

Sustainability in Mining

Past, Present, Future

06 November 2025

Avhurengwi Nengovhela



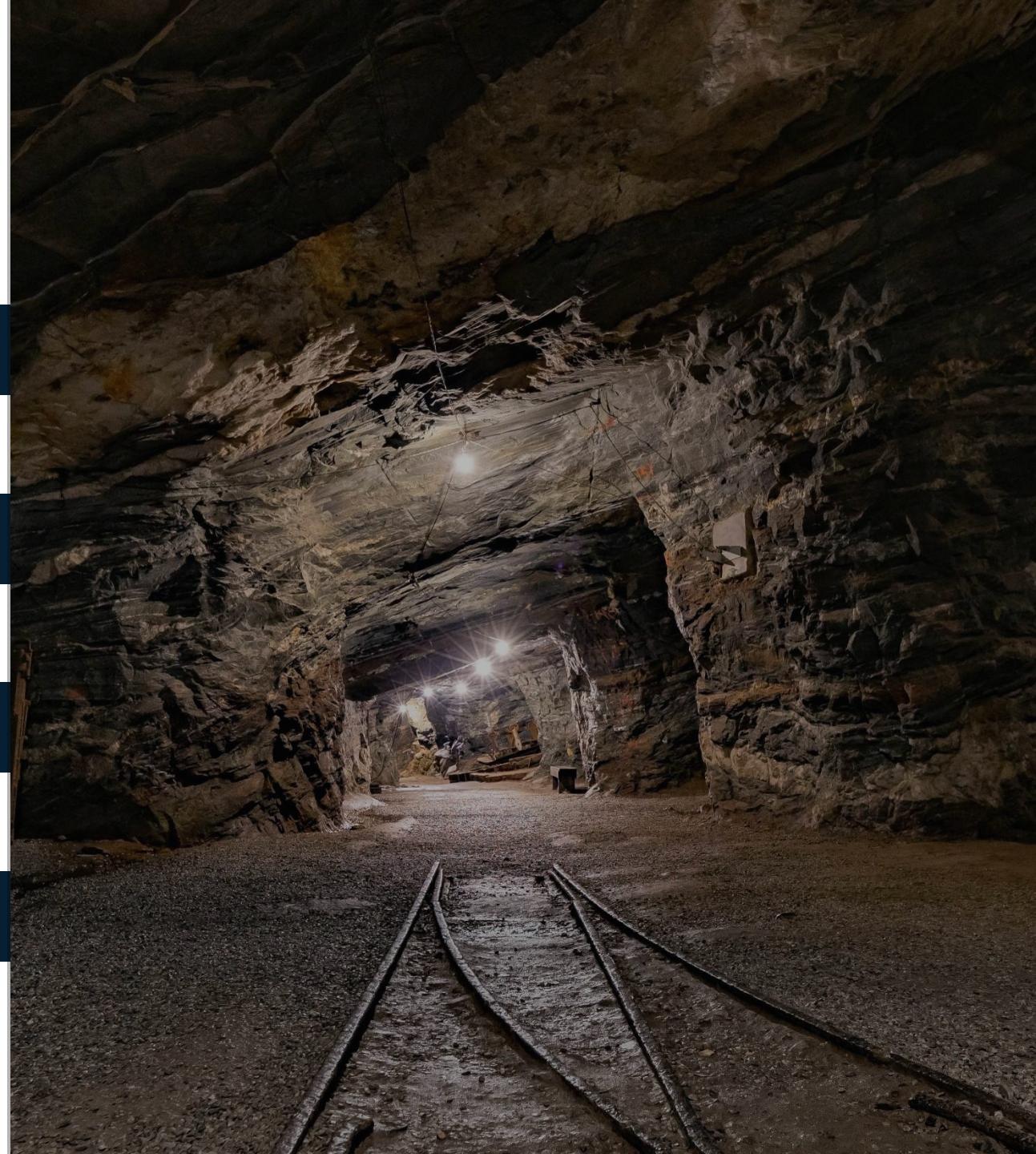
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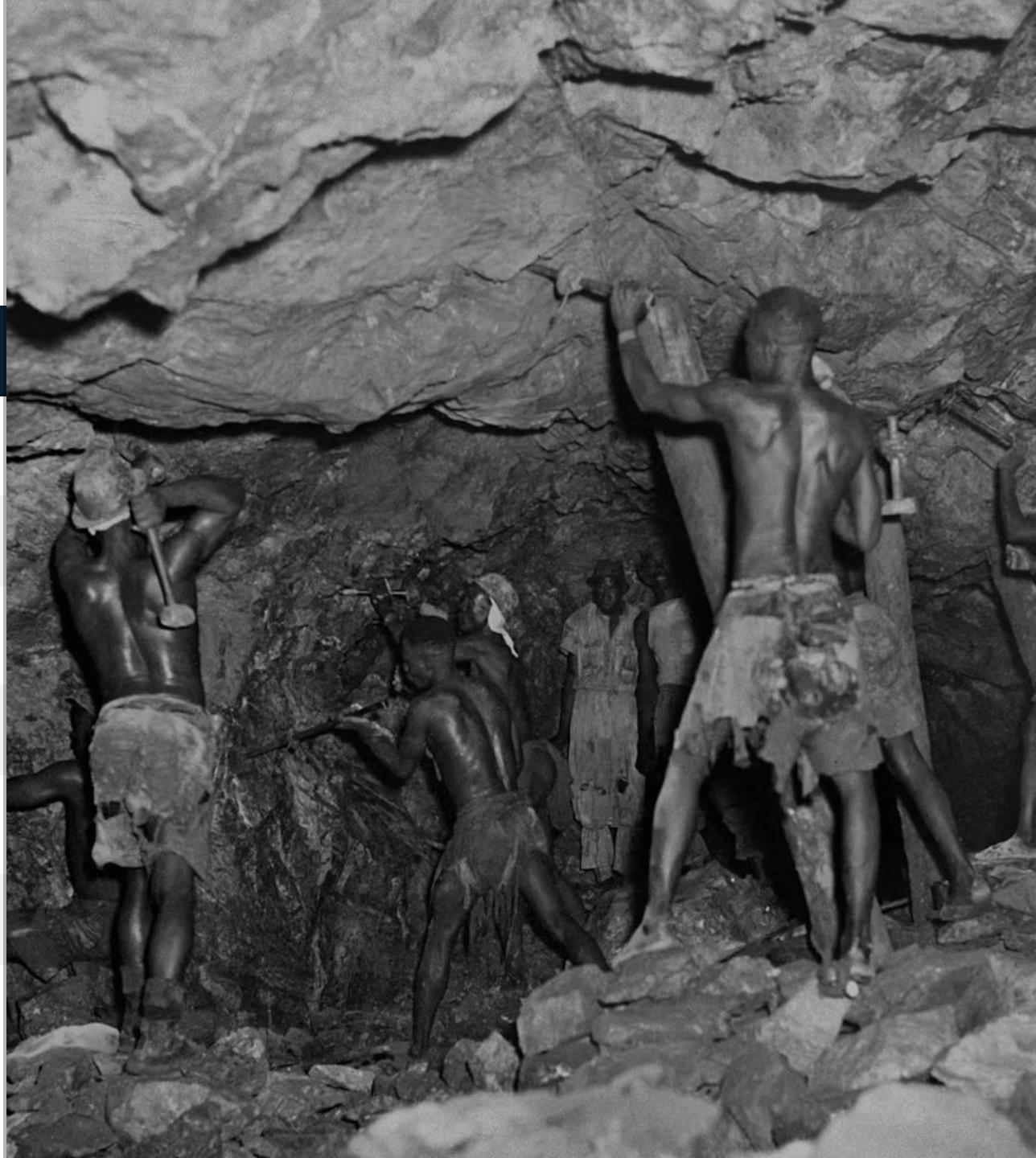
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SA's 800-Year Mining Journey

13th
Century

1850

1867

1870s-
1880s

1895

1924

Africans mine **gold** and **iron ore** in regions like the Witwatersrand.

