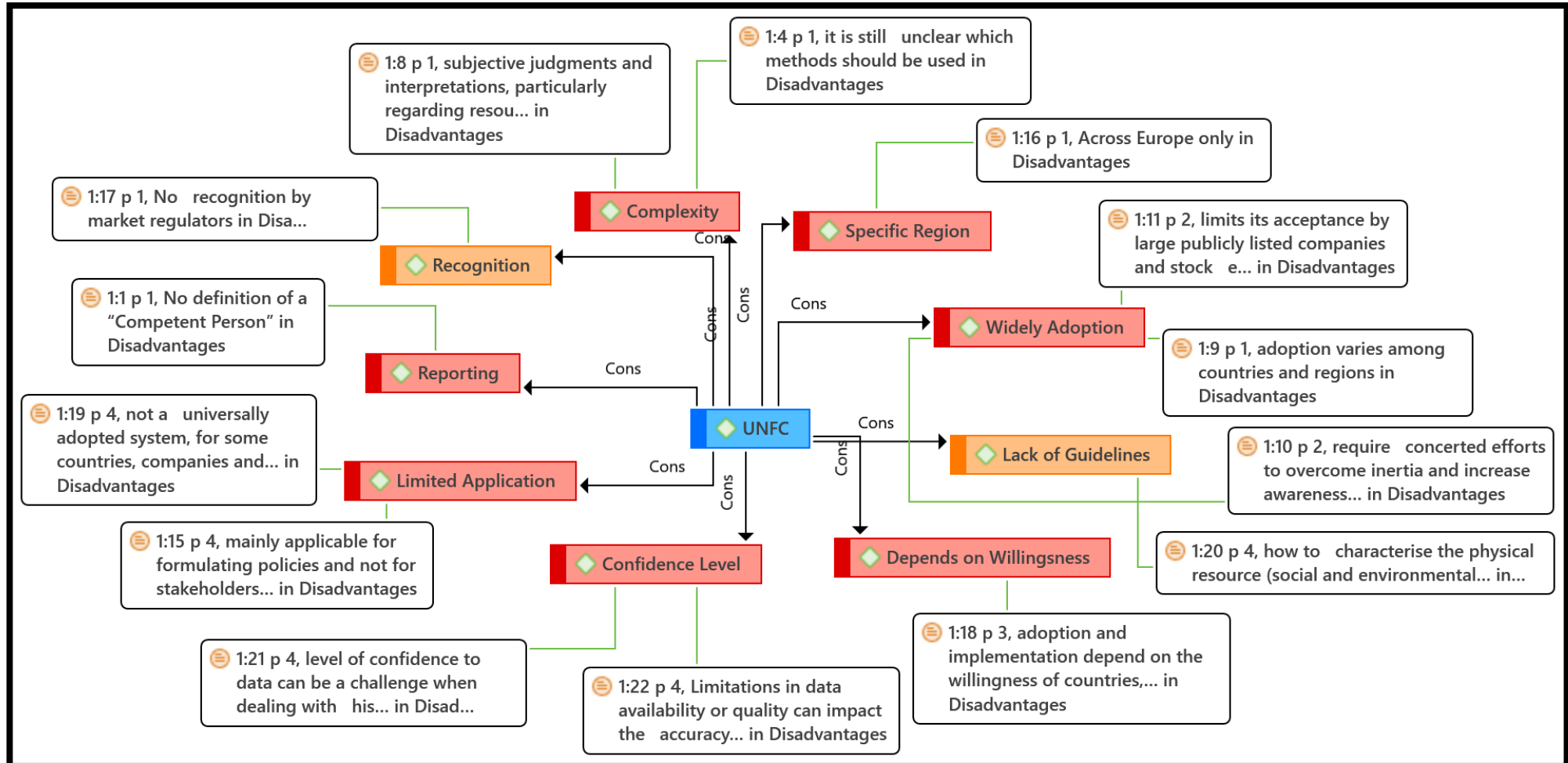
Feedback of Students

Pros Parameters



Feedback of Students

Cons Parameters



Conclusion

- ❑ First launch of the university courses – March 2024
- ❑ Lectures – recorded and available
- ❑ Relaunch – potentially in March 2025
- ❑ Scope of development – UNFC & UNRMS



 [Follow the Lectures or Enrolment](#)

