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For the Project of Ikapa Izinto

South African Railways

In-depth review

2025

Historical Background

South Africa's railroads have a rich history, closely linked to the colonial past, the industrial revolution and racial segregation, which has affected economic and political changes in the country.

(1850–1910) The launch of the first railroad in South Africa - **the Durban - Point (Natal)** line (2.4 km, 1435 mm gauge) took place in the colonial period for the purpose of exporting resources (gold, diamonds, coal). The opening of **the Cape Town** - **Wellington** (Cape Colony, gauge 1067 mm - "Cape gauge") occurred in 1873. **The Johannesburg-Pretoria Road**, launched in 1887, connected the gold mines of the Witwatersrand with the administrative center. The different standard of gauge reflected the conflict between the British and Boer colonies.

(1910–1948) After the formation of **the Union of South Africa** (1910) the unification of railroads began, marked in 1916 by the creation of **South African Railways and Harbours (SAR & H)** - a single state enterprise. In 1920-1948, the network was extended to Rhodesia (Zimbabwe) and suburban lines (Johannesburg, Cape Town) were electrified.

(1948–1994) The apartheid era was characterized by segregation, which affected rail transport. Also, during this period (1970-1980), **the Sisan-Saldanha line** was built to transport iron ore and **the Richards Bay** coal route was built

(1994–present) SAR & H is renamed Spoornet (later Transnet Freight Rail).
The postapartheid period can be characterized as reform and decline. In the 2000s there was privatization of some services, but the state monopoly remains. The railroad has mostly outdated infrastructure, and many lines have not been modernized since the 1980s.
Gautrain, the first high-speed system, was launched in 2010, but current challenges - massive infrastructure theft (Transnet loses over R1bn (over$50mn) annually to theft), deterioration of track and rolling stock, accidents and lack of funding are serious obstacles to the industry's rapid revival. Below we take a closer look at these challenges of the times.

Railroad network of the Republic of South Africa

The rail network of the Republic of South Africa (RSA) is one of the most developed in Africa, with a total length of about **20,953 km** and organized around several key transport corridors that link industrial regions to ports and neighboring countries. The main corridors are managed by **Transnet Freight Rail (TFR)** and are divided into export, transit and domestic routes.

Main operators and infrastructure owners

- **Transnet Freight Rail (TFR)** – a state-owned company that manages freight transportation and infrastructure.
- **Passenger Rail Agency of South Africa (PRASA)** – responsible for passenger transportation (Metrorail, Shosholoza Meyl).
- **Gautrain Management Agency (GMA)** – manages the Gautrain high-speed line (public-private partnership).

Track width

- **Cape gauge (1067 mm)** - main network (≈80% of tracks).
- **Standard gauge (1435 mm)** - Gautrain and some industrial lines**.**
- **Narrow gauge (610 mm)** - historic lines (hardly used).

Key railroad lines of the country

- **Freight lines (Transnet Freight Rail)**

Line name	Length (km)	Track width	Main cargoes
Iron Ore Export Line (Sisan-Saldanha)	861	1067 mm	Iron ore
Coal Export Line (Richtersveld-Durban)	580	1067 mm	Coal
Manganese Export Line (Hotazel-Port Elizabeth)	1100	1067 mm	Manganese
North–South Corridor (Johannesburg-Durban)	700	1067 mm	Containers, goods

- **Passenger lines (PRASA & Gautrain)**

Line name	Length (km)	Track width	Operator
Metrorail (city trains)	2300	1067 мм	PRASA
Shosholoza Meyl (international trains)	2400	1067 мм	PRASA
Gautrain (Johannesburg-Pretoria)	80	1435 мм	Bombela (GMA)

Performance characteristics of South African railways

Freight traffic: ~200 million tons per year (coal, ore, containers).
Maximum axle load: 18-22 tons (on main freight lines)
Speeds:

- Freight trains: 60–80 km/h.
- Gautrain: up to 160 km/h.

Electrification: ~25% of the network (3 kV DC and 25 kV AC).

Infrastructure problems

1. **Physical deterioration:** 45% of tracks require replacement (service life exceeded 40 years), 60% of the contact network has been in operation since the 1980s
2. **Vandalism:** cable theft (damage - $ 12 million / month), damage to 15% of signaling equipment annually
3. **Logistics bottlenecks:** Single-track sections on 70% of the network, low throughput (Durban terminal - only 24 trains / day)

Comparison with other African countries

Compared to its neighbours, South Africa's rail infrastructure has several advantages:

Parameter	South Africa	Namibia	Zimbabwe
Network density	6.1 km/1000 km²	2.3 km/1000 km²	3.8 km/1000 km²
Electrification	25%	5%	10%
Average speed of freight trains	45 km/h	60 km/h	30 km/h

Key infrastructure facilities

Freight lines (Transnet Freight Rail)

Object	Characteristics
Port of Richards Bay	Largest coal terminal (up to 91 million t/year), connected to Mpumalanga coal mines
Iron Ore Line (Sishen–Saldanha)	861 km, double track, automated control system (ERTMS)
Manganese Corridor (Hotazel–PE)	1100 km, 40 t/axle, specialized ore wagons

Passanger line (PRASA & Gautrain)

Object	Characteristics
Metrorail	2300 km, 1067 mm, 3 kV DC, 1200 stations
Gautrain	80 km, standard gauge (1435 mm), continuous welded track, European signalling system

Tracks and rolling stock

In South Africa, various types of rails are used, which comply with international standards, but take into account local conditions (high loads, long freight routes, climatic features).

Main types of rails:

1. By weight and profile

Rails in South Africa are classified by weight per linear metre (kg/m), which determines their strength and permissible load:

- 48 kg/m – light tracks, secondary lines.
- 57 kg/m – medium loads, regional lines.
- 60 kg/m – main standard for main lines (Transnet Freight Rail).
- 65-75 kg/m – heavy freight lines (coal and ore routes, e.g. Sishen–Saldanha line).

The rail profile most often corresponds to the UIC (International Union of Railways), but with adaptation for high axle loads (up to 26-30 tons per axle).

2. By length

- Standard length – 18–25 m (welded rails).
- Seamless (CWR, Continuous Welded Rail) – up to 400 m and more, used on high-speed and freight lines to reduce vibration and wear.

3. By material and technology

- High-strength steel rails (grades 900A, 1100, UIC60) – with chromium and manganese additives for wear resistance.
- Heat-strengthened rails (Head Hardened, HH) – for areas with high loads (e.g. in mining regions).
- Rails with a protective coating – in corrosive zones (coastal areas)).

4. By purpose of use

- Main freight lines – heavy rails (60–75 kg/m), designed for axle loads of up to 30 tons.
- Suburban and passenger lines (Metrorail) – 48–57 kg/m, often with continuous welded tracks.
- Industrial tracks (mines, ports) – reinforced rails, sometimes with additional protection against abrasive wear.

Peculiarities of South Africa

- Wide gauge (1067 mm, "Cape Gauge") – requires specific rail fastening.
- High dynamic loads – due to heavy freight trains (up to 200 cars).
- Climatic conditions – deformations are possible in arid regions, therefore compensators are used.

Rail Manufacturers and Standards

- Main suppliers: local factories (e.g. Scaw Metals Group) and imports (China, Europe).
- Standards: SANS (South African National Standards), UIC, BS (British Standards).

Several types of wagons are used in South Africa for freight and passenger transport.

1. Freight wagons

- Semiwagons - for transportation of coal, ore and other bulk cargoes.
- Dumpcars (dump cars) - for transportation of coal, ore, crushed stone
- Hoppers - for transportation of bulk cargoes (grain, coal, minerals).
- Flatbeds - for containers, heavy equipment, pipes.
- Tanks - for transportation of oil products, chemicals, liquefied gas.
- Boxcars - for tare cargoes, fertilizers, cement.
- Wagons for car transportation - used by car manufacturers.
- Refrigerated wagons - for perishable products.

2. Passenger cars

Passenger transportation in South Africa is provided by Passenger Rail Agency of South Africa (PRASA) and private operators (such as Blue Train, Rovos Rail).

