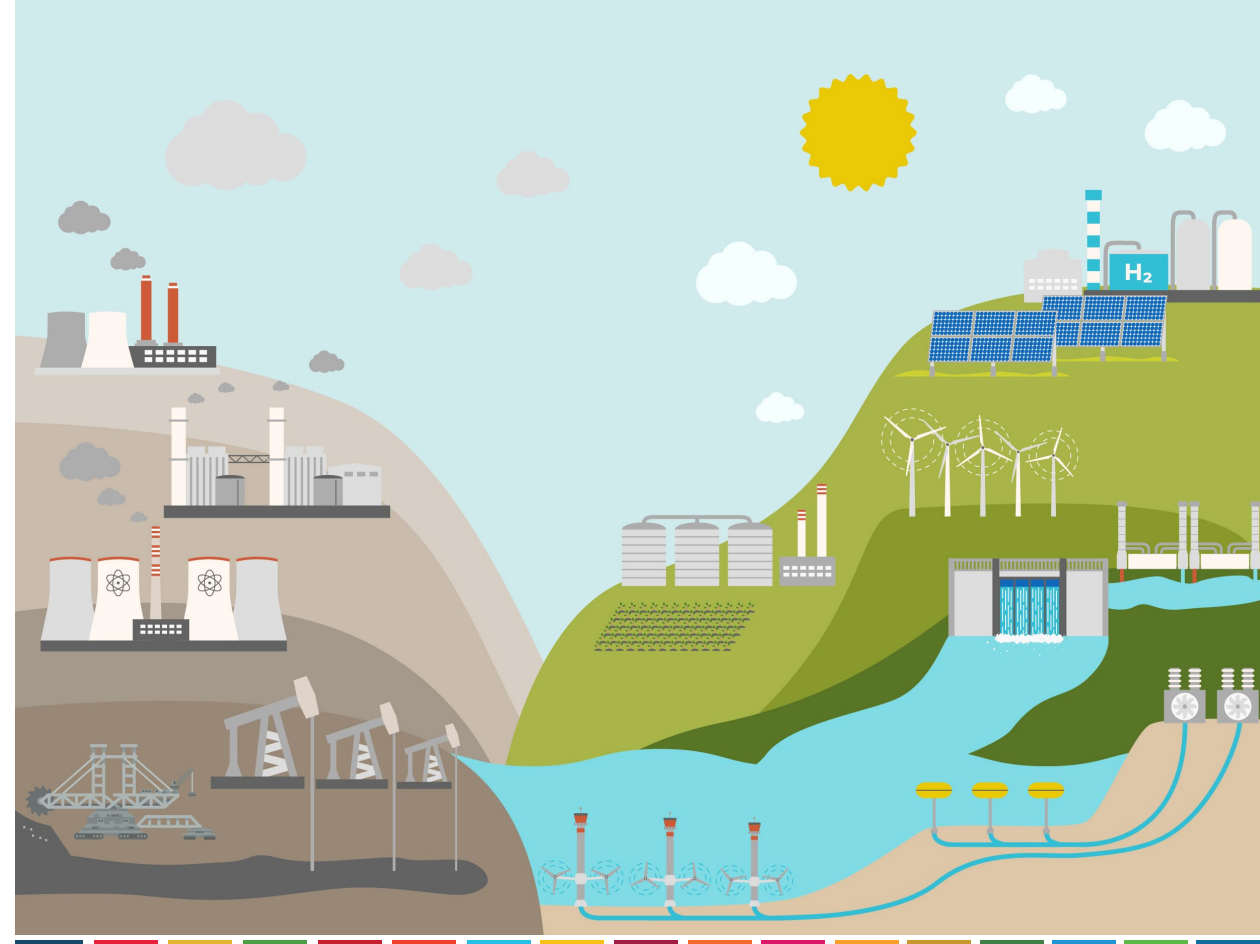


# Development and deployment of UNFC – The AMREC Case Study

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RESOURCE MANAGEMENT WEEK  
2024