First industrial mining project – **copper** in Springbok (Northern Cape).

First **diamond** discovered at Hopetown → diamond rush, rise of De Beers, by 1880s producing 95% of the world's diamonds.

Alluvial **gold** discovered (Pilgrim's Rest); 1886 Main Reef gold discovery in Witwatersrand → Johannesburg founded.

Coal found in Witwatersrand Basin, powering industrial mining.

Platinum discovered in Bushveld Igneous Complex → South Africa becomes world's largest platinum producer.

Wealth Above, Scars Below

Gold Sparked Prosperity, But At A Human Cost



- ❑ 1886: Gold discovered in Witwatersrand
- ❑ Hostels built for mineworkers from across southern Africa

Coal Fueled Progress, But Left Lasting Wounds



- ❑ 1960s–1980s: Coal powers economic growth, lighting homes across South Africa
- ❑ Miners' health: **silicosis, dust**
- ❑ Water and land: lasting impacts

From Extraction to Inequality, A Shared Challenge



- ❑ Rapid development ± growing **inequality**
- ❑ Migrant labour systems segmented families
- ❑ Communities bear the scars

Wealth Above Ground, Cost Below



- ❑ Wealth enabled industry and mobility
- ❑ Many miners faced hardship; long hours, dangerous dust, family separation
- ❑ Rivers still run orange from early mine drainage

1970-1987: When Everything Changed



Global Environmental Wake-up

- 1970: 20 million people flood U.S. streets for the first Earth Day.
- Demands: Clean air. Clean water. An end to destruction for profit.
- Spark: *Birth of a global environmental movement.*



South African Struggle

- 1976: Soweto: thousands of students march for freedom, dignity, and justice.
- Repression: Police bullets meet peaceful protest.
- Impact: *The world finally sees the cost of injustice at home.*

In 1970, millions around the globe marched for **clean air** and **water**. Six years later, in Soweto, young South Africans marched for the right to **learn, live, and be free**.



Our Common Future



United Nations
1987

“Meeting the needs of the present... without compromising the ability of future generations to meet their own needs.”

Defining Our Common Future

- ❑ Harlem Brundtland, the former Prime Minister of Norway, chaired the World Commission on Environment and Development (WCED)

From Rio to Joburg: Building the Global Framework (1992-2002 Summits)



Rio Summit (1992)

Agreement on the concept of **sustainable development** and the establishment of key frameworks and agreements to achieve it



