INTERNATIONAL UNION OF RAILWAYS

AFRICAN RAILWAY THURSDAYS

"THE CHALLENGES OF SUSTAINABLE DEVELOPMENT, WHICH RAILWAYS FOR TOMORROW ?"

UIC AFRICA - REGIONAL OFFICE

THURSDAY 29 APRIL 2021

LIVE

Basic rules for using / Comment utiliser

- **Turn off your mic when not speaking / Coupez votre micro si vous ne parlez pas**
- **Speakers** : to advance to the next slide please say “next slide” / **Orateurs** : pour passer à la diapositive suivante merci de dire “diapositive suivante”
- Please use the **chat** functionality to write a message to everyone (for example to ask a question after a presentation). / Veuillez utiliser le **chat** pour envoyer un message à tous ou poser une question.
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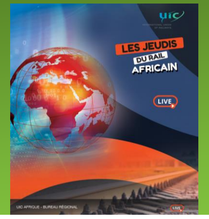
- You can mute the “original language” to listen only to English, French, etc. / Vous pouvez couper l’audio original pour écouter seulement en français ou en anglaise
- This meeting will be recorded / Cette réunion sera enregistrée.



AGENDA

OPENING

10h-10h20

- President of the UIC African Region, Mr Mohamed Rabie Khlie
- UIC Director General, Mr François Davenne

PANEL N°1

10h20-11h

Sustainable mobility at the heart of international and regional challenges

- *Initiatives and projects developed by UIC*
- Speaker : Lucie Anderton, UIC, Sustainable Development Manager
- *Rail Transport and Urbanisation In Africa: Prospects and challenges*
- Speaker : Debashish Bhattacharjee, UN-Habitat, Regional Office for Africa
- *Connecting African railways: challenges and opportunities*
- Speaker: Placide Badji, Infrastructure and Energy Department, AU
- Q/A Session

PANEL N°2

11h-11h50

Railway politics for better conciliation between mobility, environment, and climate change

- *Sydney Trains Sustainability and Emissions Reduction Strategy*
- Speaker: Mr Rod Barber, Director Environment, Safety, Australia
- *Overview of Concession Models in Africa*
- Speaker: Said Chandid, UIC African Regional Bureau
- *Sustainability Initiatives in Irish Rail*
- Speaker: Mrs Heidi Hopper Duffy, RU Environmental Officer, Ireland
- *Korail's Sustainability management to connect People, World, Future*
- Speaker: Mr Charlie Yoon, KORAIL, South Korea
- *Sustainable energy policy at SNCF Voyageurs*
- Speaker: Mrs Carole Escolan, SNCF
- Q/A Session

PANEL N°3

11h50-12h30

Finance innovative modes and mechanisms at the low-carbone mobility service in Africa

- *African Bank of Development*
- *World Bank Group*
- Q/A Session

CONCLUSIONS

12h30-13h00

Mohamed Rabie Khlie

Welcome Message of the President of the UIC African Region

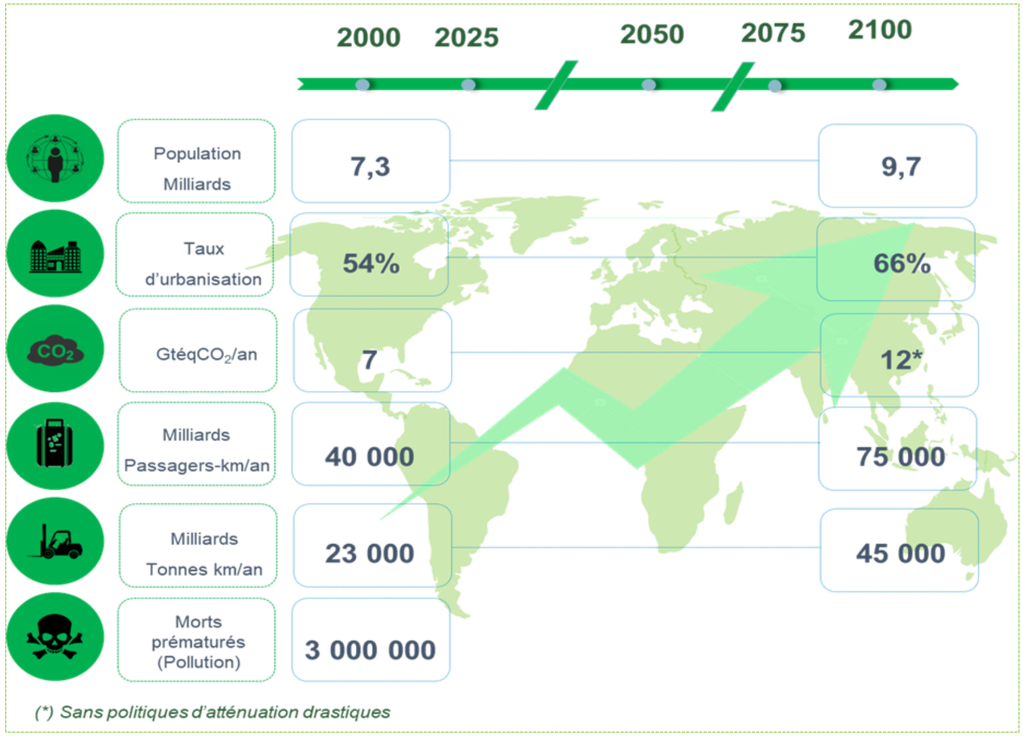
SD, an ambition for a resilient growth

Developing, transforming, adapting territories without simultaneously designing the flow of goods and people, amounts to bypassing a significant part of climate commitments !

UN CLIMATE CHANGE CONFERENCE UK 2021

IN PARTNERSHIP WITH

SD, policies to mitigate the impact of transport



TRANSPORT SECTOR

30%
Energy consumption

23%
Greenhouse gas emissions

RAIL MODE

03%
Greenhouse gas emissions share

08%
Market share

Limit the increase in global warming to less than

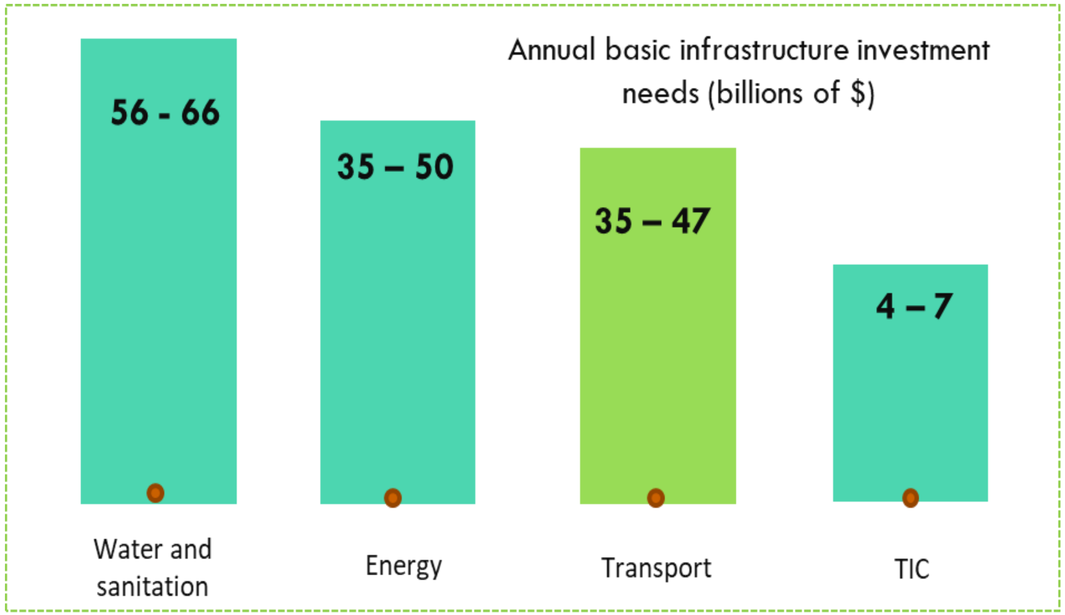
2°C at the horizon of 2100

Africa, strong SD challenges and a constant commitment






- Efforts made at several levels, but the achievement of the SDGs will have to be supported, among other things, by making up for the deficit of investments in infrastructure, in particular to establish sustainable mobility
- Infrastructure investment needs have reached **$ 130 to $ 170 billion per year**, with a funding gap of $ 68 to 108 billion