UNECE

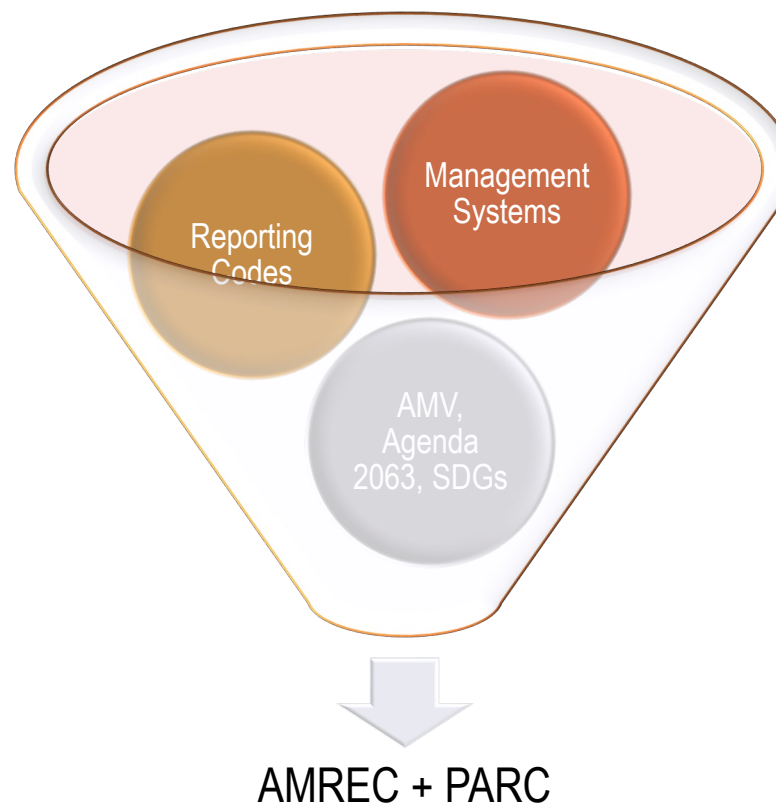
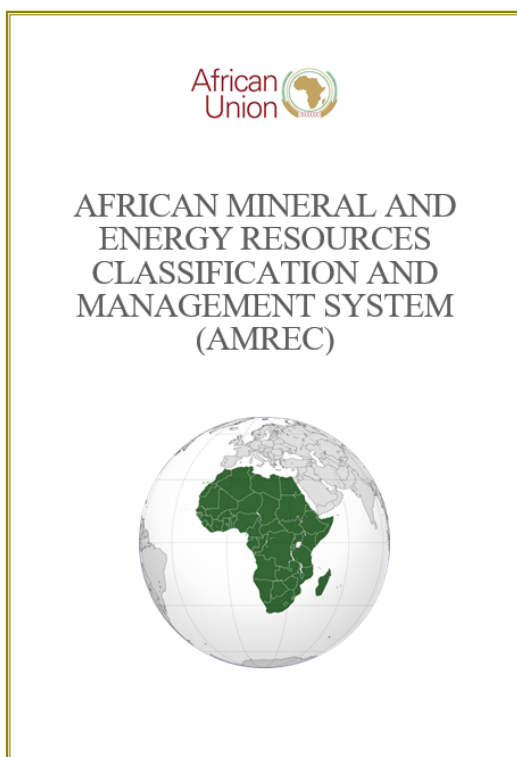
# Outline

1. Introduction
2. How AMREC relates to UNRMS
3. A Generalized approach to Application of AMREC
4. The Case Studies



# Introduction

## Overview



- A comprehensive system for sustainable management of Africa's minerals and energy resources.
- Aligned to Africa Mining Vision (AMV), Agenda 2063 and the Sustainable Development Goals (SDGs)
- Based on United Nations Framework Classification for Resources (UNFC) Principles, Generic Specifications and Guidelines
- Includes the Pan Africa Reporting Code (PARC)