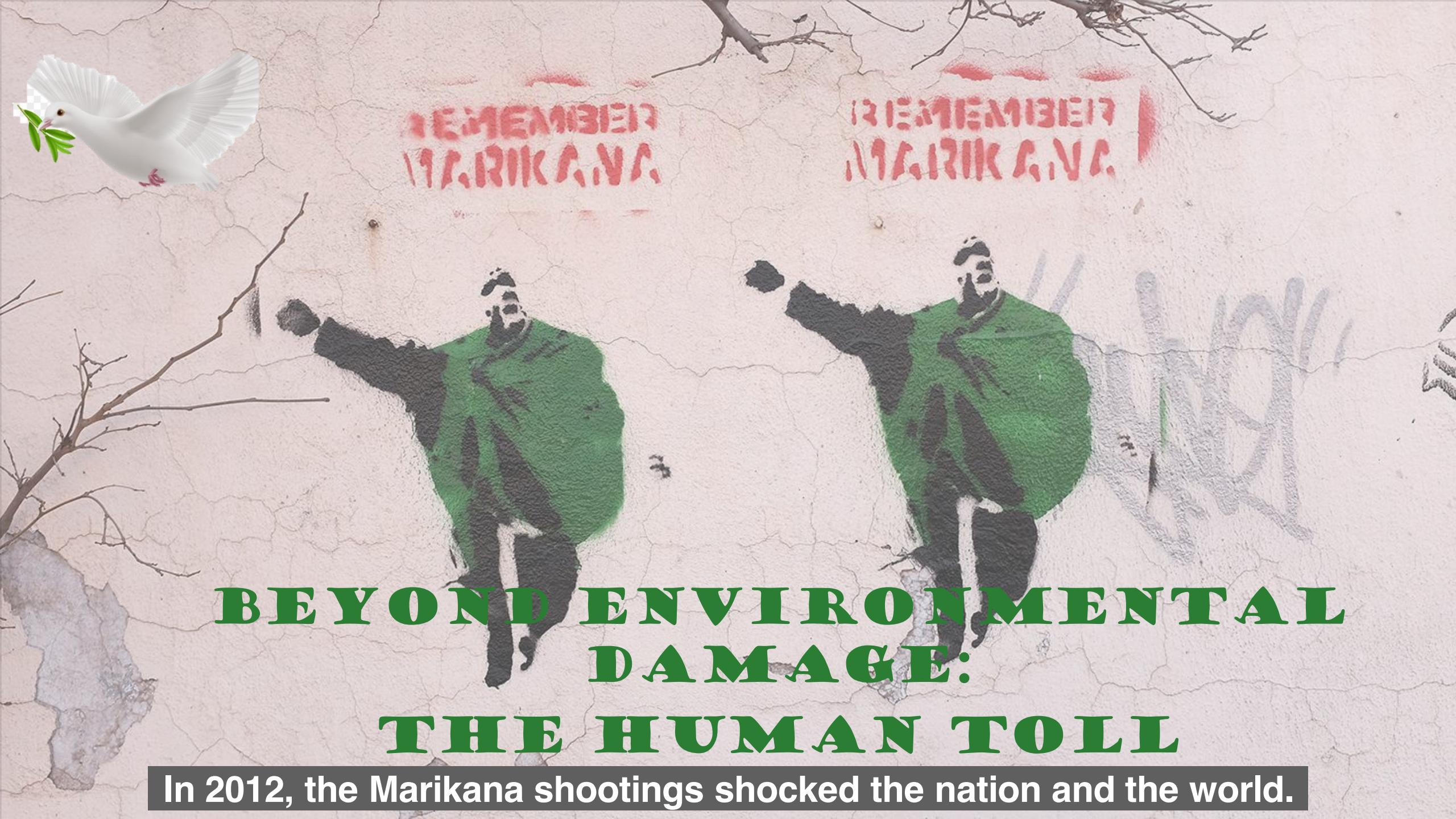
Mandela Inauguration (1994)

South Africa's post-apartheid constitution includes explicit rights to a **healthy environment**, **social justice**, and **sustainable resource use**



JHB Summit (2002)

Reaffirmed the global commitment to sustainable development, emphasizing **poverty eradication**, **social equity**, and **environmental protection**.



BEYOND ENVIRONMENTAL DAMAGE: THE HUMAN TOLL

In 2012, the Marikana shootings shocked the nation and the world.

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So, What's Next?





Where Did ESG Begin? Let's Rewind to 2004.

Before ESG became a boardroom buzzword, the United Nations was already connecting finance, ethics, and sustainability.



- Environmental**
- Social**
- Governance (ESG)**

was formally introduced to global markets.