Loss of

25%

of cumulative economic growth over the past two decades

Africa, the rail backbone of sustainable mobility

MASS TRANSPORT

- 1 passenger train = 160 cars
- 1 freight train = 50 to 60 trucks

LOW EXTERNAL COSTS

- 5 times less than a car
- 6 times less than a truck

ENERGY SAVING

- 6 times less than the road

SPACE SAVING

- 2 times less than the highway for
- 4 times more traffic

LESS POLLUTING

- Rail : 2 à 4%
- Road : 96 à 98%

SAFER

Rare accidents: non-compliance with the railway rights-of-way by local residents

Case of MOROCCO, a significant progress in achieving SD

1 **Commitments for 2030**

- 32% reduction of GHG emissions
- 52% carry the national electric capacity
- 82% reduction in energy dependence
- 20% Energy saving

2 **Transport Sector**

- 38% of national energy consumption
- 23% of GAS emissions
- 30 billion € in investments for 20 years
- 70 billion € in investment by 2035

Significant progress has been made: improvement of living conditions, facilitation of access to basic services, infrastructure development, environmental sustainability and renewable energies, etc., as part of the deployment of sector strategies

Case of MOROCCO, a railway at the service of sustainable mobility

1

ENVIRONMENTAL DIMENSION:

- ISO 14001 & 50001 certifications
- Impact studies of major projects
- Annual Carbon Report
- Photovoltaic installation in stations
- Responsible Purchasing Charter

2

ECONOMIC DIMENSION:

- Annual investments: 7OO M
- €90% purchases from national companies
- Emergence of a railway ecosystem
- Gain for local authorities / year: 250 million €
- Circular economy (46000T of materials)

3

SOCIETAL DIMENSION:

- Accessibility plan for disabled people
- Edition of CSR reports
- Labeled "Tobacco Free Company“
- National award for quality and safety at work
- Memorandum of understanding: social partners

Rail in Africa, tomorrow as of today

Ten initiatives of the African rail networks for a better involvement in the UIC commitment:

carbon neutrality of African railways by 2050

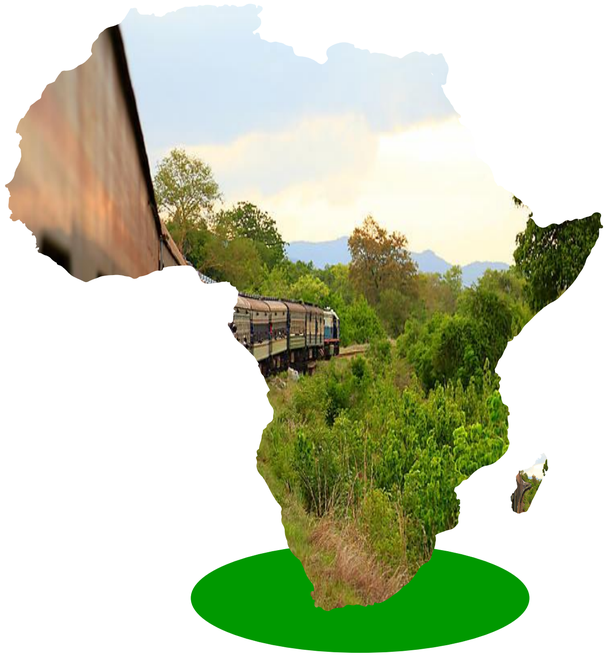
1- Strengthen territorial integration
2- Ensure a high level of safety and security
3- Accelerate digital transformation
4- Innovating low-carbon solutions
5- Valorizing recoverable energy

6- Renforcer l'intégration territoriale
7- Assurer un haut niveau de sécurité et de sûreté
8- Accélérer la transformation digitale
9- Innover des solutions à bas carbone
10- Valorisant l'énergie récupérable

Rail in Africa, tomorrow as of today

The time for stakeholder to allow the rail mode to help mitigate climate change

- Rethinking the African rail space
- Accelerate the realization of investment projects
- Allocate a share of climate funding to sustainable mobility
- Adopt regulatory and tax incentives



- Promote standardization
- Structure the modal shift
- Promote multi-modality
- Internalize externalities "polluter pays" principle

AFRICAN GREEN DEAL RAILWAY

FOR SUSTAINABLE MOBILITY

A united and committed appeal towards the institutions and negotiators during COP26

François
DAVENNE

Welcome Message of the UIC Director General

Sustainable mobility at the heart of international and regional challenges

Lucie ANDERTON

Debashish BHATTACHARJEE

Placide BADJI

Lucie

ANDERTON

Initiatives and projects developed by UIC

The UIC Sustainability Platform

Set the **vision**

Provide the **tools**

Convene the **community**

To empower the global railway community to be a driving force in a green recovery through collaborative knowledge and advocacy.

Our Vision

A railway that supports a green recovery as the **backbone of sustainable mobility**. Connectivity that contributes to healthy and sustainable lifestyles and economies on every continent – that is zero emissions, a community hub, accessible for all, and is both biodiverse and a good neighbour.

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Marie-Luz PHILIPPE

Advisor Communications & Sustainable mobility
PHILIPPE@uic.org

Advocacy and International Coalitions

International Transport Forum

https://www.itf-oecd.org/rail

International Energy Agency

https://www.iea.org/reports/rail

https://ukcop26.org/

SLOCAT Partnership

http://www.slocat.net/wp-content/uploads/legacy/slocat_transport-and-climate-change-2018-web.pdf