# Introduction

## Key sustainability considerations in AMREC (AMV, Agenda 2063, SDGs)



No.	Critical Controlling Factors	Key Focus	Examples
1.	Project milestones and decision gates	Smooth project planning and operation across the full project life-cycle, gap analysis targeted to a specific milestone rather than attempting to cover the whole life-cycle at once.	<ul style="list-style-type: none"><li>▪ Transparency in licensing</li><li>▪ Project feasibility study</li><li>▪ Environmental &amp; social impact assessment etc.</li></ul>
2.	Value addition and beneficiation	Assesses the full economic viability and benefit of a mineral resource including, downstream, up-stream and side stream linkages	<ul style="list-style-type: none"><li>▪ Value addition policy</li><li>▪ License requirement?</li><li>▪ Bottlenecks to value addition</li></ul>
3.	Economic diversification	Focus on a resource sector that optimizes Africa's finite mineral resource endowments incorporating high value and lower value resources at both commercial and small-scale levels.	<ul style="list-style-type: none"><li>▪ Diversification policy</li><li>▪ Other economic activities</li><li>▪ How livelihood of people are affected</li></ul>
4.	Comprehensive resource recovery	Managing resources in an integrated, multi-targeted manner than a management strategy that targets a single resource.	<ul style="list-style-type: none"><li>▪ Access to minerals information</li><li>▪ Other minerals than primary</li></ul>
5.	Zero waste concept	Consistent with the principles of the waste hierarchy emphasizing that at the end of the mineral processing cycle, there should be zero waste	<ul style="list-style-type: none"><li>▪ Zero waste policy</li><li>▪ Application of waste hierarchy?</li><li>▪ Who handles the waste</li></ul>

# How AMREC relates to UNRMS

In pursuit of integration



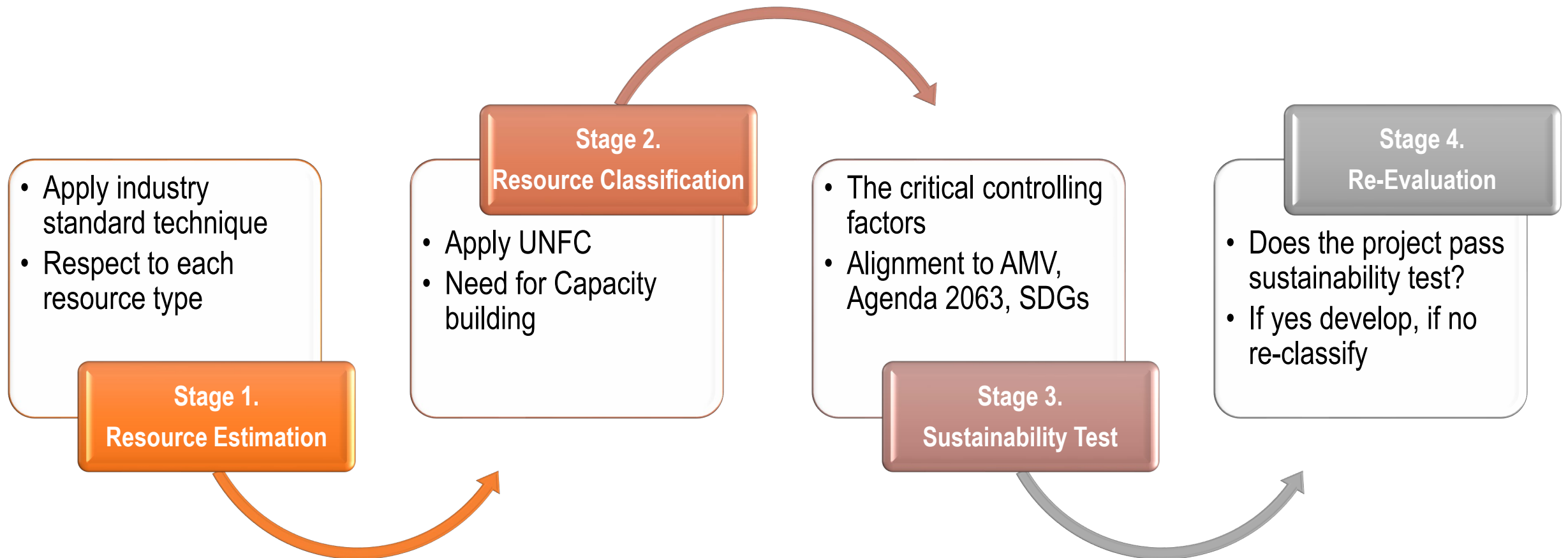
Principle 1. State rights and responsibilities in the management of resources cuts across

