

# Indicators of Sustainability for the Mining Industry

## The Economic Dimension in the Selection of Indicators

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**ISIEM - Carajás**

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# ISIEM – Carajás

- **Approaching Sustainability**
- **Matrix of Indicators of Sustainability**
- **Exploring a Compromising Solution**
- **Selected Aspects of Concern**

# Approaching Sustainability

- **The Concept**
- **Multidimensional View**
- **Intergeneration Conflicts**

# The Concept

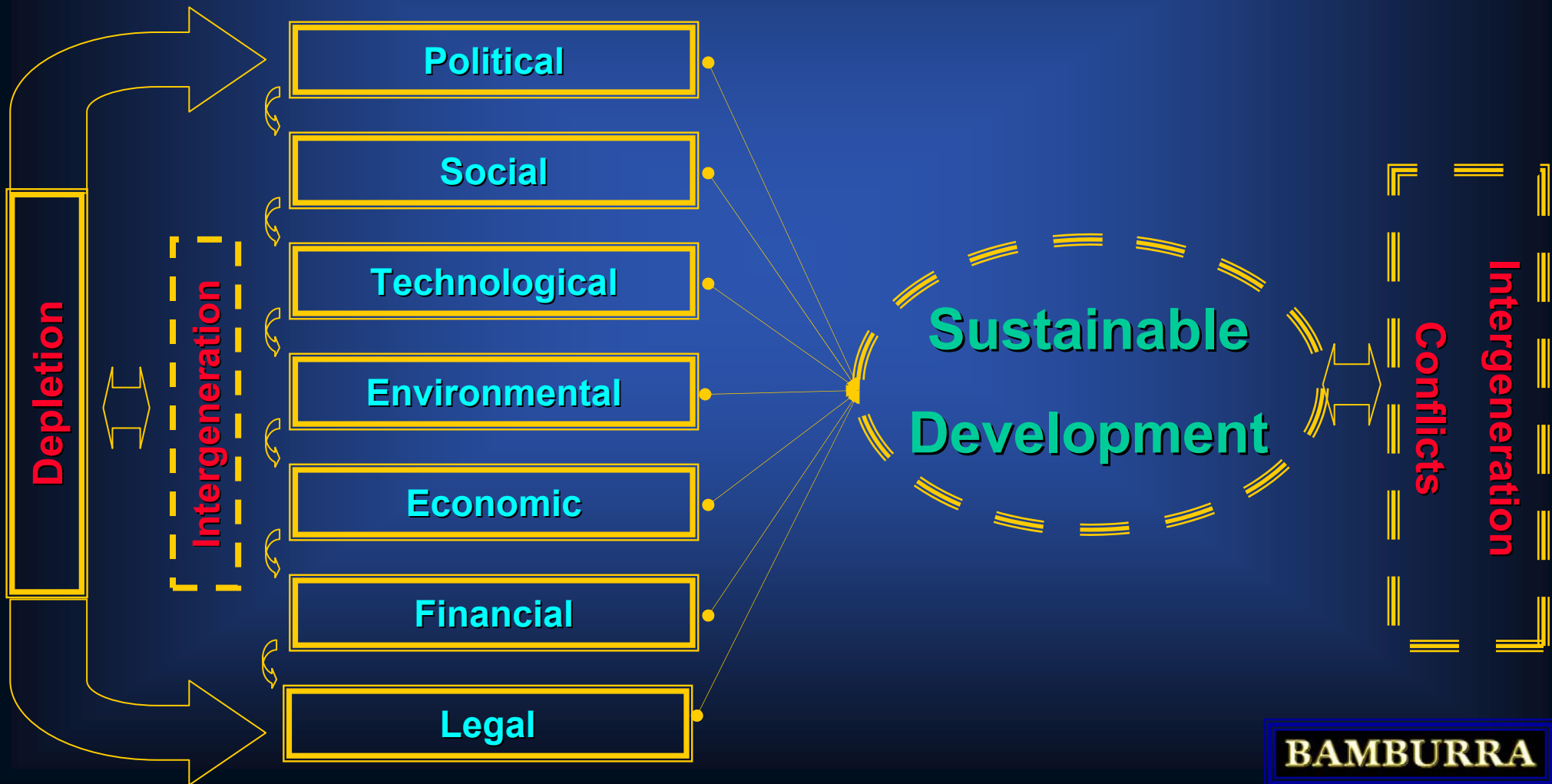
A pattern of development that fulfills the most urgent and general needs of the present generation without compromise the legacy options of the future generations in fulfilling their needs.