Marrakech Partnership

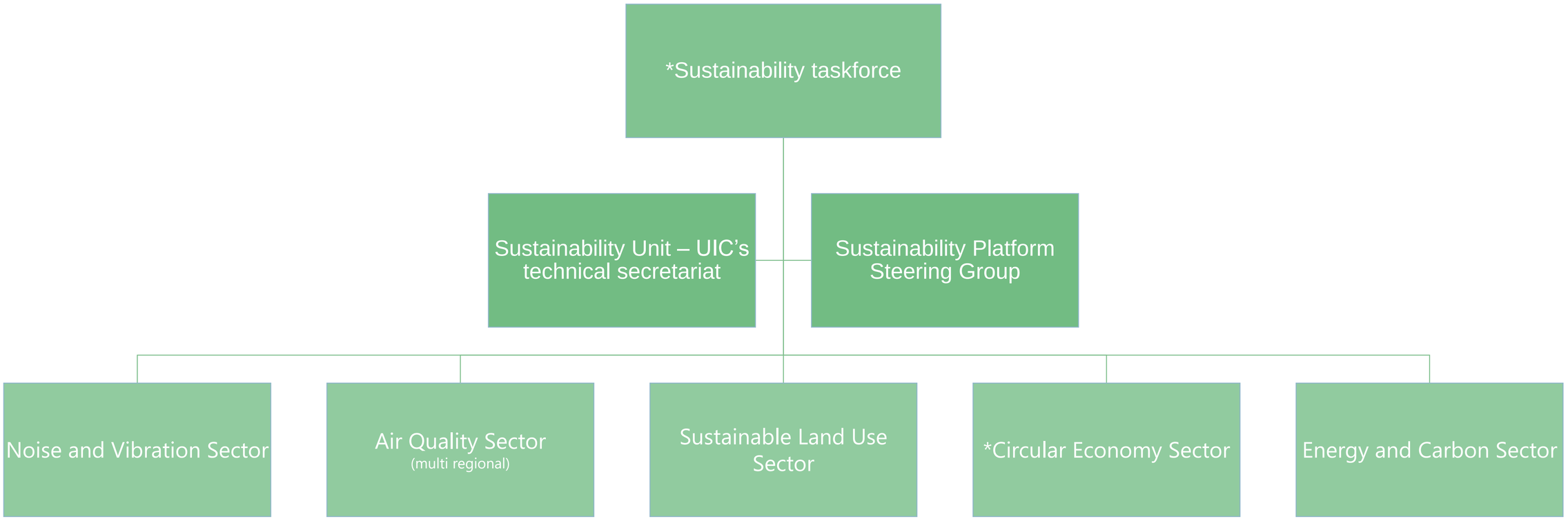
Global Climate Action

the Climate Action Pathways

SUSTAINABLE mobility FOR ALL

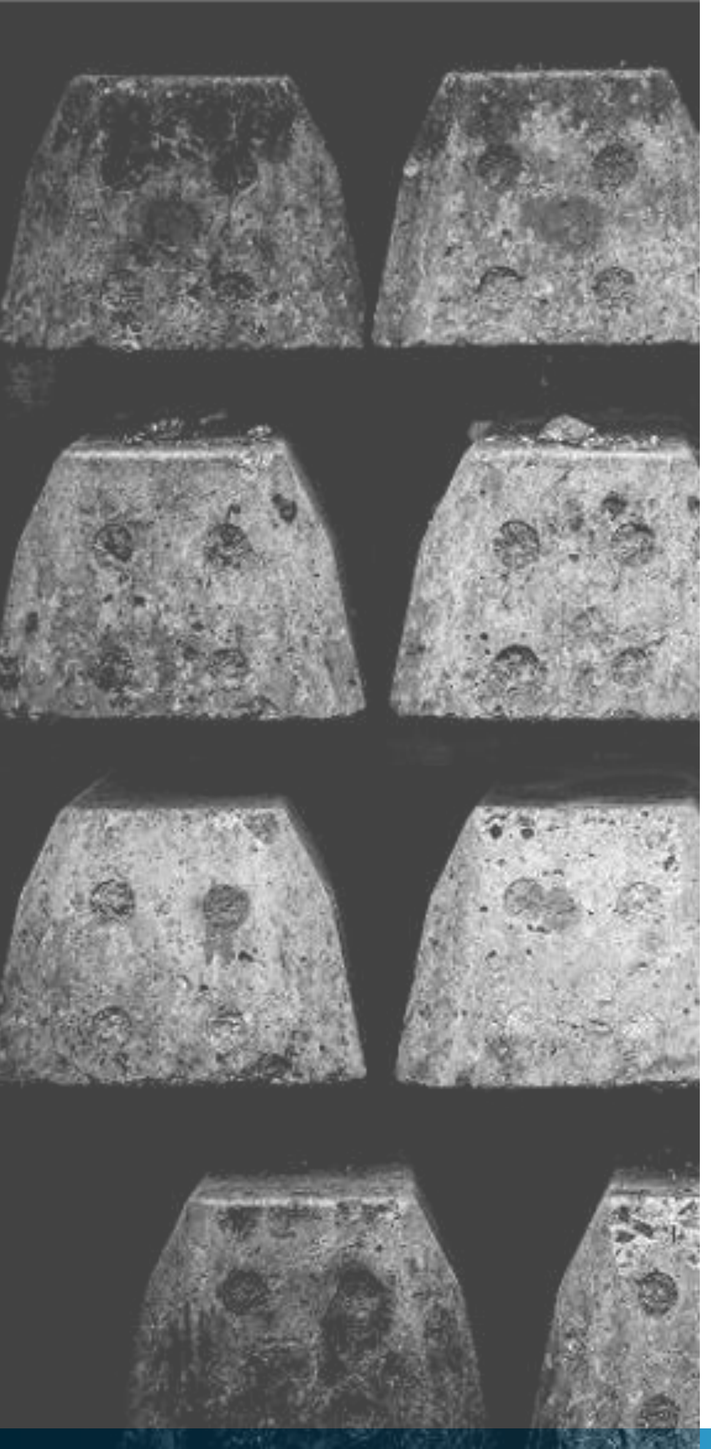
https://www.sum4all.org/

Sustainability Platform



Linking to other working groups on:

- Weather resilience and CC adaptation
- Inclusive Stations
- Covid 19 new normal working group
- Sustainable procurement
- Finance and carbon taxation