In 2004, the UN Global Compact released the landmark report 'Who Cares Wins – Connecting Financial Markets to a Changing World.' It was here that the concept of **Environmental, Social, and Governance (ESG)**

In 2004, the United Nations Global Compact released the landmark report **"Who Cares Wins, Connecting Financial Markets to a Changing World.**

The Birth of ESG - Connecting Money to Meaning

- Better consideration of environmental, social, and governance factors will lead to more sustainable markets and better outcomes

IPCC 1.5°C Report (October 2018) – Scientific Urgency

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Climate crisis

This article is more than 6 years old

We have 12 years to limit climate change catastrophe, warns UN

Urgent changes needed to cut risk of extreme heat, drought, floods and poverty, says IPCC

Overwhelmed by climate change? Here's what you can do

Jonathan Watts Global environment editor

Mon 8 Oct 2018 07.23 BST

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A firefighter battles a fire in California. The world is currently 1°C warmer than preindustrial levels. Photograph: Ringo HW Chiu/AP

Climate Strikes (2018-2019) – Youth Activism



Fees Must Fall (October 2015) – Social Justice



Paris + SDGs: The World's Biggest Promise

The Sustainable Development Goals (SDGs) officially came into force on January 1, 2016, as part of the 2030 Agenda for Sustainable Development.