	AMREC Critical Controlling Factors	UNRMS Fundamental Principles
1.	Project milestones and decision gates	Principle 2. Responsibility to Planet Principle 4. Social Contract on Natural Resources Principle 9. Health and Safety Principle 11. Transparency
2.	Value addition and beneficiation	Principle 7. Value Addition
3.	Economic diversification	Principle 3. Integrated Management of Resources Principle 5. Service Orientation Principle 10. Innovation Principle 12. Continuous Strengthening of Core competencies
4.	Comprehensive resource recovery	Principle 6. Comprehensive Resource Recovery
5.	Zero waste concept	Principle 8. Circularity



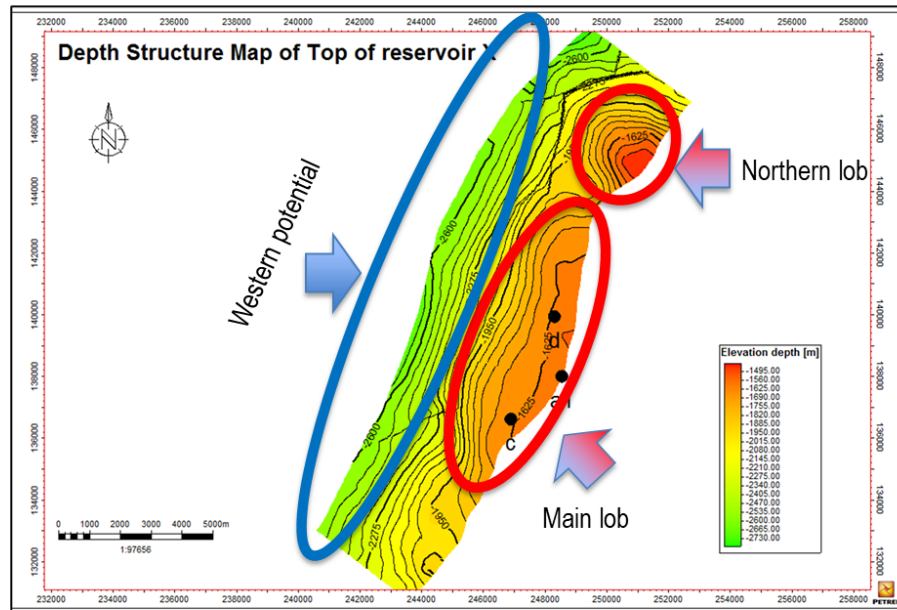
# A Generalized Approach to application of AMREC

The four-stage approach



# The Case studies

## Malingo Oil Project



### Overview of Malingo Oil Project

- Located in Albertine Graben in Western Uganda
- Two lobes (3-way dip structure) separated by a syncline
- Main lobe penetrated by three wells all encountering oil, Northern lobe has no well
- OWC hypothesis at 2400 mTVD
- Recoverable volume estimated using the volumetric method and supported by analogues ( $OIP = A \times h \times \phi \times \frac{1-S_w}{FVF}$ )
- Has a production license but not yet producing
- Western potential lie in shallow water lake
- Predominant activity of local community is fishing

No.	Project	Recoverable Volume (MMBBL)
1.	Waterflood recovery (Main lobe)	153
2.	Waterflood recovery (Northern lobe)	37
3.	Polymer Incremental (Main+Northern)	25
4.	Western prospects	320



# The Case studies

## Malingo Oil Project – Main Lob Example

### Degree of Confidence (G-Axis)

- Sandstone reservoir in fluvial-deltaic environment
- Covered by 3D seismic
- Three (3) appraisal wells drilled, all successful
- OWC Penetrated at 2400 mTVD
- Very good reservoir properties ( $\Phi > 0.25$ ,  $K > 1000\text{mD}$ )