Circular Economy

REUSE Project

“state of the art” report
ballast, rail & concrete

*Launch new Circular Economy Sector

2022 project – ZeroWASTE

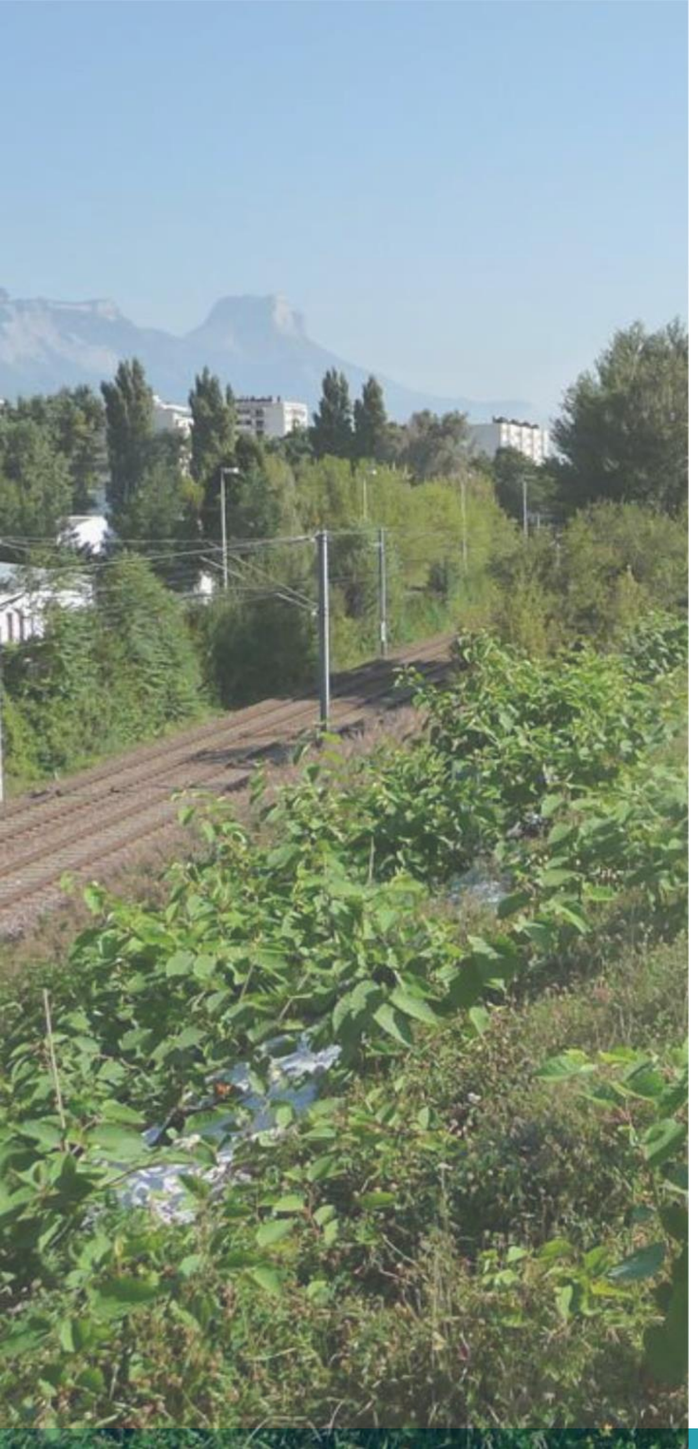
Annual best practice webinar

Online toolkit/resources

Noise & Vibration

lownoisepad

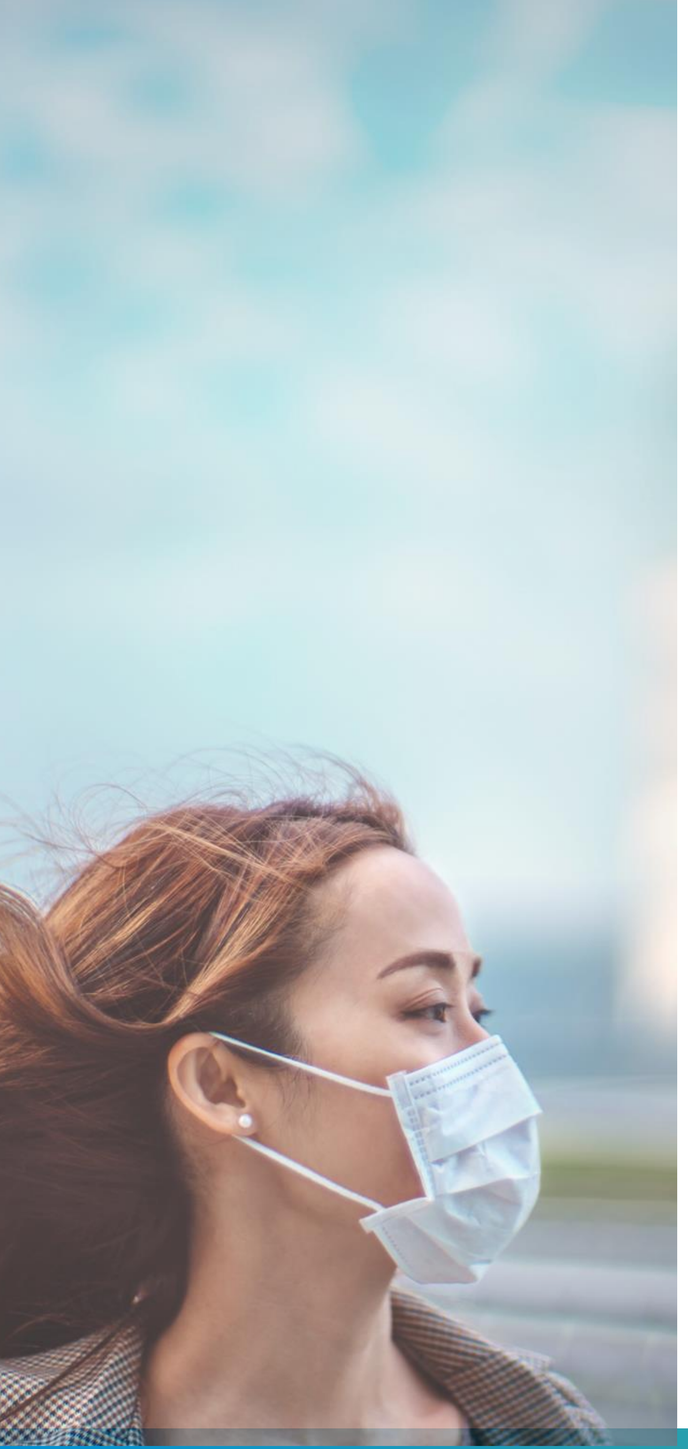
NOVITÀ



Sustainable Land Use

ECOLOGICAL EFFECTS OF RAILWAYS ON WILDLIFE

REVERSE



Air Quality

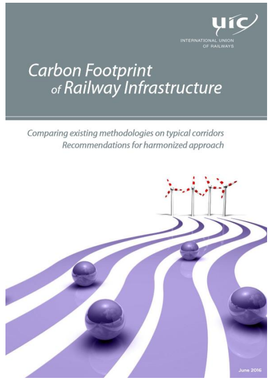
Clean Air Trains

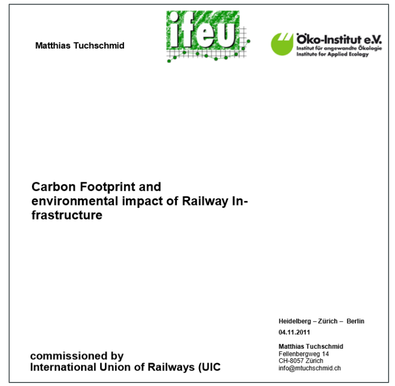
Participants required to sign the NDA

Priority Topic in 2021

- Railway system wears - brakes, pantograph/catenary, wheel/rail

Energy efficiency & CO2 emissions

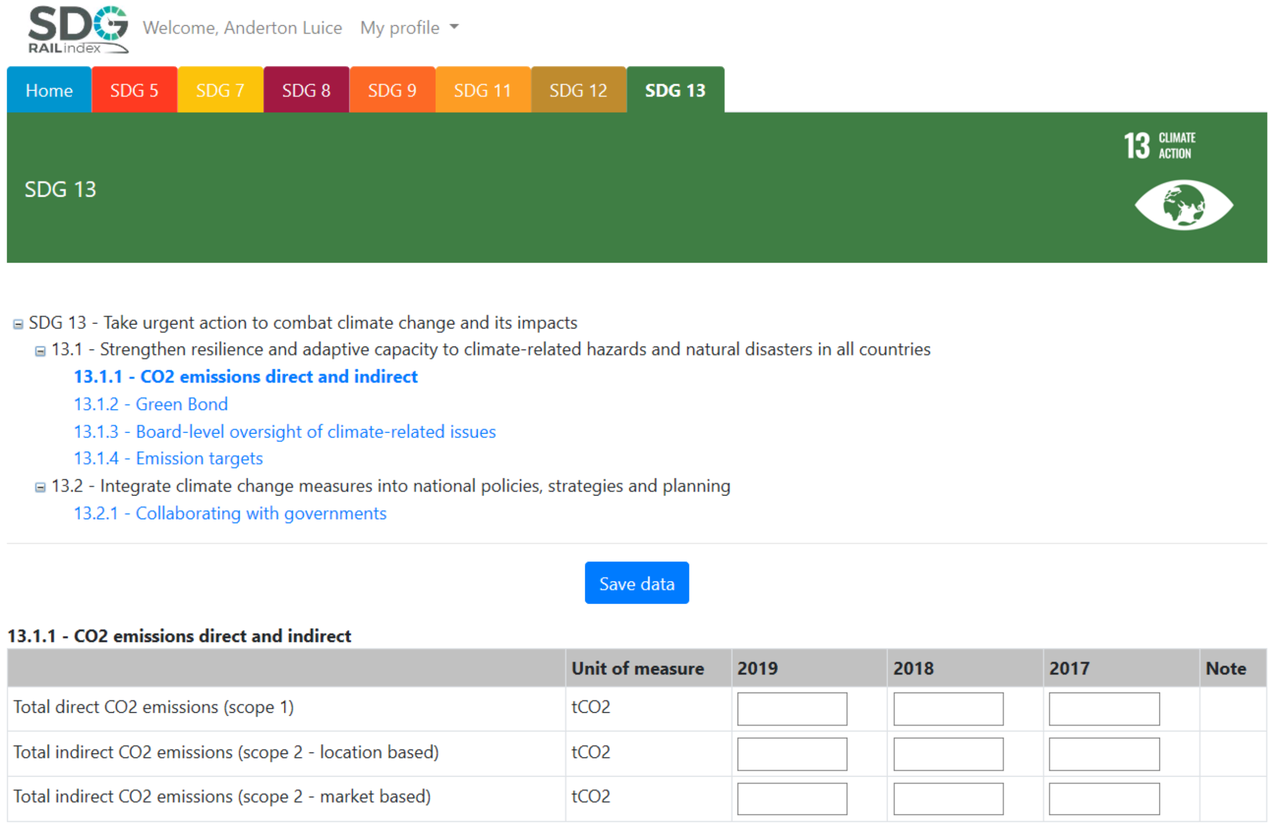




Mobility as a Service digital platforms guidelines

Look out for a webinar to communicate the findings this year