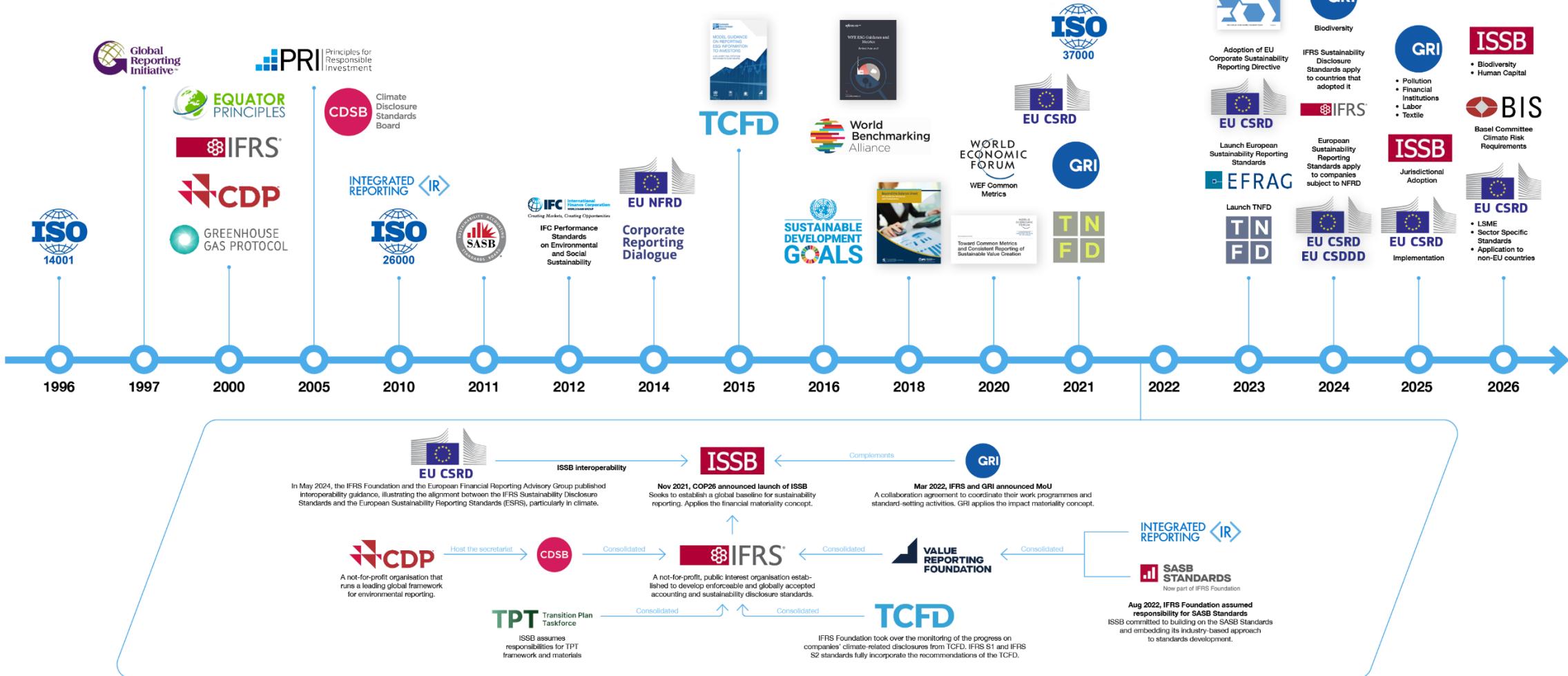


UNITED NATIONS
**PARIS CLIMATE
AGREEMENT**
SIGNING CEREMONY
— 22 APRIL 2016 —



The Paris Agreement is a **legally binding international treaty on climate change**. It was adopted by 195 Parties at the UN Climate Change Conference (COP21) in Paris, France, on 12 December 2015. It entered into force on 4 November 2016.

Which Standard Or Framework Should I Use?



Climate Change
Standard



Launch IFRS Sustainability Disclosure Standards



Adoption of EU Corporate Sustainability Reporting Directive



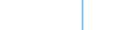
Launch European Sustainability Reporting Standards



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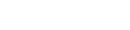
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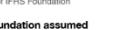
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IESBA (International Ethics Standards for Sustainability Assurance)



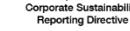
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Adoption of EU Corporate Sustainability Reporting Directive



IFRS Sustainability Disclosure Standards apply to countries that adopted it



European Sustainability Reporting Standards apply to companies subject to NFRD



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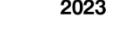
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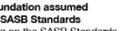
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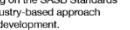
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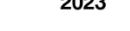
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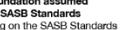
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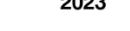
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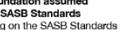
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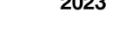
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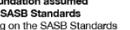
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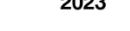
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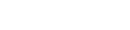
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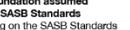
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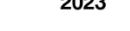
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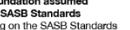
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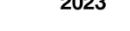
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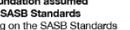
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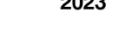
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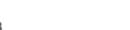
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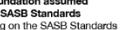
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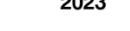
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A large, horizontal photograph of a wind farm at sunset. The sky is filled with warm, orange and yellow hues. In the foreground, two workers wearing hard hats and high-visibility vests are standing and looking towards the wind turbines. A drone is flying above them. The wind turbines are silhouetted against the bright sky.

An international survey of company practices in 2020 revealed that, among the 250 largest companies in the world, **96% produced a corporate sustainability or social responsibility report**

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DEC. 30, 2024

PERSON OF THE YEAR

TIME

DONALD
TRUMP

2024



When Sustainability Became Political

The
Economist

Weekly edition The world in brief War in the Middle East War in Ukraine United States The world economy Business Artificial

Leaders | Sustainable investing

ESG should be boiled down to one simple measure: emissions

Three letters that won't save the planet

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Mark Harris

Jul 21st 2022 | 5 min read



Business And Society

ESG Is Under Attack. How Should Your Company Respond?