Time

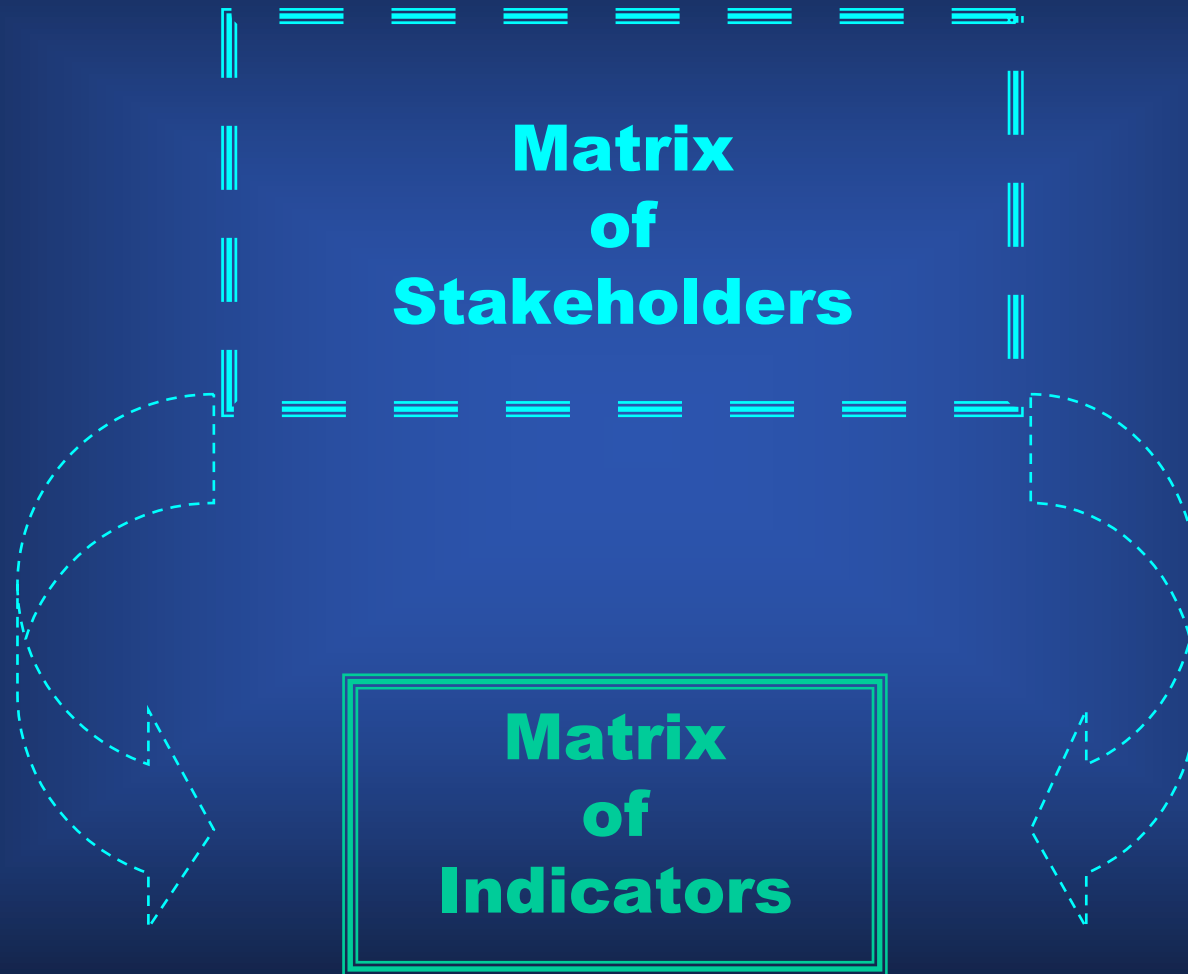


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# Mining & Sustainable Development: Multidimensional View of the Concept



# Matrix of Indicators of Sustainability



# Matrix of Indicators of Sustainability

## ➤ **FUNDAMENTAL DIMENSIONS**

{ Political, Legal, Economic, Social, Environmental, Technological . . }

## ➤ **PARAMETERS & VARIABLES**

[ Rate of Recovery, Consumption of Energy, Consumption of Water, Recycling of Water, Disturbed Land ...]

## ● **METRICS & INDICATORS**

( Emissions per Unit of Product . . . )

# Exploring a Compromising Solution

Private  
Sector

Public  
Sector

## Matrix of Indicators

➤ FUNDAMENTAL DIMENSIONS

➤ PARAMETERS & VARIABLES

- METRICS & INDICATORS



# Exploring a Compromising Solution

Private Sector

Public Sector

## Matrix of Indicators

➤ FUNDAMENTAL DIMENSIONS

➤ PARAMETERS & VARIABLES

• METRICS & INDICATORS

Present Generation

Future Generation

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# Exploring a Compromising Solution