24 Quantitative & Qualitative scored KPIs



Level	Score %	Score band
Beginner	1-20	D-
	21-30	D
Pursuer	31-46	C-
	47-55	C
Manager	56-70	B-
	71-82	B
Leader	83-90	A-
	91-100	A

SDG RAILindex

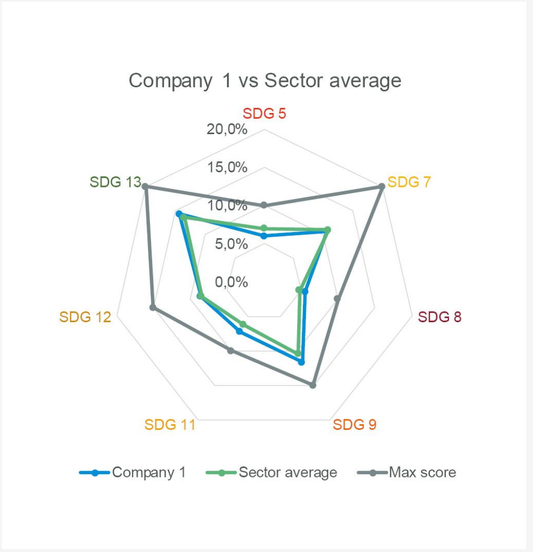
Company 1
Score band: B- Level: Manager

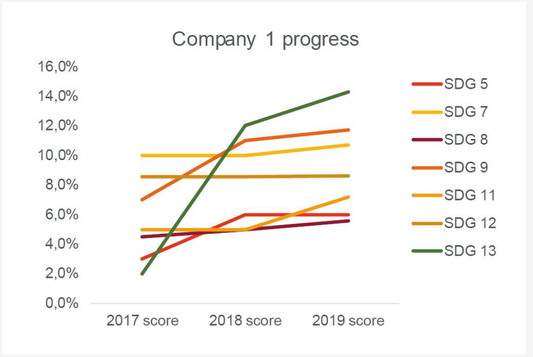
Beginner		Pursuer		Manager		Leader	
0%	21%	31%	47%	56%	71%	83%	91%
20%	30%	46%	55%	70%	82%	90%	100%
D-	D	C-	C	B-	B	A-	A
				✓			

SDG							
5 GENDER EQUALITY	7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION	Total
Company 1 2019 Score							
6,0%	10,7%	5,6%	11,7%	7,2%	8,6%	14,3%	64,0%
Sector average							
7,0%	10,9%	4,8%	10,4%	6,2%	8,5%	13,5%	61,3%

Highest scoring KPI
The formalised process for defining energy targets that involves also the Board of Directors