### Technical Feasibility (F-Axis)

- Waterflood feasibility study successful
- Development strategy approved by Government
- Project sanction anytime but less than 5 years

### Environmental-Social-Economic Viability (E-Axis)

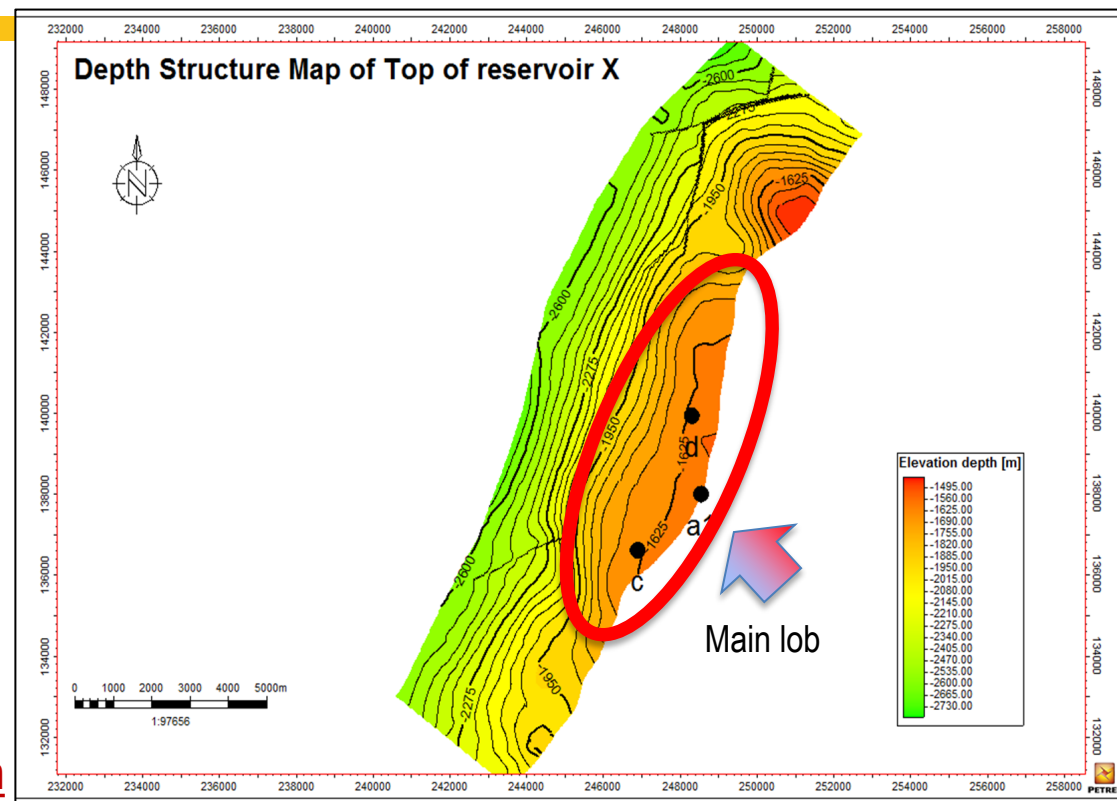
- Commercial & Economic viability proven
- Environmental impact assessment report under review for approval

### Classification

**G-Axis: G1** (Quantities associated with a known deposit that can be estimated with a high level of confidence)

**F-Axis: F1.3** (Sufficiently detailed studies have been completed to demonstrate the feasibility of extraction by implementing a defined development project or mining operation)

**E-Axis: E1.1** (Extraction and sale is economic on the basis of current market conditions and realistic assumptions of future market conditions)