- Electric trains (Metrorail) - suburban trains in major cities (Cape Town, Johannesburg, Durban).
- Interregional trains (Shosholoza Meyl) - seating and sleeping cars.
- Luxury trains (e.g. Blue Train) - VIP cars with air conditioning, restaurants.
- Tourist trains (Rovos Rail) - historical luxury cars.

3. Special wagons

- Fire and repair cars - for infrastructure maintenance.
- Locomotives (electric and diesel) - for freight and passenger trains.

Rail wagons in South Africa are manufactured by both local companies and overseas suppliers, to exacting standards adapted to harsh environments.

Main wagon manufacturers in South Africa

- **Local producers**

1. **Transnet Engineering (former Union Carriage & Wagon) -** the largest local manufacturer and repairer of wagons for Transnet Freight Rai, modernizes old trains and manufactures new ones to order. Produces: Freight wagons (dumpcars, hoppers, platforms, tanks), Passenger wagons (for Metrorail, Shosholoza Meyl).
2. **Grindrod Rail** - specializes in freight wagons for the mining industry. Produces dumpcars, gondola cars, tank wagons.
3. **DCD Rolling Stock (part of ACTOM)** - produces specialized wagons for ore, coal, containers.
4. **Siemens South Africa** - assembles modern electric trains for Metrorail (e.g. People's Train).

- **International suppliers**

China (CRRC, CSR) - supplies freight cars and components.
Europe (Alstom, Stadler) - participate in passenger transportation projects.
India (RITES, BEML) - supply wagons for heavy cargoes.

Standards and regulations for railcars in South Africa

- **Basic standards**

1. **SANS (South African National Standards)**

   - **SANS 3000** – general requirements for railway rolling stock.
   - **SANS 1912** – safety and design standards for wagons.

2. **International standards**

   - **UIC (International Union of Railways)** – for compatibility with export cargo.
   - **ISO** – standards for welding, materials, loads.
   - **AAR (Association of American Railroads)** – for wagons operating in ports and for export.

- **Key requirements for wagons**

Freight wagons:

- Minimum axle load – **26–30 tons** (for coal and ore routes).
- Reinforced frames and braking systems (due to long heavy trains).
- Corrosion resistance (coastal and industrial areas).

Passenger wagons:

- Impact resistance and fire safety (SANS 1395).
- Track width **1067 mm** (Cape Gauge).
- Compatibility with the PRASA system (for electric trains).
-

3. Trends and new projects

- **Localisation of production** – Transnet and the government encourage local manufacturing of wagons.
- **Electrification and "green" wagons** – transition to energy-efficient models.
- **Fleet modernisation –** replacement of older wagons with higher capacity ones (especially for the Sishen–Saldanha line).

Modernization plans (2024-2030)

Project	Budget	Goal
Transition to standard gauge	$3.2 billion	Conversion of 5,000 km for integration with neighboring countries networks
Digital signaling (ERTMS)	$1.1 billion	Implementation of 3,000 km by 2027
Reconstruction of port lines	$800 million	Increase Durban capacity to 36 trains/day

Let's take a closer look at the main railway corridors of South Africa.

Main corridors of South Africa

1. Freight

- **North Corridor**

Route: Johannesburg → Polokwane (Pietersburg) → Musina → Beitbridge (Zimbabwe border) and further to DR Congo, Zambia
Length: ~550 km
Cargo: Containers (including transit to DR Congo and Zambia), agricultural products (corn, citrus), general cargo (auto parts, consumer goods)
Gauge: 1067 mm (Cape gauge)
Operator: Transnet Freight Rail (TFR**)**
Capacity: ~4–5 million tons of cargo per year, ~8–12 freight trains (depending on load)
Restrictions:

- **Infrastructure** – sections with single-track traffic
- **Logistics** – delays at the border (Beitbridge) due to manual handling of goods
- **Deterioration of infrastructure** – train speed is limited to 30–40 km/h in places
- **Competition with road transport** – 20% versus 80%.
- **Vandalism** – cable theft and damage to tracks

Operator plans and objectives: Laying double tracks on key sections, partial transition from diesel to electric traction (25 kV AC), synchronization of customs procedures to speed up transit, increasing capacity to 7-8 million tons/year by 2026-2027.

Economic importance: The Northern Corridor railway plays a key role in the economy of South Africa and the entire southern African region. It connects the country's industrial center (Gauteng) with Zimbabwe, Zambia and the DR Congo, ensuring the transit of goods and the integration of regional markets**.**

Main economic functions of the corridor:

- **Cargo transit to Zimbabwe and Central Africa**

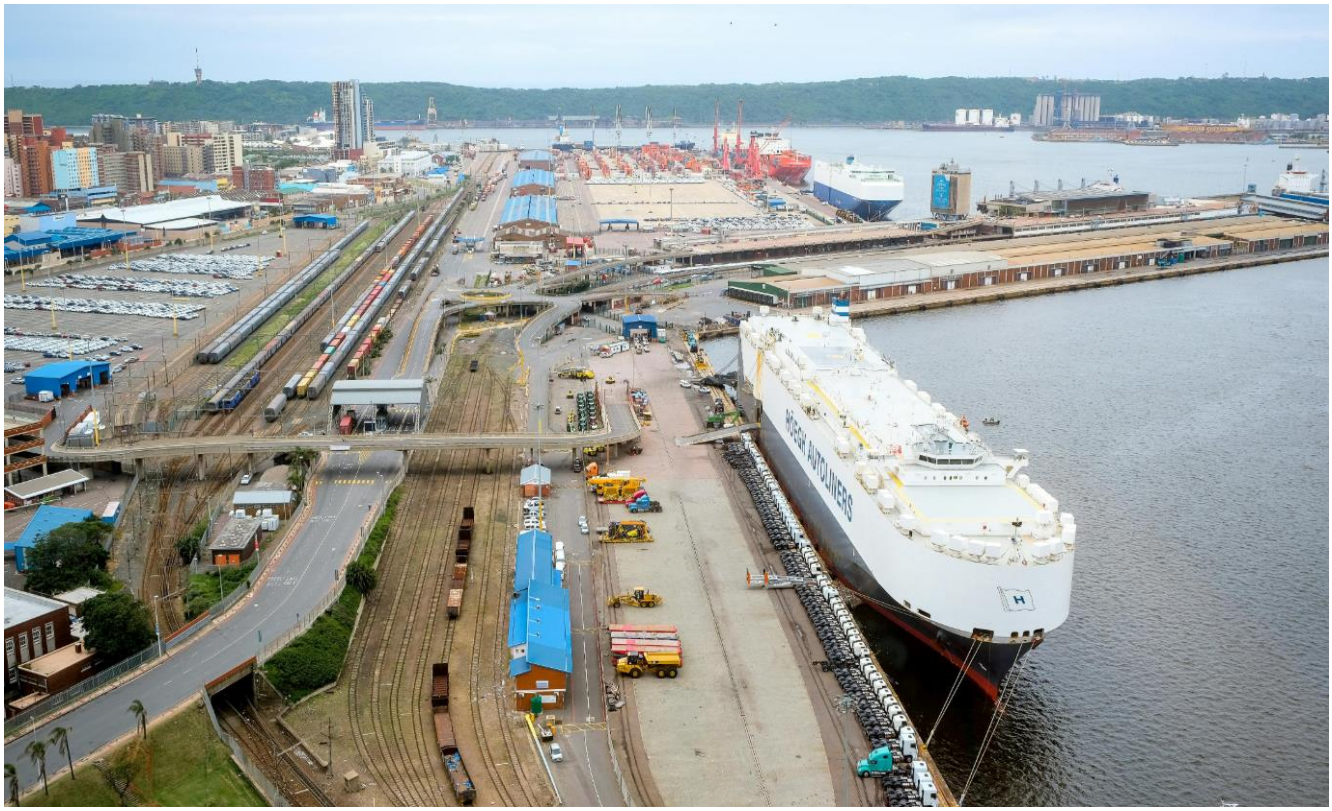
Container shipping (import/export via the ports of Durban and Maputo).
Agricultural products (corn, citrus, tobacco) – export from Zimbabwe via South Africa.
Industrial goods (fertilizers, machinery, oil products) – supplies to Zambia and the DR Congo.