Key Opportunity to improve
Creation of a diversity and inclusion code





New Sustainability reporting

IRS

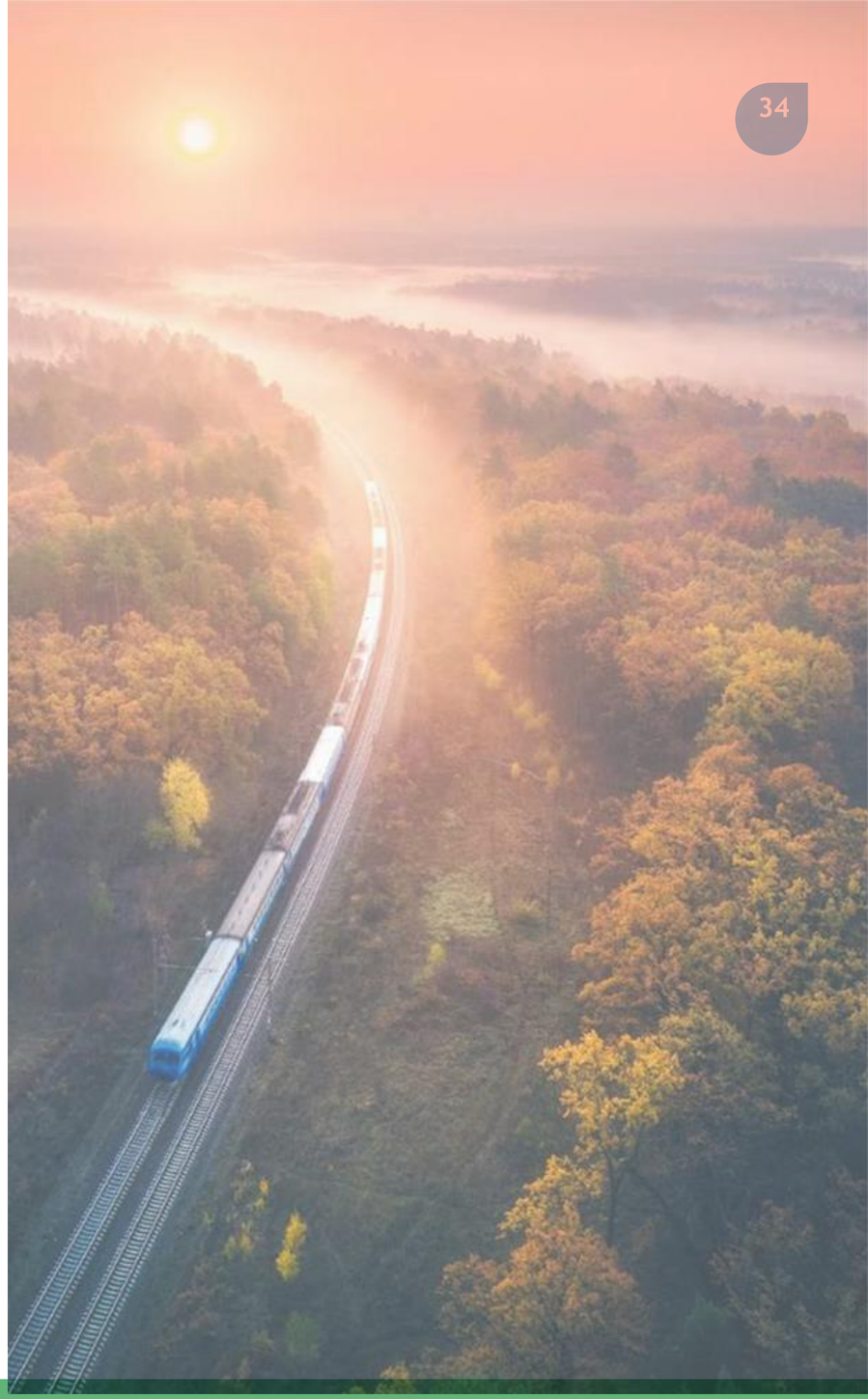
The UIC Sustainability Platform

Sign up to the extranet ‘Sustainability’ Group and Subscribe to the UIC E-news for the latest articles, events and publication

Join the online webinars

Contribute to the sector meetings and projects

Test the SDG Rail Index tool



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OF RAILWAYS

Stay in touch with UIC:

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#UICrail

Environnement2@uic.org

Thank you for your attention.

Rail Transport and Urbanisation In Africa: Prospects and challenges

Debashish
BHATTACHARJEE

RAIL TRANSPORT AND URBANISATION IN AFRICA: PROSPECTS AND CHALLENGES

Debashish Bhattacharjee
UN-Habitat

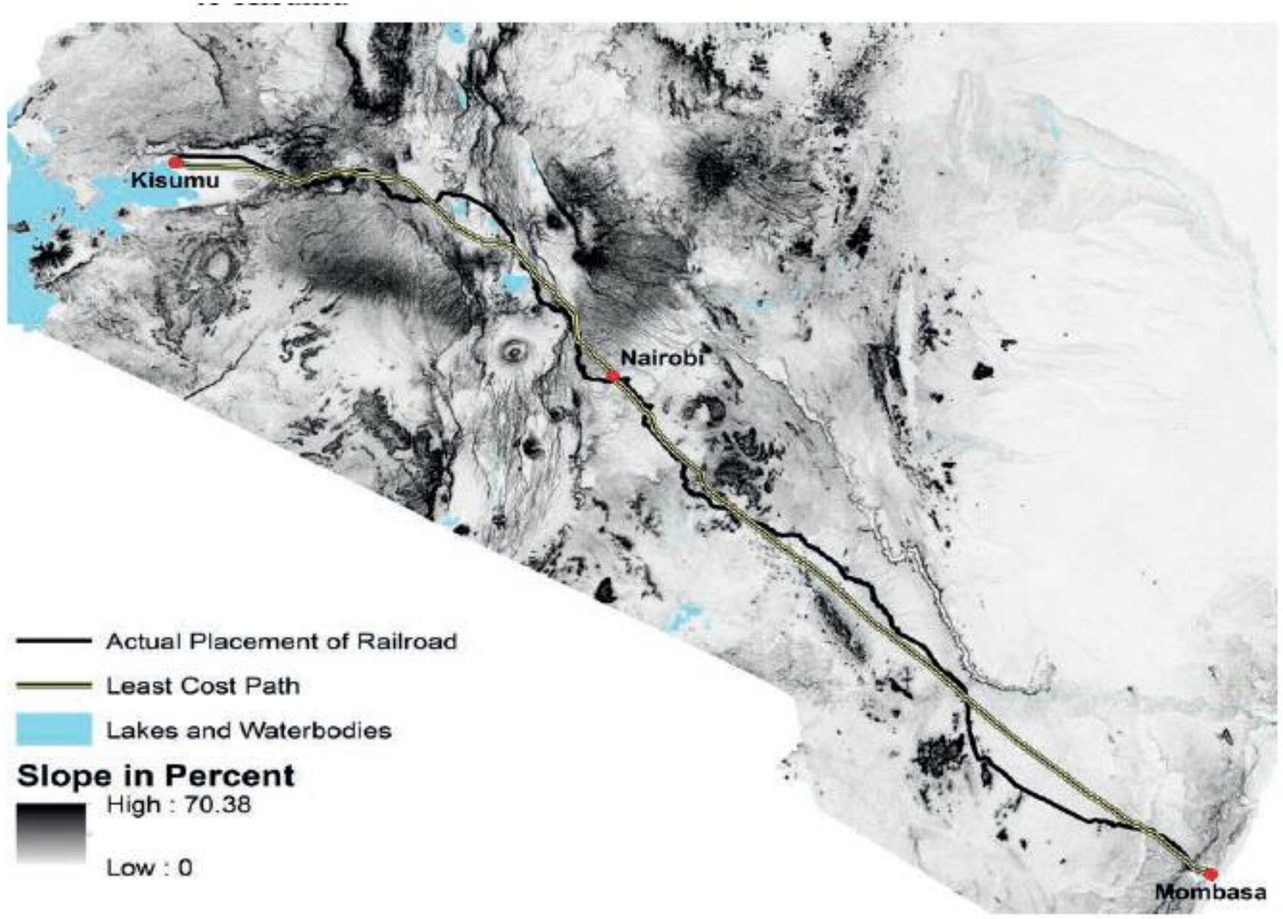
IMPLEMENTING THE NEW URBAN AGENDA

UN HABITAT
FOR A BETTER URBAN FUTURE

Outline

1. Urbanisation and Rail: An Intertwined History
2. Value and benefits of rail transport
3. Urbanisation and Transport: Challenges and Opportunities
4. A perspective on the way forward