# The Case studies

## Malingo Oil Project



UNFC Classes Defined by Categories and Sub-categories						
Produced	Sold or used production					
	Production which is unused or consumed in operations					
Total Products	Class	Sub-class	Categories			UNFC Class/Sub-Class
			E	F	G	
Known Sources	Viable Projects	On Production	1	1.1	1, 2, 3	Justified for Development
		Approved for Development	1	1.2	1, 2, 3	
		Justified for Development	1	1.3	1, 2, 3	
	Potentially Viable Projects	Development Pending	2 <sup>b</sup>	2.1	1, 2, 3	Development Pending
		Development On Hold	2	2.2	1, 2, 3	
	Non-Viable Projects	Development Unclassified	3.2	2.2	1, 2, 3	Development on hold
		Development Not Viable	3.3	2.3	1, 2, 3	
	Remaining products not developed from identified projects		3.3	4	1, 2, 3	Exploration project
	Potential Sources	Prospective Projects	[No sub-classes defined]	3.2	3	
		Remaining products not developed from prospective projects		3.3	4	4

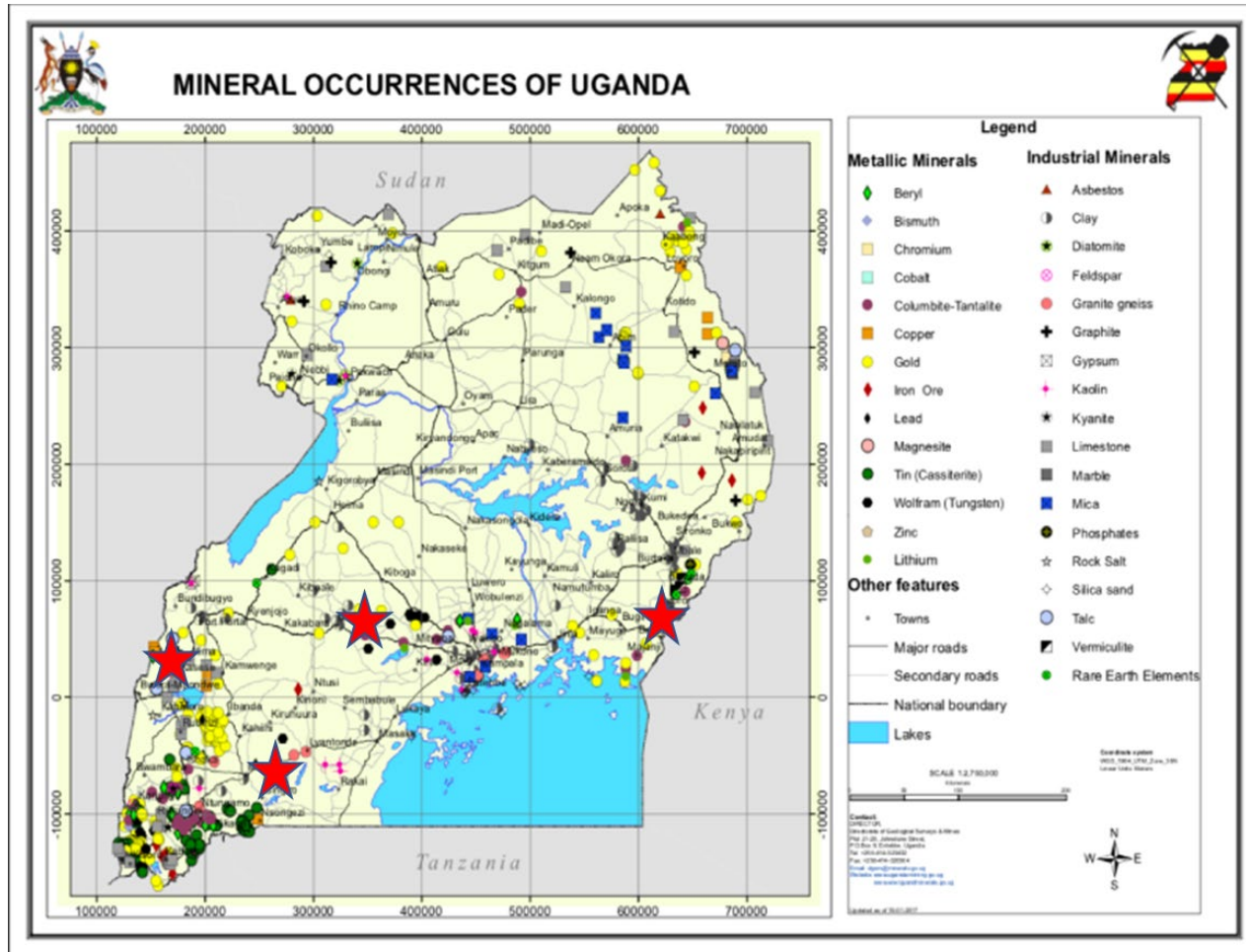
### Summary of Classification

No.	Project	Volume (MMBBL)	E	F	G	UNFC Class/Sub-Class