- **Support for the mining industry**

Transportation of chrome ore, copper, platinum from Zimbabwe and Zambia.
Providing logistics for South African companies (e.g. Exxaro, Anglo American).

- **Connections to ports and alternative routes**

An alternative to the congested road crossing in Beitbridge (up to 80% of cargo is transported by trucks).
Integration with the Maputo Corridor (Mozambique) for access to the Indian Ocean.



Problems that reduce economic efficiency

Problem	Consequences
Low capacity (~4–5 million t/year)	Loss of cargo in favor of trucks
Cable theft and vandalism	Downtime, increase in insurance costs
Bureaucracy at the border (Beitbridge)	Delays up to 3-5 days
Old rolling stock	Low speed (30-50 km/h)

Freight flows of the Northern Railway Corridor

The Northern Corridor serves **5 key freight categories,** linking the industrial hub of Gauteng with neighbouring countries.

1. Agricultural products

- **Volume:** ~1.2 million tons/year (30% of cargo flow)
- **Directions**:
  - **Export from Zimbabwe**:
    - Corn (400,000 t/year) – to South Africa and Mozambique
    - Tobacco (150,000 t/year) – transit via Durban to China/EU
  - **Import to Zimbabwe**:
    - Fertilizers (300,000 t/year) – from South Africa (Sasol)
    - Sugar (from South Africa) – 200,000 t/year
- **Operators**:
  - **Grain Rail (special cars for grain)**
  - **Transnet Bulk**

2. Minerals

- **olume:** ~1.5 million tonnes/year (37% of cargo flow)
- • **Key cargoes**:
  - **Chrome ore (600,000 tonnes/year)** – from Zimbabwe (Great Dyke) to South Africa for processing
  - **Copper (300,000 tonnes/year)** – from Zambia to the port of Durban
  - **Platinum (200,000 tonnes/year)** – Anglo American supplies to Europe
  - **Coal (400,000 tonnes/year)** – Zimbabwean thermal power plants (Hwange Colliery)
- **Features**:
  - 80% of minerals are transported in special containers (due to sanctions against Zimbabwe)

3. Industrial goods

- **Volume:** ~800,000 t/year (20% of cargo flow)
- **Composition**:
  - **Auto parts (BMW, Toyota)** – from South Africa to Zambia
  - **Petroleum products (300,000 t/year)** – from Sasol refinery in Zimbabwe
  - **Construction materials (PPC cement)**

4. Container shipping

- **Volume:** ~500,000 TEU/year (13%)
- **Routes**:
  - **Asia → South Africa → Zimbabwe**:
    - Electronics (China)
    - Pharmaceuticals (India))
  - **EU → South Africa**:
    - Cars (Germany)
- **Problems**:
  - 70% of containers are shipped by trucks due to border delays

5. Transit in DR Congo

- **Volume:** ~200,000 t/year
- **Cargo**:
  - Mining equipment (from South Africa)
  - Copper/cobalt (back to Durban)
- **Logistics**:
  - Transhipment to Zimbabwe on narrow gauge (610 mm)

Distribution by country (2023) occurs in the following volumes:

Direction	% of cargo flow	Main cargos
Zimbabwe → South Africa	55%	Chrome, tobacco, corn
South Africa → Zimbabwe	30%	Fertilizers, petroleum products
Transit (Zambia/DRC)	15%	Copper, equipment

Problems of cargo transportation in the Northern Corridor and ways to solve them

1. **Imbalance**:
   - In Zimbabwe, **empty wagons** return 40% more often (shortage of export cargo).
2. **Competition with trucks**:
   - Cost of transporting 1 ton of cargo:
     - **Rail: $0.10/km**
     - **Truck: $0.07/km**
3. **Customs delays**:
   - Average time to cross the Beitbridge border is **52** hours (3 times longer than planned).

! The state is interested in solving the above problems, let's take a closer look at what investment projects and plans are currently relevant for this railway line.

North Corridor Investment Projects:

- **Public Investments** (Current Projects (2023–2025))

Project	Budget	Goal	Status
Track Repair (Polokwane–Musina)	2.1 billion ZAR (~$110 million)	Elimination of "slow zones", increasing the speed to 60 km/h	Start in 2024
Digital Management System (ERTMS)	1.5 billion ZAR (~$80 million)	Implementation of the European signaling system	Pilot launch
Purchase of 50 New Locomotives	3.8 billion ZAR (~$200 million)	Replacement of worn-out diesel models	Deliveries until 2025

Government funding problems: Transnet budget deficit (~$14bn debt) slows projects. Cable thefts increase security costs.

- **Частные инвестиции**

Company/Project	Budget	Description	Current status
Traxtion (Africa)	1.2 billion ZAR (~$65 million)	Launch of container trains Johannesburg-Harare (2 trains weekly)	Negotiations with Transnet. Deadlines 2024–2027.
CCECC (China)*	$450 million	Modernization of the terminal in Beitbridge (increase in throughput by 40%)	Signing of MoB in 2024. Deadlines 2025–2028.
DP World (UAE)	$300 million	Construction of a logistics hub in Polokwane (transshipment of goods onto trucks)	feasibility study Deadlines 2026–2030.
Grindrod (South Africa)	800 million ZAR (~$43 million)	Purchase of 20 locomotives for transportation of chrome ore	First deliveries in 2024. Deadlines 2023–2025.
Vecturis (Belgium/South Africa)	$120 million	Organization of regular container flights to Zambia	Search for investors. Deadlines 2025–2027.

Companies listed in the table as **CCECC - the main Chinese contractor for the overall project (CRRC and China Civil Engineering). Plans: by 2030 to integrate the corridor with Lobito (Angola) to access the Atlantic.*

CRRC is the world's largest rolling stock manufacturer, supplying wagons and locomotives specifically for the narrow gauge (1067 mm).
CCECC - builds infrastructure (tracks, bridges, terminals). The Beitbridge project includes a customs terminal and a switch to a double-track system.

Let's take a closer look at **CCECC's investments**:

Company/Project	Budget	Financial model	Status
CRRC/Delivery of 100 freight wagons	$28 million	Direct sale to Transnet	Deliveries completed (2024)
CRRC/Contract for 20 locomotives	$120 million	Leasing via Exim Bank of China	Signed in Q3 2024, Timeframe 2025–2027.
CCECC/Track rehabilitation: Polokwane–Musina	$220 million	BOT (Build-Operate-Transfer) for 25 years	Tender won (2023). Timeframe 2024–2028.
CCECC + CRRC/Electrification of Beitbridge section	$450 million*	Co-financing with AfDB	Feasibility study. Timeframe 2024–2028

* *Including $200 million from Exim Bank of China*.