by Andrew Winston

December 22, 2023, Updated December 22, 2023

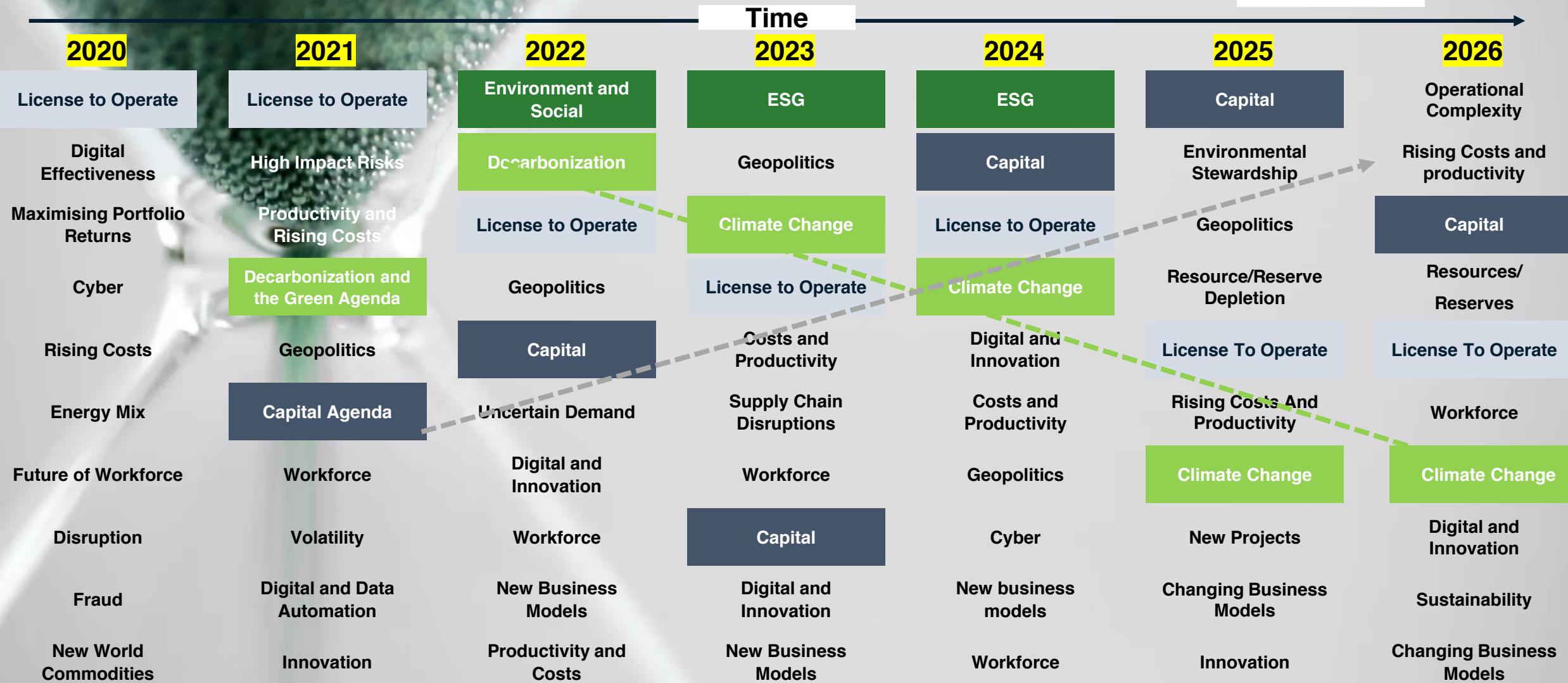


Trump will pull U.S. out of Paris climate agreement

The agreement was meant to ensure global cooperation in reducing the amount of carbon dioxide released into the atmosphere.