1.	Waterflood recovery (Main lob)	153	1.1	1.3	1	Justified for Development
2.	Waterflood recovery (Northern lob)	37	2	2.1	2	Development Pending
3.	Polymer Incremental (Main+Northern)	25	2	2.2	3	Development on hold
4.	Western Prospects	320	3.2	3	4	Exploration project



# The Case studies

## Minerals Project



### Projects studied

- Gold Mining in Tiira, Busia, Eastern Uganda (500,000 ounces)
- Gold Mining in Kassanda, Mubende, Central Uganda (5 million ounces)
- Tin Mining in Isingiro, Western Uganda (2.5 million tons)
- Salt Mining in Lake Katwe, Kasese, Western Uganda (12.6 metric tons)

### Sustainability test

- Each project was assessed on how they conform to the critical controlling factors.
  - ✓ Project Millstone & Decision gate
  - ✓ Value addition and beneficiation
  - ✓ Economic diversification
  - ✓ Comprehensive resource recovery
  - ✓ Zero waste concept

### Criteria

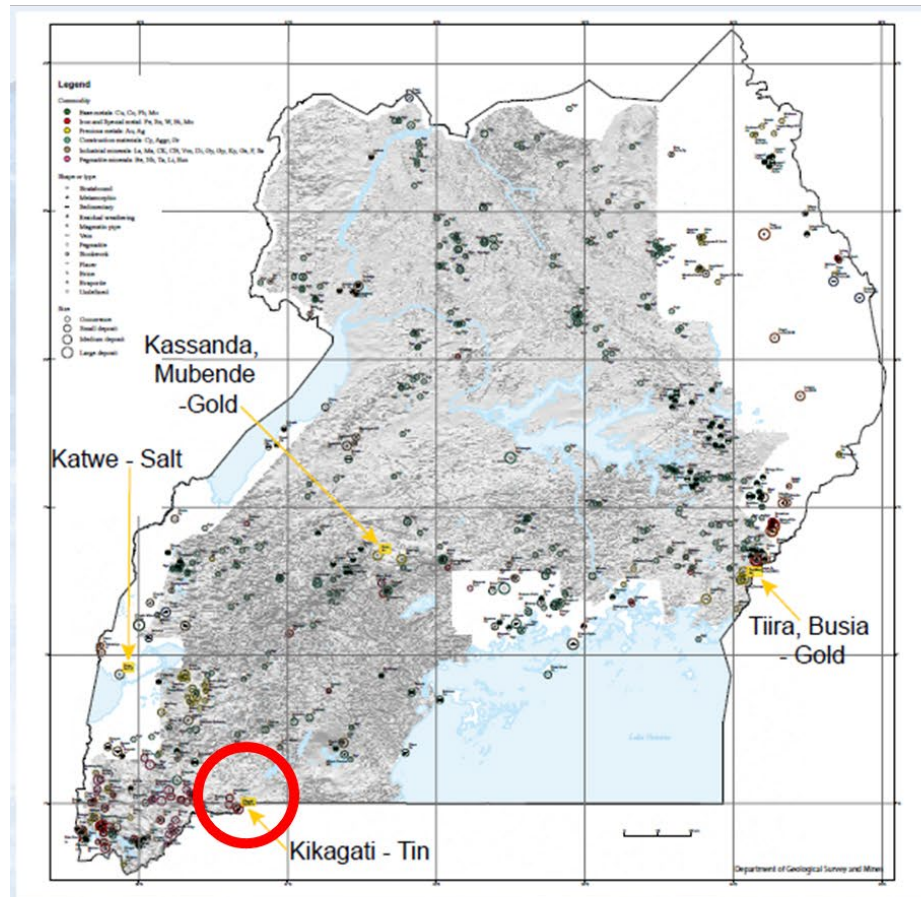
Meets Expectation = greater than 70% conformity  
 Average = at least 50% conformity  
 Below Expectation = Less than 50% conformity