Detailing the financial models of private investments in the Northern Corridor:

1. **Traxtion**
   - **Project:** Johannesburg-Harare container transportation
   - **Sources of financing:** 40% own funds, 60% Standard Bank loan
   - **Tariff model:** $0.12 per ton-km + freight charges
   - **Guarantees:** Transnet ensures a minimum 60% load. Tax holidays for 5 years
   - **Payback:** 7 years at 70% load
   - **Risks:** Competition with road transport (trucks are 15-20% cheaper), bureaucratic delays in track allocation
   - **Current status:** negotiations with Transnet on the schedule, first test runs in Q2 2025

2. **CCECC**
   - **Project:** Upgrade of Beitbridge terminal for export of copper and cobalt from DR Congo
   - **Financial model:** BOT (Build-Operate-Transfer) for 25 years + 70% financing – loan from Exim Bank of China at 2.8% per annum
   - **Revenue model:** Cargo handling fee + terminal lease
   - **Benefits:** VAT exemption for 10 years
   - **Guarantees:** Government of South Africa – compensation for political risks, Zimbabwe – exemption from customs duties on construction materials
   - **Current status:** Start of excavation works – March 2024, completion of the first stage (Polokwane–Louis Trichardt) – Q3 2026

CRRC

- **Project:** Rolling stock supply
- **Contracts:** 100 freight cars (2023–2024) – USD 28 million, 20 locomotives (2025–2027) – USD 120 million
- **Deadlines:** Leasing via Exim Bank of China, 10-year technical support
- **Specifications:** Jupiter-type locomotives (adapted for 1067 mm), 3,500 tonnes per train
- **Current status:** Cars already in use on the Sishen–Saldanha route, first 5 locomotives to be delivered in September 2025

3. DP World

- **Project:** Polokwane Logistics Pub
- **Financial Model:** Joint Venture (Transnet 49%, DP World 51%)
- **Financing:** $200 million - DP World, $100 million - Transnet
- **Revenues:** Warehousing (+$5/TEU), cargo handling
- **Beneficiaries:** Miners (Glencore, Anglo American)
- **Deadlines:** Minimum guaranteed cargo flow - 500,000 TEU/year, preferential land lease for 30 years, DP World requires guarantees on the payback of the hub (minimum 15 years).
- **Current Status:** Construction start - Q2 2026

4. Grindrod

- **Project:** Chrome ore transportation
- **Financial model:** Sale-leaseback 20 locomotives
- **Tariff:** 18 USD/ton (fixed for 3 years)
- **Partners:** South African chrome exporters (Glencore – 40% of cargo flow, Samancor Chrome – 35% of cargo flow)
- **Risks:** Volatility of chrome prices, dependence on production in the Bushveld complex
- **Risk hedging:** Forward contracts for 3 years
- **Current status:** 5 locomotives already in operation, full capacity commissioning in June 2025

5. Vecturis

- **Project:** Container shipping to Zambia
- **Financial model:** Public-private partnership, USD 60 million – loan from the African Development Bank (AfDB)* at 4% per annum for 15 years (with a deferred payment for the first 3 years), $20 million – Vecturis' own funds, $40 million – planned to be raised from European investors (EIB, Proparco) and South African pension funds.

  * AfDB conditions: Commitment to create 300 jobs for the local population, use of 30% local suppliers, annual audit of ESG indicators
- **Tariffs:** 30% lower than freight
- **Guarantees:** Political risk coverage from SACE, subsidies for the first 3 years of operation
- **Current status:** First tranche ($15 million) in September 2024, start of pilot voyages – Q1 2026

- **International financing (IFI)**

Organization	Amount	Focus
African Development Bank (AfDB)	$300 million	Infrastructure modernization
World Bank	$150 million	Improvement of customs infrastructure
BRICS New Development Bank	$500 million	Electrification and new locomotives

Loan conditions: reforms in Transnet (reducing corruption) and attracting private capital.

Key challenges for all investors:

- **Currency risks:** ZAR/USD exchange rate fluctuations, USD conversion problems in Zimbabwe
- **HeInsufficient track capacity** during peak periods (no more than 12 trains/day)
- **Long approval period** (6-18 months for new operators)
- **Political instability:** Upcoming elections in Zimbabwe (2028), Transnet reform in South Africa
- **Competition** with road transport

Economic impact of investments

Expected results by 2030:

- Increase in freight traffic from 4 to 10 million tons/year.
- Reduction in transportation costs by 25–30%.
- Creation of 15,000+ jobs in logistics.

All investments in the Northern Corridor of South Africa are aimed at strengthening the artery of trade between South Africa and Zimbabwe and Zambia, which is cheaper and more profitable than through Tanzania or Angola, will reduce logistics costs for the mining sector, reduce the load on roads (1 train = ~200 trucks (savings on road repairs)), and increase the potential for growth in the transit of copper and cobalt to the DR Congo.

- **Coal Corridor (Coal Export Line / Richards Bay Coal Terminal - RBCT)**

Route: Witbank/Mpumalanga Coal Mines → Richards Bay
Length: ~580 km, 2 tracks (85% of the length), maximum gradient 1.5%
Locomotives: 9E-class (electric, 3 kV DC) and diesel
Cargo: Coal (world's largest coal terminal - RBCT)
Gauge: 1067 mm
Operator: TFR
Capacity:

- Design capacity of RBCT: 91 million tons/year
- Actual transshipment (2023): 72.1 million tons (79% of capacity), (2022: 68.4 million tons)
- Rail throughput: 76 million tons/year (restrictions due to infrastructure deterioration)

Capacity constraints

Track wear: 40% of sections require repair → speed reduced to 40 km/h

Locomotive shortage: only 65% of Transnet fleet serviceable

Cable thefts: 120 days out of service in 2023

Weather: KwaZulu-Natal floods (2022) halt services for 3 weeks

The South African Coal Corridor is a key artery for the export of thermal coal, linking the Mpumalanga and Limpopo deposits with the port of Richards Bay. Let's take a closer look at its cargo flows:

Structure of cargo flow (2023)

Parameter	Value	Share
Total volume of traffic	72.1 million tons	100%
Export via RBCT	68.4 million tons	95%
Domestic traffic	3.7 million tons	5%

Main export directions

Country	Volume (million tons)/Share	Type of coal	Key buyers
India	32.4/47%	Energy (5500 kcal)	Adani, Tata Power
Pakistan	12.01/18%	Energy (6000 kcal)	Hubco, K-Electric
China	8.3/12%	Coking	Baosteel, Sinosteel
Europe	6.7/10%	Energy (5800 kcal)	RWE, Uniper (до 2022)*
Others (Türkiye, Vietnam)	8.9/13%	Mixed	-

**In 2022, exports to Europe rose sharply to 15 million tons (record deliveries to Germany, the Netherlands and Poland), as the EU imposed an embargo on Russian coal. However, in 2023, volumes fell to 6.7 million tons due to lower demand: Europe accelerated the transition to LNG and renewables, cheaper Indonesian coal ($80/t versus $120/t for South Africa) and logistics costs (freight from South Africa to Europe is more expensive than to Asia)*

Domestic transportation

Direction	Volume (million tons)	Consumers
Eskom Power Plants	2.1	Kendal, Matimba, Majuba
Metallurgy	1.6	ArcelorMittal, Scaw Metals

Logistics chains

1) Mining

- Main basins:
    - Witbank/Mpumalanga (60% of production) – Glencore, Exxaro, Anglo American mines
    - Limpopo (25%) – Exxaro projects (Grootegeluk)
    - KwaZulu-Natal (15%) – Somkhele coal seams

2) Transportation

- Rail:
    - Average train size: 200 wagons (100 t each) = 20,000 t/train
    - Intensity: 25-30 trains/day (peak load)
    - Travel time: 36-48 hours (580 km)
- Trucking:
    - Volume: ~15 million tons/year (due to lack of railway capacity)
    - Cost: $18-22/t (versus $12-15 for railway)
- Port RBCT:
    - 4 berths, depth 21 m
    - Loading speed: 12,000 tons/hour
    - Vessels: Capesize (up to 180,000 DWT), Panamax (60,000–80,000 DWT)

The Economic Importance of the South African Coal Corridor

1. Contribution to the South African economy

- **Export revenues**:
  - Annual revenue from coal exports via RBCT: $5-7 billion (≈10% of South African exports).
  - Tax revenues: $1.2 billion/year (royalties, VAT, corporate taxes).
- **Employment**:
  - 40,000+ jobs (mines, railways, port, logistics).
  - Indirect employment (service companies, construction) – another 60,000.

2. Mining Support

- **Coal Mining in South Africa**:
  - 4th largest thermal coal exporter in the world (after Indonesia, Australia, Russia).
  - 80% of production is exported through RBCT.
- **Key Beneficiary Companies**:
  - Glencore, Exxaro, Anglo American, Thungela Resources.

3. Impact on the transport system

- **Share in Transnet Freight Rail freight traffic:** 45% (the main source of income for the railway).
- • **Tariffs**:
  - Transportation of 1 ton of coal: $12-15 (competitive vs. $20-25 for trucks).
- **Infrastructure investments**:
  - $500 million/year to support tracks and locomotives.