A SnapShot of Shifting Priorities -



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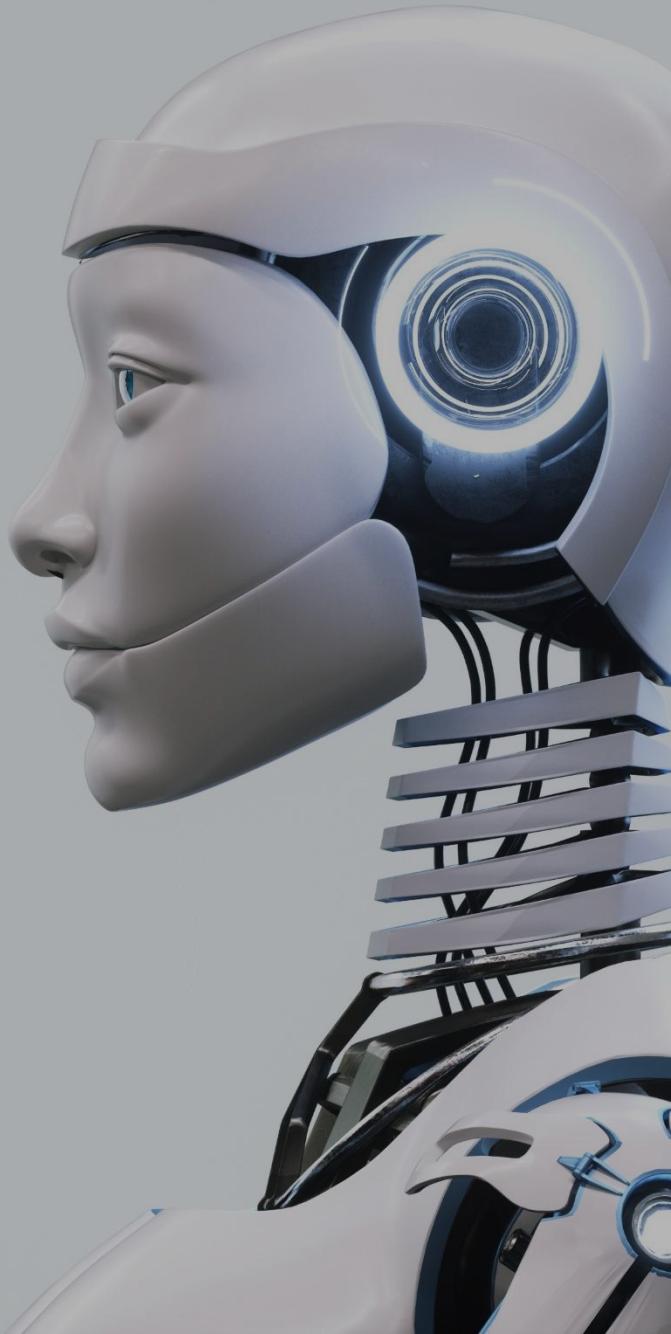
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So, what's Next?



**It's tough to
make
predictions,
especially about
the future.
N. Bohr**



Trends That Will Define Sustainability's Next 10 Years

Reuse, recycling, and eliminating waste.

Biodiversity credits will emerge as new financial instruments to fund habitat restoration and species reintroduction, requiring like-for-like local restoration



Climate finance needs to reach \$5-9 trillion annually by 2030, requiring massive scaling of green bonds, transition finance, and adaptation funding

Digital transformation will directly support sustainability goals through IoT monitoring, digital twins for resource optimization, and blockchain for supply chain transparency

Artificial intelligence will optimize energy grids, predict extreme weather, monitor deforestation in real-time, and enable precision agriculture with reduced water and fertilizer use

2040 Scenarios (AI's View)

'Based on historical data, current industry practices, and credible fact-based projections, analyze and synthesize the most probable scenario for sustainability practices in mining by 2040, considering the specific context of South Africa'



Sustainability in mining will be defined by a bifurcated model where **highly regulated, digitally-integrated**, and capital-intensive critical mineral operations will coexist with a vast, **under-resourced, and socially contested legacy sector**, which will **struggle to address historical liabilities** and manage a just transition.



Mining operations will be fully-integrated, **circular ecosystems** mandated by stringent global ESG frameworks, where zero-carbon, automated extraction processes are symbiotically linked to local energy grids and water systems, with **social license** entirely contingent on **delivering** tangible, audited **benefits to host communities**



Mining will achieve **incremental emissions reductions of 25-40%** from 2020 baselines through renewable energy adoption and efficiency gains, but **will fall short of net-zero targets** while struggling with **legacy environmental issues, community tensions**, and the challenge of scaling critical mineral production for the energy transition without proportional sustainability improvements



South African mining will operate through **AI-optimized**, semi-automated systems under **mandatory carbon-neutral** ESG frameworks, maximizing **critical mineral** extraction for global clean energy infrastructure while meeting standardized **social license** requirements.

“Sustainability entails matters of
economic equity, financial
security, human dignity and social
justice, all with a weight equal to
any environmental concerns”



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