University-level Education in Support of Sustainable Mining: Case Study from Columbia University & UNDP-Guinea

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Action-Oriented Learning Holds Opportunity

Traditional Funded University Research

Narrowly-Defined Brief → Specialist Research → Report to Funder

Traditional Coursework

Course Syllabus → Individual Research → Final Project Submission

Action-Oriented Learning

Complex Brief → Collaborative Research → Revised Brief → Outcomes Keyed to Research Partner Need
Industry & Associations: CBG et al., IMCC

Funding Institutions: UNDP GCF, IFC, USAID

Regulators: Ministries of Mines, and Energy

NGOs & Watchdogs: UNDP, HRW

Think Tanks: CCSI

University Research

Consulting

Curriculum Based Research & Action-Oriented Learning
GHG Inventory
Before Project

UNDP preparing Guinea to qualify for matching funds - concerns:

• Dated emissions inventory
• Limited experience with sustainability agenda
• Need to avoid alienating private sector players
Initial Findings and Project Re-conception

Plans for expanding downstream processing overwhelmed mining’s emissions

= 16.6 tCO₂e
Updated GHG Inventory

Data from 18 sources representing all 7 types of organizations
2017 emissions = 0.8* MM tCO$_2$e/ y

2022 emissions = 65.3 MM tCO$_2$e/ y

* Pre-2017 refining = 5.4 MM tCO$_2$e
Reframing Project Brief

Energy Constraints

Local Environmental Impacts
Renewed Fact-Finding & Expert Interviews

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**Consulting**
Energy & Social Unrest

29 Jun 2017

Guinea: Protests in Conakry erupt over electricity shortage June 29

Protests in Conakry over lack of electricity disrupt traffic; situation normalized but further outages and protests possible

Rural Access to Electricity
% of Population

0% 5% 10% 15% 20% 25%

Energy Solution: Shared Use

Resolve Social Unrest and GHG risks via Hydropower
Capacity Building

- 26% National Electrification Rate

  11% rural areas, 53% urban areas (2013 data)

- 1,268 GWh Produced in 2015

  43.1% fossil fuels, 55.9% hydro sources

- Hydropower potential 26,000 GWh/y

  Guinea’s geography includes 12 major rivers
Best Practices & Case Studies

"What Do We Get Out of It?"

The Human Rights Impact of Bauxite Mining in Guinea
COMMUNITY ENGAGEMENT FOR Bauxite MINING

Objective: Improve transparency and stakeholder dialogue to reduce social unrest

Solution: Dialogue and support for local communities around bauxite mine, Brazil

METHODS / TECHNICAL APPROACH
• Host annual intersectoral forum with an international education foundation to include 60 civil society organizations and local authorities
• Use itinerant dialogue process to bring company representatives into communities for regular meetings
• Offer access to monitor local water quality during extreme weather events and support local recovery efforts and services
• Involve local NGOs as third-party observers in community-related actions
• Use open house initiative to provide scheduled facility tours for local residents

BENEFITS / BUSINESS VALUE
• CSR supports listing on Dow Jones Sustainability Index
• Better informed local communities see company as reliable partner and resource for information
• Third-party verification reduces high-risk conditions (e.g., illegal dwellings on site), thereby reducing unpopular actions (e.g., removal of illegal dwellings)
• Investment in community infrastructure and climate change (i.e., weather related) resilience facilitates production continuity during and after extreme events
• Improved local economic conditions means reduced dependency on future mining company support

STANDARDS / REGULATORY DRIVERS
• IFC 4: Community, 7: Indigenous Peoples, (IFC 1: Assessment & Management of E&S Risks & Impacts)
• ASI Principle 9.7 Local communities, 3.4 Stakeholder complaints, information requests
• ICMM 1, 4, 10

LOCATION
• Three small communities within an area with population 88,000
• Subject to flooding, deforestation
• Low employment, high poverty
COST-EFFECTIVE CLEAN ENERGY FOR ALUMINUM SMELTING

Objective: Long-term fixed price clean energy supply for smelting

Solution: Purchase Agreement (PPA) for hydroelectric power

METHODS / TECHNICAL APPROACH

• Preliminary financial agreement between company as anchor customer and governmental agencies permits project development and financing

• Shared investment and concessions mean publically-funded energy infrastructure in exchange for company-funded smelter, job creation guarantee and financial support for national park to offset lands lost to hydroelectric plant

• Multi-year energy supply contract guarantees offtake to amortize public investment and 40-year commitment for reduced energy pricing for smelting company

BENEFITS / BUSINESS VALUE

• Use of long-term pricing agreement will reduce energy cost by 30% over other smelting operations

• Guarantee uninterrupted power supply to smelter using only 1/3 of hydroelectric plant’s output

• Minimal three-year window between signing of agreement and start of operations

• Allows banks and co-financing lenders to expand their green finance portfolios

• Construct national parklands to sequester carbon and for community recreation, thereby creating environmental benefit and widespread good will

STANDARDS / REGULATORY DRIVERS

• IFC 3: Resource Efficiency, (IFC 1: Assessment and Management of E&S Risks and Impacts)

• ICMM 6, (10-reporting)
  • ASI Principle 5 - Greenhouse Gas Emissions

LOCATION

• Iceland
  • Area population 5,000
  • High environmental sensitivity
  • Highly educated community
From Student Collaboration …
… to Stakeholder Roundtable Sponsored by UNDP
Planned Future Collaborative Work in Guinea

Local Capacity Building

Remote Sensing for Impacts