4. Regional importance

- **For KwaZulu-Natal**:
  - RBCT provides 30% of the budget of uMhlathuze Municipality.
  - Funding for schools, hospitals, roads through port dues.
- **For neighbouring countries**:
  - Mozambique and Botswana use the corridor for the transit of their coal.

Investment projects in the South African Coal Corridor (RBCT – Richards Bay Coal Terminal)

1. Modernization of railway infrastructure

Project: *Expansion and reconstruction of the Ermelo–Richards Bay line*

- **Budget:** $1.5 billion (2024–2030)
- **Financing:**
  - 60% – Transnet Freight Rail (TFR)
  - 30% – private investors (including Glencore, Exxaro)
  - 10% – World Bank loan
- **Main works::**
  - Laying second tracks for 300 km (reducing congestion)
  - Replacing 100 km of rails (increasing speed to 70 km/h)
  - Modernization of signaling (implementation of ERTMS Level 2)
- **Impact:**
  - Increase in throughput from 76 to 90 million t/year
  - Reduction in logistics costs by 15%

2. RBCT Port Extension

Project: New Coal Terminal "RBCT Phase V"

- **Budget:** $800 million (2025–2028)
- **Investors:**
  - RBCT Shareholders Consortium (Glencore, Anglo American, etc.)
  - Chinese CCCC (construction))
- **Characteristics:**
  - Berth depth: 23 m (versus 21 m now)
  - Throughput capacity: +12 million tons/year
  - Automated loading system (ROBOTIC SHIP LOADERS))
- **Impact:**
  - Reduction of vessel mooring time from 3 to 1.5 days
  - Ability to receive Capesize vessels (180,000 DWT)

3. Waterberg Coal Expansion Project

Objective: Connecting new coal fields in Limpopo

- **Budget:** $2.1 billion (2026–2032)
- **Participants:**
  - Exxaro (main operator)
  - Japanese JICA (loan $500 million))
- **Infrastructure:**
  - New 250 km railway line (Lephalale–Richards Bay)
  - o 2 new loading terminals
- **Impact:**
  - Additional 15 million t/year by 2030
  - Creation of 8,000 jobs

4. Green initiatives

Project: Transition to low-carbon logistics, reducing carbon footprint by 25% by 2030

- **Budget:** $300 million (2024–2027)

- **Activities:**
  - Purchase of 10 hybrid locomotives (Siemens, CRRC)
  - Solar panels at RBCT terminals (100 MW)
  - Hydrogen fuel pilot project for forklifts

5. Private investment in rolling stock

Project: Rolling stock renewal

- **Budget:** $600 million (2023–2025)
- **Participants:**
  - CRRC (delivery of 1,200 railcars)
  - Traxtion (leasing of 50 locomotives)
- **Technical details:**
  - Railcars with a payload capacity of 105 tons (versus 100 now)
  - IoT sensors for wear monitoring

Key challenges for investors

- **Regulatory risks:** EU/US pressure to abandon coal (potential loss of $3 billion/year by 2030).
- **Infrastructure theft:** in 2023, damage from cable thefts will be $120 million.
- **Competition:** Australia and Indonesia offer cheaper coal (difference of $10-15/t), trucks transport 20% of coal due to tariff flexibility
- **Infrastructure wear:** accidents on the tracks cost $50 million/year of downtime

- **Iron Ore Corridor (Iron Ore Export Line / Sishen–Saldanha)**

Route: from the mines in the Sisen area (Northern Cape) to the port of Saldanha (Western Cape).
Length: ~861 km
Cargo: almost exclusively iron ore (one of the busiest ore corridors in the world)
Cargo flow: ~60 million tons of ore per year (peak values - up to 100 million tons)
Gauge: 1067 mm
Operator: TFR (Orex Line)
Electrification: none (all traction is diesel)
Locomotives

- Main models:
  - GE C30-ACi (3,000 kW, 30-axle, specially for heavy-haul trains).
  - EMD GT26CW-2 (used for shunting).
- Traction system:
  - Distributed traction (locomotives at the head, middle and tail of the train).
  - Remote control (lead locomotive + "puppeteer" at the tail).

Wagons

- Type: Orex wagons (special dump cars for ore).
- Load capacity: ~100 tons per wagon.
- Number of wagons in a train: up to 342 (world record – 4.2 km in length).
- Unloading: Rotary dumpers (wagons turn 360° in the port of Saldanha), unloading speed: ~10,000 tons/hour.

Automation

- Control centre: Johannesburg Rail Control.
- Systems: TFR's Advanced Train Control.
- Continuously welded track: minimises vibrations and wear.

Structure of cargo flow of the Sishen–Saldanha Iron Ore Corridor

Trends of recent years:

- 2019-2021: decline to 55-60 million tons (pandemic, decreased demand in China)
- 2022-2023: recovery to 70-75 million tons
- 2024: forecast 80+ million tons (new contracts with China))

Distribution by shippers

Company	Share	Annual volume	Main deposits
Kumba Iron Ore (Anglo American)	75%	45-60 million t	Sishen, Kolomela
Assmang	20%	12-16 million t	Khumani, Beeshoek
Other	5%	3-4 million t	local small producers

Seasonality of cargo flow

- High season: March-November (active navigation in China)
- Low season: December-February (reduced demand + weather restrictions)
- Daily intensity: 12-15 trains per day (high season), 8-10 trains (low season))

Export directions (2023)

1. **China -** 68% (50-55 million tons), main recipients: Baosteel, Sinosteel
2. **Europe -** 22% (15-18 million tons): Germany (ThyssenKrupp), Netherlands (Port of Rotterdam) - 10%
3. **Asia -** 10% (6-8 million tons): Japan (Nippon Steel) - 6%, South Korea (POSCO) - 4%

Type of cargoes

• **Main product:** iron ore pellets (64-66% Fe)
• **Fractions:** large fraction (+6 mm) - 45%, small fraction (-6 mm) - 55%

• **Special deliveries:** pellets with high Fe content (68%+) - 5% of the volume, concentrate for special metallurgy - 3%

Logistics hubs and their loading

Hub	Cargo turnover	Bandwidth	Loading
Loading at Sishen	70 million tons	85 million tons	82%
Bishops Sorting Yard	65 million tons	75 million tons	87%
Port of Saldanha	68 million tons	82 million tons	83%

Port of Saldanha – a key logistics link

- Harbor depth: up to 21 m (accommodates Capesize vessels, 300,000+ DWT).
- Productivity: Train unloading: up to 4 trains per day.
  Ship loading: ~24 hours for full load.
- Ore storage: open warehouses (~1.5 million tons capacity).

The Economic Importance of the Iron Ore Corridor

The Sishen–Saldanha Iron Ore Corridor is a critical artery for the South African economy, providing exports of one of the country's key resources. Despite logistical challenges, the line remains one of the most efficient in the world for the transportation of bulk cargo.

- **Cost of transportation of 1 ton:** ~$10–15 (competitive with Brazil and Australia**).**
- **Transnet revenue:** ~$1 billion/year.
- **Impact on the South African economy:** almost all of the volume is exported (10% of the country's total exports)
  50,000+ jobs (mining, railway, port).

Logistics problems

• Limited capacity (maximum ~80 million tons/year).
• High track wear (due to super-heavy trains).
• Dependence on diesel fuel (no electrification).

Investment projects of the Sishen–Saldanha Iron Ore Corridor

The Iron Ore Corridor is actively developing, but requires $2–3 billion in additional investment to implement all plans. Let's look at these projects below.

- **Public investment through Transnet**

Railway modernization (R8.7 billion / ~$460 million), deadline 2024-2027.
Goal: Increase capacity to 100 million tons/year.
Measures: Replacement of rails and sleepers on critical sections.
Extension of train stations to 4.5 km.
Installation of new signaling systems (ERTMS Level 2).

Expansion of the port of Saldanha (R5.2 billion / ~$275 million)

Objective: Increase cargo turnover to 90 million tons/year, deadline: 2025–2028
Measures: Deepening the bottom to 23 m (for vessels of 400,000 DWT+). New conveyor lines (10,000 tons/hour), construction of an additional berth.