Urbanisation and Rail: An Intertwined History



Railway Development and Urbanisation in Kenya

Alignment of Mombasa – Kisumu Railway

Constructed 1896-1901

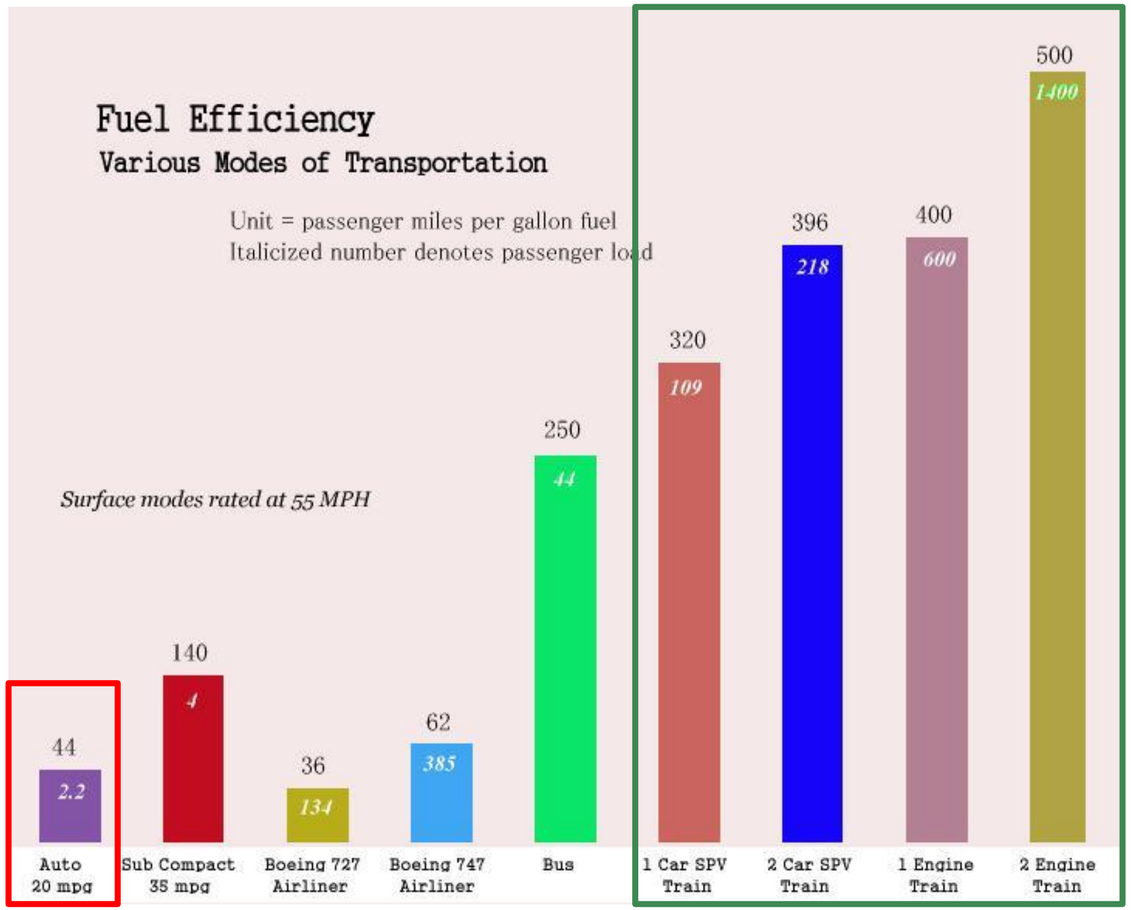
Followed “least cost path” of construction

Source: Jedwab et al., 2016

(https://voxeu.org/article/how-colonial-railroads-defined-africa-s-economic-geography)

Value and benefits of rail transport

- Highly beneficial for long-distance regional connectivity
- High load carrying capacity – reduces road congestion and road wear and tear
- Highly energy-efficient, and possibly fully electrified
- High initial investment, but low long-term costs
- Reduces costs for freight transit



Value and benefits of rail transport

- Potential for decarbonising passenger and freight transport; lowest emissions per passenger on long distance
- Can help achieve the UN Sustainable Development Goals and the 1.5°C stabilisation pathway in the Paris Agreement on Climate Change
- Ensuring that Public Transport becomes more affordable, convenient, attractive and efficient than personal cars can incentivise a shift towards sustainable mobility

PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

SUSTAINABLE DEVELOPMENT GOALS

IMPLEMENTING THE NEW URBAN AGENDA

UN HABITAT
FOR A BETTER URBAN FUTURE

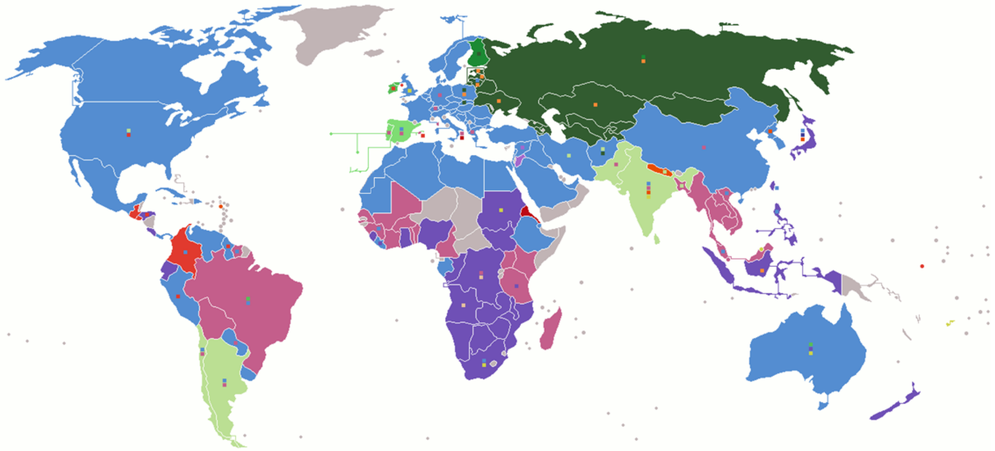
Concerns of rail transport

- Railroads can represent physical barriers and cause environmental disruption
  - ⟶ Environmental impacts need to be considered and addressed

- Due to the large initial investment may not be the most viable option within urban areas of developing countries

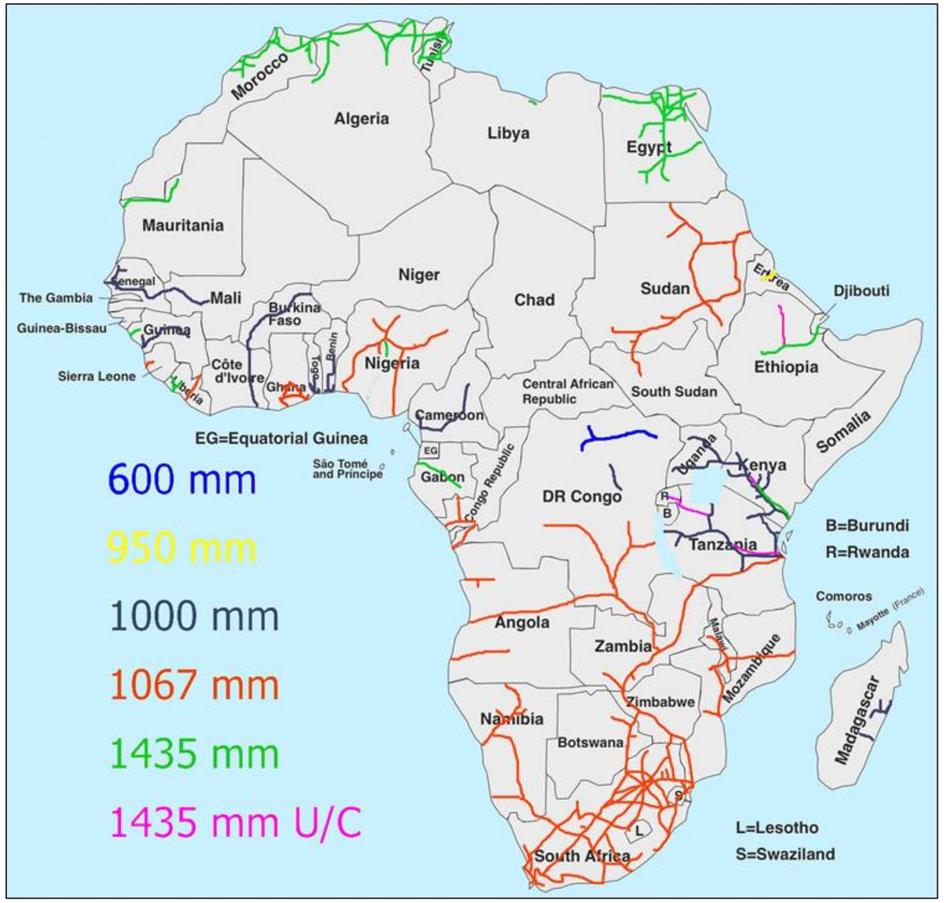
International interconnectivity

- Greater inter-country and cross-country uniformity leads to greater connectivity
- Use of different gauge tracks require the use of expensive variable gauge systems
- Non-comparable gauges cause delays and added costs in freight transit



mm	1676	1668	1600	1524	1520	1435	1372	1067	1050	1000	950	914	762	750	610	600
ft in	5'6"	5'5.67"	5'3"	5'	4'11.8"	4'8.5"	4'6"	3'6"	3'5.3"	3'3.4"	3'1.4"	3'	2'6"	2'5.5"	2'	1'11.6"

