

# KANO-MARADI RAILWAY PROJECT

## Feasibility Study Report

### EXECUTIVE SUMMARY

The Kano-Maradi Railway Project represents a transformative infrastructure initiative connecting Nigeria and Niger Republic through a 283.75-kilometer standard gauge railway line. This feasibility study, commissioned by the African Development Bank (AfDB) and conducted by a consortium of international engineering firms, confirms the technical, economic, and financial viability of the project.

#### Project Overview:

The railway will connect Kano (Nigeria) through Jigawa and Katsina states to Maradi (Niger Republic), establishing the first cross-border rail link in West Africa in over 70 years. The project aligns with ECOWAS regional integration objectives and Nigeria's Railway Modernization Programme.

#### Key Findings:

- Economic Internal Rate of Return (EIRR): 18.2%
- Financial Internal Rate of Return (FIRR): 12.8%
- Net Present Value (NPV): 47 million (at 12% discount rate)
- Benefit-Cost Ratio: 2.34
- Payback Period: 11 years
- Estimated annual freight volume: 2.8 million tonnes by Year 5
- Estimated annual passenger traffic: 1.2 million by Year 5

The study concludes that the project is economically viable, financially sustainable, and strategically critical for regional development.

# 1. TECHNICAL ASSESSMENT

## 1.1 Route Alignment

The proposed route follows the existing road corridor from Kano to Maradi, minimizing land acquisition requirements. Key technical specifications include:

- Track gauge: 1,435mm (standard gauge)
- Design speed: 120 km/h (freight), 160 km/h (passenger)
- Axle load: 25 tonnes
- Minimum curve radius: 800 meters
- Maximum gradient: 1.5%
- Electrification: Dual voltage (25kV AC overhead)

## 1.2 Infrastructure Components

The project includes construction of:

- 283.75 km of new standard gauge track
- 12 passenger stations (6 in Nigeria, 6 in Niger)
- 4 freight terminals with modern cargo handling facilities
- 1 locomotive maintenance depot in Kano
- 1 rolling stock maintenance facility in Maradi
- 47 bridges and 23 culverts
- Modern signaling and telecommunications systems
- Border crossing facility at Jibia-Magama Jibia

## 1.3 Rolling Stock Requirements

Initial fleet composition:

- 15 diesel-electric locomotives (3,000 HP)
- 8 electric multiple units (EMU) for passenger service
- 300 freight wagons (various types)
- 60 passenger coaches

## 2. ECONOMIC ANALYSIS

### 2.1 Demand Forecast

Traffic projections are based on comprehensive origin-destination surveys, trade flow analysis, and econometric modeling:

#### Freight Traffic Projections (million tonnes):

Year 1: 0.8 | Year 3: 1.9 | Year 5: 2.8 | Year 10: 4.2 | Year 20: 6.5

#### Passenger Traffic Projections (million passengers):

Year 1: 0.4 | Year 3: 0.9 | Year 5: 1.2 | Year 10: 1.8 | Year 20: 2.6

### 2.2 Economic Benefits

The project generates substantial economic benefits:

- Transport cost savings: 56 million annually (Year 5)
- Time savings: 2 million annually
- Reduced road maintenance costs: 8 million annually
- Accident cost reduction: 2 million annually
- Environmental benefits (CO2 reduction): million annually
- Employment creation: 12,000 jobs during construction, 2,500 permanent jobs
- Regional trade facilitation: Estimated 35% increase in Nigeria-Niger trade

### 2.3 Sensitivity Analysis

The project remains economically viable under various scenarios:

- 20% reduction in traffic: EIRR = 14.6%
- 15% cost overrun: EIRR = 15.8%
- Combined worst case: EIRR = 12.1%

### 3. FINANCIAL ANALYSIS

#### 3.1 Capital Costs

Total project cost: .04 billion (2024 prices)

Cost Breakdown:

- Civil works: 80 million (48%)
- Track and signaling: 20 million (25%)
- Rolling stock: 40 million (17%)
- Stations and terminals: 20 million (6%)
- Engineering and supervision: 0 million (4%)

#### 3.2 Operating Costs

Annual operating costs (Year 5): 7 million

- Staff costs: 2 million
- Energy: 4 million
- Maintenance: 8 million
- Administration: 3 million

#### 3.3 Revenue Projections

Annual revenue (Year 5): 42 million

- Freight revenue: 8 million (69%)
- Passenger revenue: 8 million (27%)
- Ancillary services: million (4%)

Operating ratio (Year 5): 61% (industry benchmark: 75%)

#### 3.4 Financing Plan

- AfDB loan: 50 million (17%)
- China Exim Bank: 00 million (39%)
- IFC: 00 million (10%)
- Nigerian Government: 90 million (24%)
- Niger Government: 00 million (5%)
- Private sector (AFC): 00 million (5%)

## **4. RISK ASSESSMENT AND MITIGATION**

### **4.1 Key Risks Identified**

#### **Construction Risks:**

- Geological challenges in certain sections
- Potential delays in land acquisition
- Security concerns in border areas

Mitigation: Comprehensive geotechnical surveys completed; land acquisition process initiated; security cooperation agreement between Nigeria and Niger signed.

#### **Financial Risks:**

- Currency fluctuation
- Interest rate volatility
- Cost escalation

Mitigation: Hedging strategies; fixed-rate financing for 70% of debt; 10% contingency provision.

#### **Operational Risks:**

- Lower than projected traffic
- Competition from road transport
- Cross-border operational challenges

Mitigation: Conservative traffic forecasts; competitive pricing strategy; joint Nigeria-Niger railway authority established.

### **4.2 Environmental and Social Risks**

Addressed through comprehensive ESIA (see separate document) and Resettlement Action Plan (RAP).

## **5. CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Conclusions**

The Kano-Maradi Railway Project is technically feasible, economically viable, and financially sustainable. The project will:

- Significantly reduce transport costs for landlocked Niger
- Enhance regional trade and economic integration
- Create substantial employment opportunities
- Contribute to climate change mitigation through modal shift
- Strengthen Nigeria-Niger bilateral relations

### **5.2 Recommendations**

1. Proceed with detailed engineering design immediately
2. Finalize all financing agreements within 6 months
3. Complete land acquisition and resettlement before construction start
4. Establish joint Nigeria-Niger Railway Operating Company
5. Develop comprehensive training program for operations staff
6. Implement robust project management and monitoring framework
7. Conduct regular stakeholder consultations throughout implementation

### **5.3 Implementation Timeline**

- Detailed design: 12 months
- Procurement: 8 months
- Construction: 48 months
- Testing and commissioning: 6 months
- Total project duration: 74 months (6.2 years)

Expected commercial operation: Q2 2026

*This feasibility study was prepared by AECOM-SYSTRAS Consortium for the African Development Bank, December 2023.*