Reference



1. United Nations Framework Classification for Resources (UNFC), Update 2019, United Nations publication issued by the United Nations Economic Commission for Europe, [online], <Accessed from: https://unece.org/sites/default/files/2023-10/UNFC_ES61_Update_2019.pdf>, <Accessed on: 22nd April 2024>
2. Bridging Document between the Committee for Mineral Reserves International Reporting Standards Template and the United Nations Framework Classification for Resources, [online], <Accessed from: https://unece.org/sites/default/files/202404/CRIRSCO_Template_UNFC_BD_ECE_ENERGY_GE.3_2024_5_ENG.pdf>, <Accessed on: 22nd April 2024>
3. Deliverable D4.1 Appendix UNFC pilot case studies compiled as part of Mintell4EU WP4 (Appendix to Deliverable D4.1), [online], <Accessed from: <https://geoera.eu/wp-content/uploads/2021/10/D4.1-Mintell4EU-Case-Study-Overview-Appendix.pdf>>, <Accessed on: 22nd April 2024>

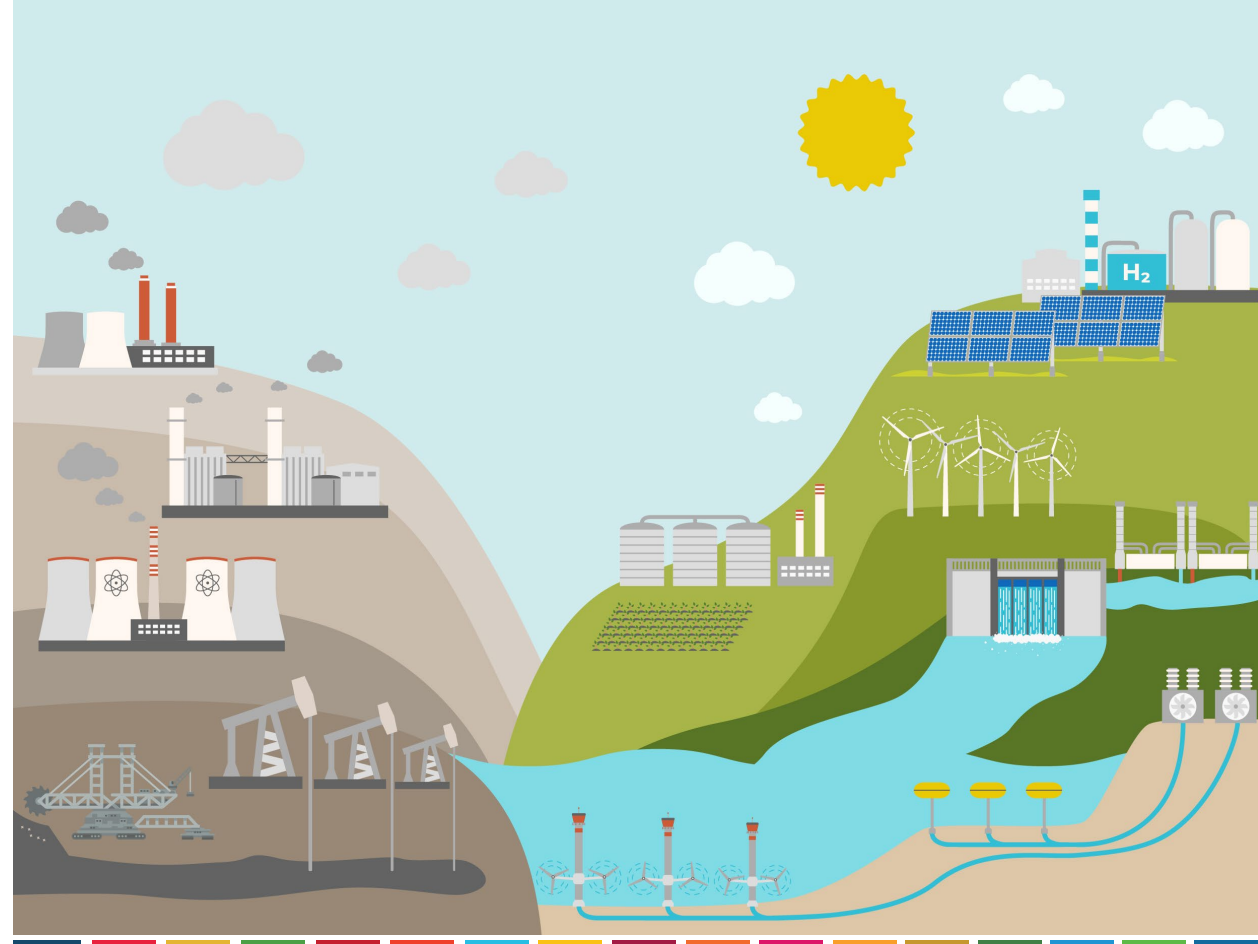


THE VIEWS EXPRESSED ARE THOSE OF [Md Ariful Islam, Georg Meissner, Helmut Mischo] AND DO NOT NECESSARILY REFLECT THE VIEWS OF THE UNITED NATIONS.

Thank you!

UNECE

Date 22 | 04 | 2024, Geneva



RESOURCE MANAGEMENT WEEK

2024



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