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Implementation of "green" technologies (R3 billion / ~$160 million). Timeframe: 2026–2030
Goal: Reduce carbon footprint by 30% by 2030.
Measures: Testing hydrogen locomotives (HyRail). Solar power plants along the route (100 MW). Electrification of part of the line (pilot section De Aar–Saldanha).

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- **Private investment Kumba Iron Ore and Assmang**

Automation of loading in Sishen (R2.5 billion / ~$130 million) Timeframe: 2024–2025.
Goal: Speed up train processing by 20%.
Measures: Robotic forklifts. AI-based train queue optimization system.

New deposits (Postmasburg Hub, R15 billion / ~$800 million) Timeframe: 2025–2030**.**
Goal: add 15 million tons/year to freight traffic.
Measures: Development of Kapstevel South and Gamagara mines. Construction of the Postmasburg–Sishen railway line (80 km).

- **International projects**

Chinese logistics investment (R10 billion / ~$530 million), timeframe: 2024–2026.
Participants: China Communications Construction Company (CCCC) + Transnet.
Goal: Optimization of return cargo (import of equipment to South Africa).
Measures: Construction of logistics hubs in De Aar. Digital platform for cargo tracking.

EU: "Green Corridor" (€200 million / R4 billion) Timeframe: 2025–2029.

Goal: Decarbonization of ore supplies to the EU.
Measures: Financing of hydrogen locomotives. Certification of low-carbon ore.

Investment risks

- Funding delays (Transnet budget deficits)
- Political interference (disputes over private concessions)
- Competition with Guinea (Simandou project threatens South Africa's share in China).

- **Manganese Export Line / Hotazel–Port Elizabeth**

Route: from the Hotazel deposits (Northern Cape Province) to the port of Ngqura (Port Elizabeth) for export.
Length: ~1,100 km
Cargo: Manganese (South Africa has the world's largest reserves)
Gauge: 1,067 mm
Operator: TFR
Capacity: ~5–6 million tonnes per year (limited by track and rolling stock conditions).
Rolling stock:
Locomotives: Electric locomotives: Transnet Class 15E (4,000 kW, 120 km/h) are the main ones on the route. Class 18E, 19E (newer, 3,300–4,500 kW).
Diesel locomotives (on reserve sections): Class 43-000 (General Electric, 3,000 hp).
Freight cars

- Type: dump cars (dump gondola cars) and hoppers.
- Capacity: 80–100 tons per car.
- Number of cars in a train: 200–240 cars (maximum length – 2.5–3 km).
- Total Transnet fleet for manganese: ~8,000–10,000 cars (of which ~5,000 are in active use).
- Problems: Lack of serviceable cars (up to 30% are idle due to repairs). Theft of wheelsets and brake systems.

Freight trains

- Average train weight: 16,000–20,000 tons (one of the heaviest in Africa).
- Speed: 30–50 km/h (limited due to track conditions).
- Number of trips per month: ~100–120 (5–6 million tons/year)).

The structure of cargo flow of the Manganese Corridor (Hotazel – Port Elizabeth / Ngqura)

Export cargo (main direction: mines → port)

Manganese ore (~5–6 million tons per year, plans up to 16 million tons)

- Ore types:
  - High-grade (44–52% Mn) – the main export product (about 70% of the flow).
  - Low-grade (30–44% Mn) – partially enriched before shipment.
- Delivery form:
  - Lumpy ore – 60% of export.
  - Fine ore, sinter – 40%.
- Largest shippers:
  - South32 (Hotazel Manganese Mines) – ~3 million t/year.
  - Assmang (Black Rock, Gloria) – ~1.5 million t/year.
  - Jupiter Mines (Tshipi Borwa) – ~1 million t/year.
  - Others (United Manganese of Kalahari, Kalagadi, etc.) ~0.3–0.5 million t annually.

Associated minerals (~5% of flow)

- Iron ore (from adjacent deposits).
- Chromites (minimal volumes).

Import/return cargo (port → hinterland)

Return traffic accounts for 10-15% of total cargo flow and includes:

- Empty wagons (70% of return flow).
- Machinery and equipment for the mining industry.
- Coal and oil products (for power supply to mines).

Logistics hubs and cargo distribution

- **Rail hubs**

Hotazel – main loading point.
Sishen – key transhipment hub.
De Aar – largest marshalling yard.

- **Port of Ngqura**

Manganese throughput: ~5 million t/year (90% of South Africa's exports).

Specialized terminals:
Manganese Export Terminal (since 2019, capacity up to 16 million t/year).
Deepwater berth (Capesize vessels, 180,000–200,000 DWT).

The Economic Role of the Hotazel – Port Elizabeth Corridor / Ngqura

South Africa is the world's largest producer of manganese (~30% of the world market).
Annual production: ~20 million tons (of which ~7-8 million is exported).
Manganese ore price: ~$4-6/t (depending on Mn content).
Export revenue: ~$2-3 billion annually.
Employment: direct employment (~5,000-7,000 people), indirect employment (~7,000-9,000 people)
Wages in related industries - $150-200 million per year.
South Africa is actively developing manganese export infrastructure to increase throughput.

Investment projects for the modernization of the manganese corridor (Hotazel – Port Elizabeth / Ngqura)

- **Public investment (Transnet, SANRAL, DMRE)**

Railway modernization

Project	Budget	Deadlines	Description
Reconstruction of Hotazel–De Aar	$800 million	2024–2027	Strengthening of rails (P75), replacement of sleepers, new turnouts
Increase in capacity (Sishen–Port Elizabeth)	$600 million	2025–2028	Addition of 12 sidings, automation (CTC system)
Electrification of sections	$300 million	2026–2029	Replacement of contact network (25 kV), new substations

Port of Ngqura

Project	Budget	Deadlines	Description
Deepening of the bottom to 18 m	$450 million	2024–2026	Allows to receive vessels of 200,000+ DWT
New handlers	$250 million	2025–2027	2 new loaders (2,500 t/hour each)
Expansion of storage areas	$120 million	2024–2025	+500,000 m² for ore storage

Security and digitalization

Project	Budget	Deadlines	Description
Anti-theft (sensors, security)	$150 million	2024–2027	5,000 IoT sensors, drones, patrols
Digital management platform	$80 million	2025–2026	Unified monitoring system Transnet

- • **Private investment (mining companies)**

South32 (largest operator)

Project	Budget	Deadlines	Description
Own fleet of wagons (600 units)	$220 million	2024–2026	Dumpcars 100 t, contract with Transnet
Logistics hub in Hotazel	$90 million	2025–2027	Accelerated loading (+30% efficiency)

Assmang (Black Rock Manganese)

Project	Budget	Deadlines	Description
Modernization of access roads	$70 million	2024–2025	Repair of 50 km of private railways
Joint fleet of locomotives	$50 million	2025–2026	10 electric locomotives Class 22E

Jupiter Mines (Tshipi Borwa)

Project	Budget	Deadlines	Description
Direct contracts with China	$100 million	2024–2028	Capesize vessel rental
Pneumatic unloading wagons	$60 million	2025–2027	200 units (reduced downtime)

- **International funding**

Source	Budget	Terms	Description
China (Exim Bank)	$1,2 billion	Credit at 3%	Railway modernization
EIB (EU)	$500 million	Grant + credit	Environmentally friendly technologies
African Development Bank	$300 million	Preferential loan	Port infrastructure

Total investment in the manganese corridor: $5-6 billion (2024-2030). Expected effect: reduction of logistics costs by 20-25%, creation of 8,000-10,000 new jobs.

- **South Corridor / Johannesburg–Durban**

Route: Johannesburg → Durban
Length: ~720 km
Cargo: Containers, cars, petroleum products
Gauge: 1067 mm
Operator: TFR
Importance: Largest port in South Africa (Durban)
Cargo capacity: up to 22.5 tonnes per axle (on main lines).
Freight train speed: 40–60 km/h (due to terrain and congestion).
Electrification: Voltage: 25 kV, 50 Hz (AC). Electrified sections: Johannesburg – Durban (main line). Non-electrified branches: some branches to coal terminals (diesel locomotives are used).