Private Sector

National Interests

Public Sector

## Matrix of Indicators

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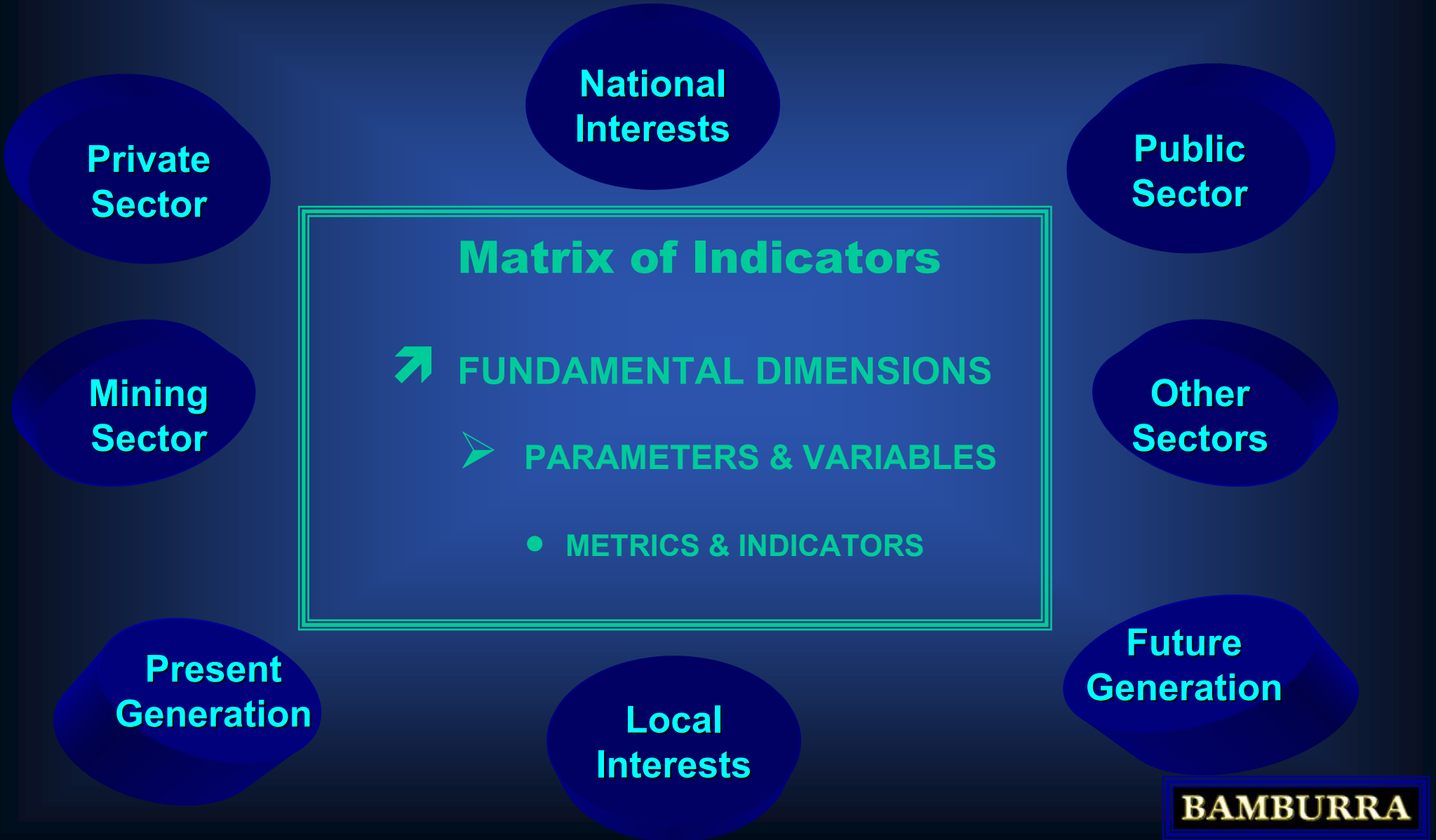
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Local Interests

Future Generation

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# Exploring a Compromising Solution



# **Selected Aspects of Concern**

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  - ✓ Subjectivity in using weights!

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  - ✓ Specificities in terms of regions, minerals, process etc?
  - ✓ How to measure with?
  - ✓ How to handle the quantitative & qualitative dichotomy?
  - ✓ Subjectivity in using weights!
  - ✓ Impacting the relative importance: hierarchy & ranking!

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  - ✓ **Rate of Extraction**
  - ✓ **Rate of Recovery**
  - ✓ **Recovering Byproducts**
  - ✓ **Optimization Dichotomy: private versus public**
  - ✓ **Private Attractiveness: minimum rate of return**

# **Selected Aspects of Concern**

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- **The Influence of Spatial Dimensions**

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  - ✓ **Trade Offs & Opportunity Costs**

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- **Confronting National & International Markets**

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  - ✓ **Transferring Prices Issues**
  - ✓ **Sustainability Dumping?**

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- **Selection of Indicators & Attributes**
- **Social Rate of Discount**
- **The Influence of Spatial Dimensions**
- **Confronting National & International Markets**
- **Who Pays the Bill?**

# Selected Questions of Concern

- **Who Pays the Bill?**
  - ✓ Is It the Same – *polluter pays* – Approach?