# The Case studies

## Minerals Project – Tin Example

### Tin— Kikagati, Insingiro, Uganda



#### Project Milestone & Decision gate (Meets Expectation)

- Project conforms and has an approved ESIA with a mine closure plan, feasibility with a long-term plan was also approved

#### Value Addition & Beneficiation (Below Expectation)

- Separation of tin from mined rubble is the highest notable value addition, extracted tin is exported as an unprocessed raw material, lack of tin smelting blamed on huge electricity requirement

#### Economic Diversification (Below Expectation)

- Remains limited, activities restricted to tin mining only although some support like pipe water is given to the community

#### Comprehensive Resource Recovery (Meets Expectation)

- Plausible evidence, in addition to tin, iron is also harvested during the separation process. Importantly, the non-mineralised rocks are washed and separated into aggregates of gravel and sand used in other construction works

#### Zero Waste (Average)

- Satisfactory, the only waste output is muddy water, which drains into the River Kagera, part of this “wastewater” is re-used for repeated phases in the ore separation process.



# The Case studies

## Sustainability results



These results guides classification on the E and F axis of the UNFC

Critical Controlling Factors	Project A	Project B	Project C	Project D
1. Project milestones and decision gates	Below expectations	Meets expectations	Average	Below expectations
2. Value addition and beneficiation	Below expectations	Below expectations	Below expectations	Below expectations
3. Economic diversification	Below expectations	Below expectations	Average	Average
4. Comprehensive resource recovery	Average	Meets expectations	Below expectations	Below expectations
5. Zero waste concept	Below expectations	Average	Below expectations	Below expectations



# The Case studies

## Re-evaluation of projects (illustration)

		E	F	G
		1.1	1.3	1
		+		

Project A	Critical Controlling Factors	Project A
	1. Project milestones and decision gates	Below expectations
	2. Value addition and beneficiation	Below expectations
	3. Economic diversification	Below expectations
	4. Comprehensive resource recovery	Average
	5. Zero waste concept	Below expectations

**Is it still Justified for Development?**

		E	F	G
		1.1	2.1	2+3
		+		

Project B	Critical Controlling Factors	Project B
	1. Project milestones and decision gates	Meets expectations
	2. Value addition and beneficiation	Below expectations
	3. Economic diversification	Below expectations
	4. Comprehensive resource recovery	Meets expectations
	5. Zero waste concept	Average

**Is it still Development Pending?**

		E	F	G
		2	2.2	3
		+		

Project C	Critical Controlling Factors	Project C
	1. Project milestones and decision gates	Average
	2. Value addition and beneficiation	Below expectations
	3. Economic diversification	Average
	4. Comprehensive resource recovery	Below expectations
	5. Zero waste concept	Below expectations

**Is it still Development on Hold?**

		E	F	G
		3.2	3	4
		+		

Project D	Critical Controlling Factors	Project D
	1. Project milestones and decision gates	Below expectations
	2. Value addition and beneficiation	Below expectations
	3. Economic diversification	Average
	4. Comprehensive resource recovery	Below expectations
	5. Zero waste concept	Below expectations

**Is it still a Prospective Project?**



# Conclusion

- UNFC remains the classification system capable of universal application
- But it is no longer enough to just classify projects
- The tenets of sustainable development must be at the heart of any resource management system
- Africa has made progress but more needs to be done to achieve global aspirations.



THE VIEWS EXPRESSED ARE THOSE OF FELIX BOB OCITTI AND DO NOT NECESSARILY REFLECT THE VIEWS OF THE UNITED NATIONS.

# Thank you!

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Date 25 | 04 | 2024, Geneva



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