Rolling stock:

Freight trains

- **Locomotives**:

  Electric:

  - Class 15E (4,000 kW, 25 kV AC) — main locomotives
  - Class 18E, 19E (modern models that improve efficiency).

  Diesel:

  - Class 43 (General Electric) — used on non-electrified sections.
  - Class 44 (3,300 kW) — for heavy freight trains.

- Wagons:

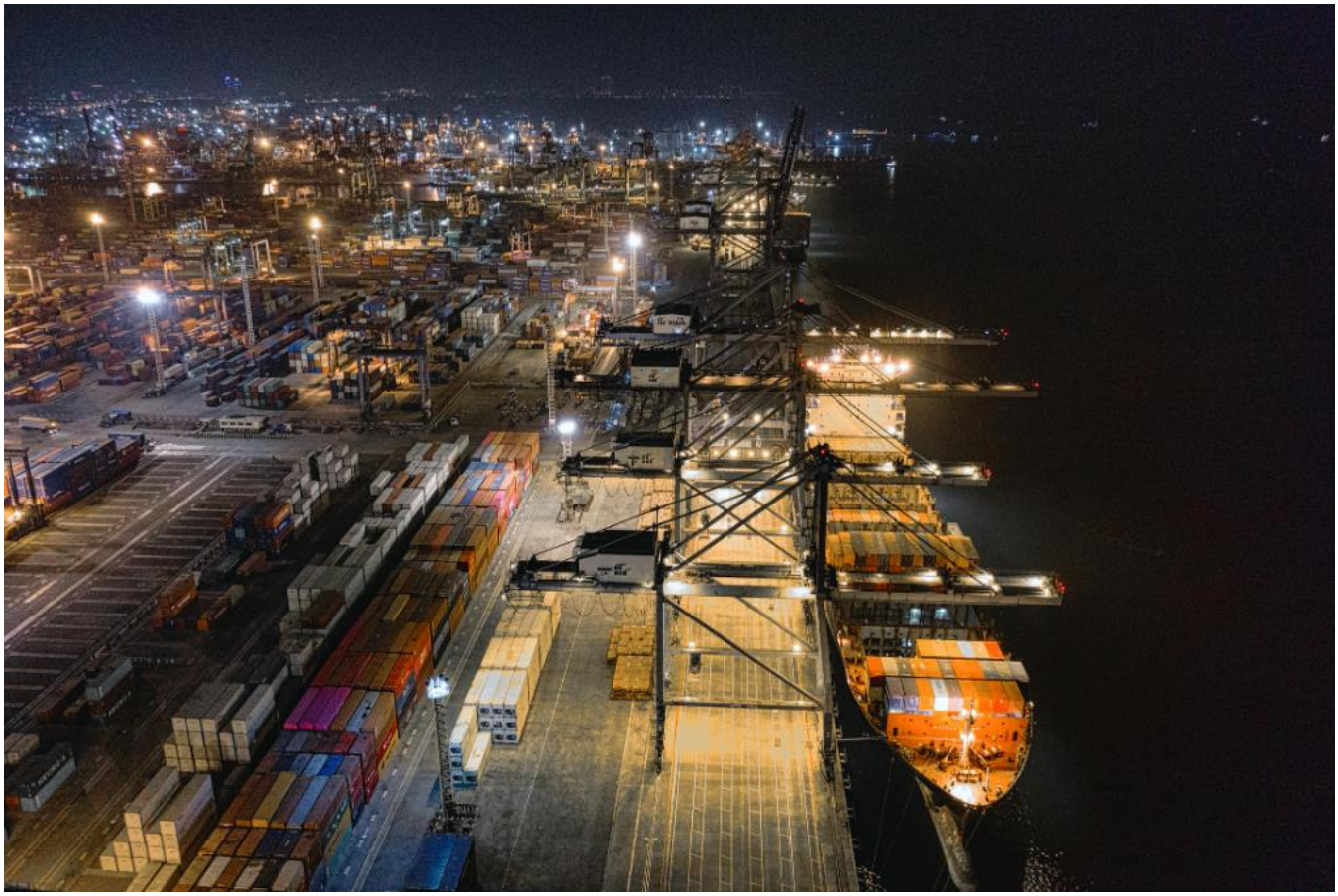
  Gondola cars (for coal, ore) — capacity up to 100 tons.

  Container ships (up to 96 TEU per train).

  Tank cars (transportation of petroleum products and chemicals).

Passenger trains

- **Shosholoza Meyl** (intercity transportation).
- **Gautrain** (high-speed line Pretoria–Johannesburg, but not directly part of the Southern Corridor).



Logistics routes South Corridor / Johannesburg–Durban

Major cargo flows

1. **Coal (→ Port of Durban and Richards Bay):** ~ 60 million tons/year
2. **Containers (import/export via Durban):** ~ 4.5 million TEU/year (Durban is the largest container port in Africa).

3. **Cars and spare parts** (factories in Pretoria and Johannesburg).
4. **Chemicals and petroleum products** (from Durban inland).

Key stations and hubs

- **Johannesburg (City Deep Terminal) —** the largest dry port.
- • **Durban (Durban Port) —** the main sea terminal.
- • **Pietermaritzburg —** an important logistics hub.

Economic importance of the South Corridor / Johannesburg–Durban

Share of South Africa's freight: ~40% of all rail freight.
Coal exports: ~25% of total (via Durban and Richards Bay).
Container shipping: ~70% of South Africa's seaborne imports/exports go via Durban.
Impact on GDP: Rail freight along the corridor accounts for ~5% of South Africa's GDP.

The Southern Corridor rail network is a key logistics artery for South Africa, but its infrastructure suffers from chronic underinvestment, wear and tear and congestion. Massive investment is needed from both the government (via Transnet) and the private sector to improve capacity and efficiency.

Current Investment Projects South Corridor / Johannesburg–Durban

- **Public investment**

Transnet Modernization Programme (2020–2030)

Budget: ~ R50 billion (~$2,7 billion)
Goals: Track renovation: replacement of rails, switches, reinforcement of embankments.
Electrification: extension of the contact network to secondary lines (R2.1 billion).
Digitalization: implementation of ERTMS (European Rail Traffic Management System) to improve safety and throughput (R3.5 billion).

Durban Port Expansion

Budget: R100 billion (~$5,4 billion, 2022–2032)
Goals: Deepening of the fairway to accommodate large vessels (up to 16,000 TEU).
Construction of new rail terminals (R15 billion).
Increasing capacity from 4.5 million TEU to 11 million TEU by 2030.

Project "Southern Coal Corridor" (Coal Line)

Budget: R20 billion (~$1,1 billion) 2024–2030
Goal: Increased coal exports via Richards Bay and Durban.
Modernization of the Ermelo–Richards Bay section.
Purchase of new Class 23E locomotives (200 units, R8 billion).

Details by year:

Stage	Deadlines	Investments (R billion)	Main works
1. Preparation and start	2024–2025	5.0	Infrastructure analysis, procurement of first locomotives (Class 23E), repair of critical track sections.
2. Active modernization	2026–2028	10.0	Re-railing, bridge reinforcement, station expansion (Ermelo, Richards Bay), ERTMS implementation.
3. Completion and optimization	2029–2030	5.0	Connection of new mines, capacity testing, final adjustments.

Expected results by 2030:

Increase in cargo flow from 70 to 90+ million tons of coal per year.
Reduction in delivery time by 20% (from 48 to 38 hours).
Increase in export revenue by $1–1.5 billion/year.
Creation of 5,000 jobs (construction + logistics).

- **Private investment and PPP**

Concession to operate City Deep Terminal (Johannesburg)

Investors: DP World, Maersk, local logistics companies.
Budget: R5 billion (~$270 million) for container hub upgrade.

Private wagon parks

Total investment: 8.3 billion rand (≈ $450 million)

Company	Investments (R billion)/Deadlines	Participants	Types of wagons (quantity)	Deadlines of delivery
Grindrod Rail	2.1/2024-27	Mitsui Exxaro CRRC	400 gondola cars (coal) 200 container ships (92 TEU) 150 tanks	2024-2025: coal cars 2026-2027: tank cars
Traxtion	1.8/2025-29	GE Transportation DP World Transnet	250 hoppers (ore) 180 platforms (containers) 100 refrigerators	2025-2026: hoppers 2027-2028: platforms
Sheltam	0.9/2024-26	Pembani Remgro Steel importers	300 grain trucks 100 road transporters	2024: grain trucks 2025: road transporters
Transnet PPP	3.5/2025-30	Macquarie Old Mutual Government	500 coal cars 200 tanks 100 platforms	2026-2028: main deliveries

Financing of wagon fleet supplier companies:

Grindrod Rail: 50% - own, 30% - Afreximbank, 20% - Mitsui
Traxtion: 40% - own, 35% - Nedbank, 25% - partners
Sheltam: 60% - own, 40% - ABSA
Transnet PPP: 49% - private, 51% - Transnet

- **International financing**

World Bank: $1 billion loan for digitalization of railway infrastructure (2024–2028).
African Development Bank (AfDB): $500 million for green solutions (electric trains, renewable energy).
China (CRRC): delivery of 150 electric locomotives (R6 billion, 2025–2027).

- **West Corridor / Johannesburg–Cape Town**

Route: Johannesburg → Cape Town
Length: ~1400 km (largest domestic route in South Africa)
Cargo: General cargo, agricultural products
Gauge: 1067 mm
Operator: TFR
Electrification: 30% of sections (3 kV DC)
Double track sections: 35% (Johannesburg – Bloemfontein)
Permissible speed: 60–80 km/h (freight), 100 km/h (passenger)
Axle load: 18.5 t (max. 22 t on new sections)

Rolling stock:

Locomotives

Type of Locomotives	Quantity	Characteristics	Operator
Class 38E (Electric locomotive)	45	3 kV DC, 3,000 kW, 100 km/h	Transnet Freight Rail
Class 43-000 (Diesel)	30	2,000 kW, 90 km/h, 1,200 km range	TFR
Class 18E (Electric locomotive)	25*	25 kV AC (for new sections)	TFR (планируется)

Note:

- 80% of locomotives have been in operation for over 20 years.
- 20 new CRRC locomotives are planned to be purchased (2025–2026).
- Only 60% of the fleet is in good working order.
- No energy recovery systems.

Car park

Type of wagon	Quantity	Load capacity	Specialization
Hoppers	1,200	60–70 tons	Grain, fertilizers
Platforms	800	60 tons	Containers, equipment
Refrigerated	150	50 tons	Fruits, perishables
Tanks	300	50–60 tons	Oil products

Note:

- Average train size: 120 wagons (maximum 150).
- Train capacity: 7,200–9,000 t.
- Wagon utilisation: 75–85% (due to axle load restrictions).
- Average speed: 50 km/h
- 60% of tracks require modernisation, peak delays: up to 72 hours

Bandwidth

Plot	Trains/day в/сутки	Cargo flow (million tons/year)
Johannesburg - Bloemfontein	18–22	8.4
Bloemfontein - Cape Town	12–15	5.6
Total by corridor	**30–37**	**14.0**

Restrictions:

- Single-track sections reduce capacity by 40%.
- Repair "windows" - up to 8 hours/week.

Key cargo categories of the corridor

Agricultural products (45% of cargo flow))

Cargo	Volume (million tons/year)	Direction	Main senders
Citrus	2.1	Cape Town → EU/USA	Outspan, Sundays River
Grapes	1.8	Cape Town → China/UK	Table Grape Company
Wheat/Corn	3.2	Domestic	Senwes, Afgri

Industrial goods (35%)

Automotive components (BMW, Mercedes) - from Gauteng to the Port of Cape Town
Petroleum products (from the Sapref refinery in Durban)
Construction materials (PPC cement)

Container shipping (20%)

Import: electronics (China), cars (Europe)
Export: wine, fruit, cars

Freight flows by direction (2023)

Direction	Volume (million tons)/Share	Main cargoes	Transport hubs
Johannesburg → Cape Town	6.94/55,4%	Grain (2.1) Fruits (1.8) Containers (1.44) Automotive components (0.7) Metals (0.9)	City Deep Terminal (JHB)
Cape Town → Johannesburg	5.6/4,6%	Oil products (2.3) Manufactured goods (1.9) Import containers (1.4)	TPT Integrated Warehouses

Terminals

City Deep (Johannesburg)

Africa's largest land port.
Capacity: 500,000 TEU/year.
Cargo throughput: 5.0 million t + 720k TEU *
* Container calculations: Average weight of a 20-foot container (1 TEU) = 2.0 t (including tare)
720,000 TEU = 1.44 million t

Port of Cape Town

- **Container terminal**:

Depth: 14 m
Throughput: 1.2 million TEU/year

- **Specialized capacities**:

Reefer capacity: 120,000 t/month (fruit).
Car terminal

Western Corridor Investment Projects (Johannesburg – Cape Town)

- **Public investment**

Project	Budget/ Deadlines	Description	Status
Modernization of railway tracks	$800 million/ 2024–2028	Replacement of 400 km of rails, electrification (section De Aar – Mathiesonstone 25 kV)	Approved,
City Deep expansion	$300 million/ 2025–2027	+40% of terminal capacity (up to 1 million TEU/year)	start Q2 2024

- **Private investment**

Project	Budget/ Deadlines	Description	Status
Worcester Logistics Hub	$750 million/ 2026–2029	Grindrod (ЮАР) + DP World (ОАЭ)	Construction of refrigerated warehouses, railway branch
Rolling Stock	$380 million/ 2024-2026	Traxtion + CRRC	Supply of 20 locomotives, 1,200 wagons

- **International investments**

Project	Budget	Source of funding	Terms	Goals
"Green Corridor"	$600 million	EU (grant) + World Bank (loan)	Rate 0.5% (EU), 2.5% (GB)	Solar panels, biodiesel trains
Signaling (ERTMS)	$250 million	JICA (Japan)	Credit at 1.5% for 15 years	Implementation of digital control systems

Investment risks of the Western Corridor (Johannesburg – Cape Town)

- **Political and regulatory risks** (In 2023, the Worcester Hub Project approval is delayed by 8 months due to changes in environmental legislation.)
- **Economic:** devaluation - ZAR/USD rate: -23% over 5 years (2019–2024), inflation in South Africa: 6.2% (2023), low profitability: operator margin: 8–12% (vs 15–20% in Asia). The payback period of Projects increases by 15–25%.
- **Operational risks:** cable theft* and vandalism daily, damage $15–20 million, strikes 1–2 times/year, damage $10–12 million/day, infrastructure failures 10–15 cases/year, damage $5–8 million

** In 2023, Transnet lost 47 days of corridor operation due to thefts.*

- **Market risks:** electricity tariffs increase by 12%/year (cost increase by 8%), falling demand for coal (RBCT load decrease by 30% by 2030), competition (by 2027, up to 35% of freight may go to trucks).
- **Natural and environmental risks:** in 2022, floods paralyzed traffic for 11 days (damage - $45 million), **droughts**.
- **Cyber attacks** (in 2021, hackers paralyzed Transnet for 5 days)

Recommendations for investors

- **Risk insurance:**

Political risks – through MIGA (World Bank).

Currency risks – hedging through futures.

- **Security technologies:**

Predictive Maintenance sensors for tracks.

Blockchain for cargo tracking.

- **Diversification:**

Investment in green projects (hydrogen, renewable energy).

Our company wishes you prosperity!

Links

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26. South African Iron and Steel Institute (SAISI) https://www.saisi.co.za/
27. GE Transportation - Locomotives in South Africa https://www.ge.com/transportation/locomotives
28. Bulk Terminal Saldanha (BTS) https://www.bts.co.za/
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34. Kumba Iron Ore Investor Presentation 2023 https://www.angloamerican.com/investors
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36. TNPA Port Development Plan https://www.transnetnationalportsauthority.net/Investors/Pages/Port-Development.asp
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