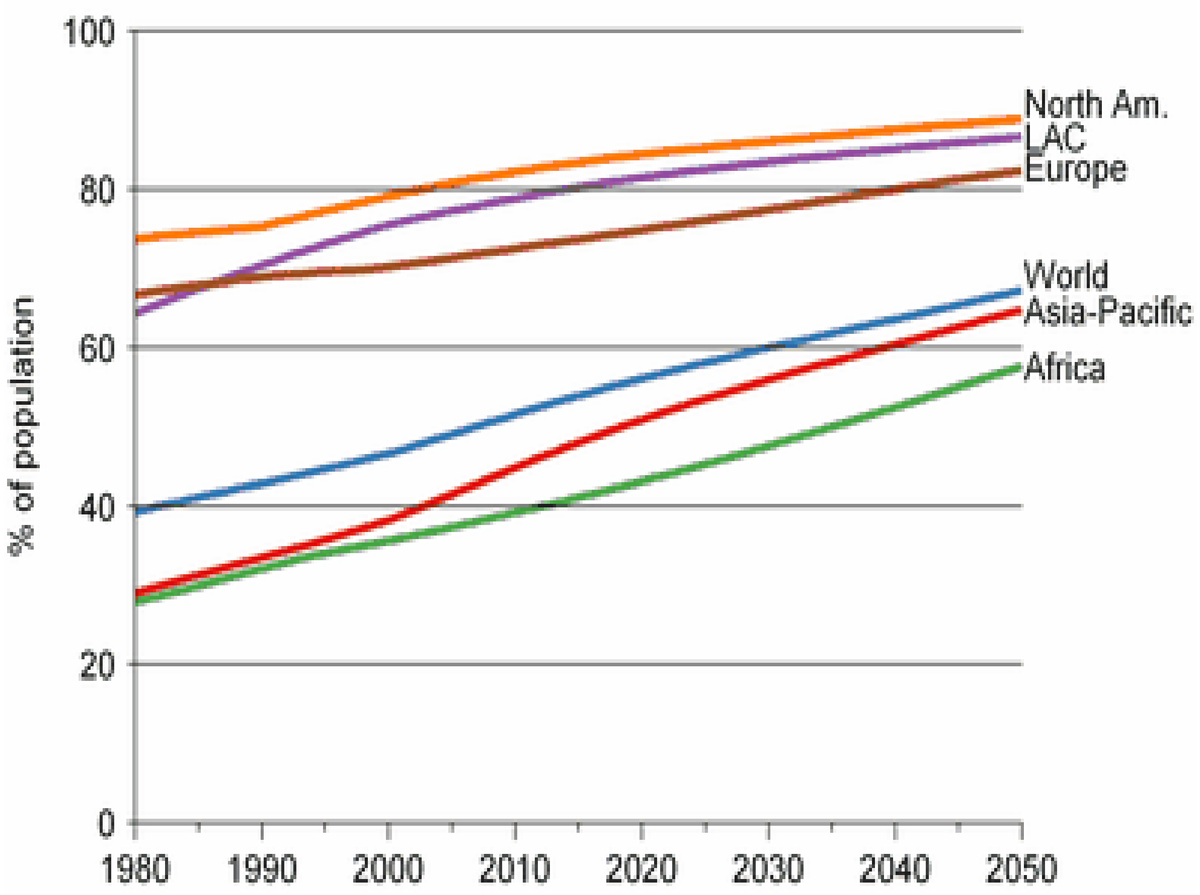
Source: CIA Factbook railways



Source: Wikimedia commons

World urbanisation trends

Urban Population Growth by region (2005-2020)



- **Rapid global urbanisation:**
  From 37% in 1995 to 68% in 2050

- **Africa and Asia are urbanising fastest:**
  90% of total by 2050

CURRENT SITUATION: CAR BASED TRANSIT CORRIDORS

Outcomes: Resource-Inefficiency, Segregation, Congestion, Road Fatalities

- Low density, urban sprawl, mono-functional use
- **Car-based** transit corridors contributing to traffic congestion, emissions, air pollution
- **No Integration** between separate mobility systems
- **NMT users forgotten** even though they are the majority

FRAGMENTED URBAN FORM

Weak urban fundamentals for public transport

- Often unplanned city expansion/ lack of public transport connectivity and affordability
- Rapidly growing secondary cities that merge with large cities to form large urban agglomerations
- Urban structure and movement networks not combining in a functional urban system
- In most African cities, the land use systems have not been able to provide access through proximity

IMPLEMENTING THE NEW URBAN AGENDA

UN HABITAT
FOR A BETTER URBAN FUTURE

Transitioning to a system of public transport

Matatus in Nairobi

- Financially unviable formal public transport
- Fragmented Institutions
- No relation to proximity to BRT and land use intensity

Dar Es Salaam's Bus Rapid Transit System

- Comprehensive planning approach
- Efficient operations
- Managed by Dar Rapid Transit Agency

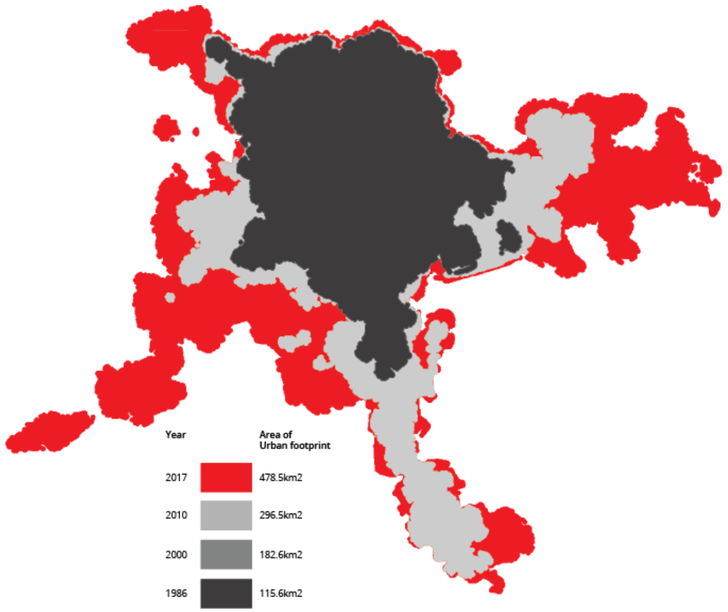
Integration of regional connections with urban transport

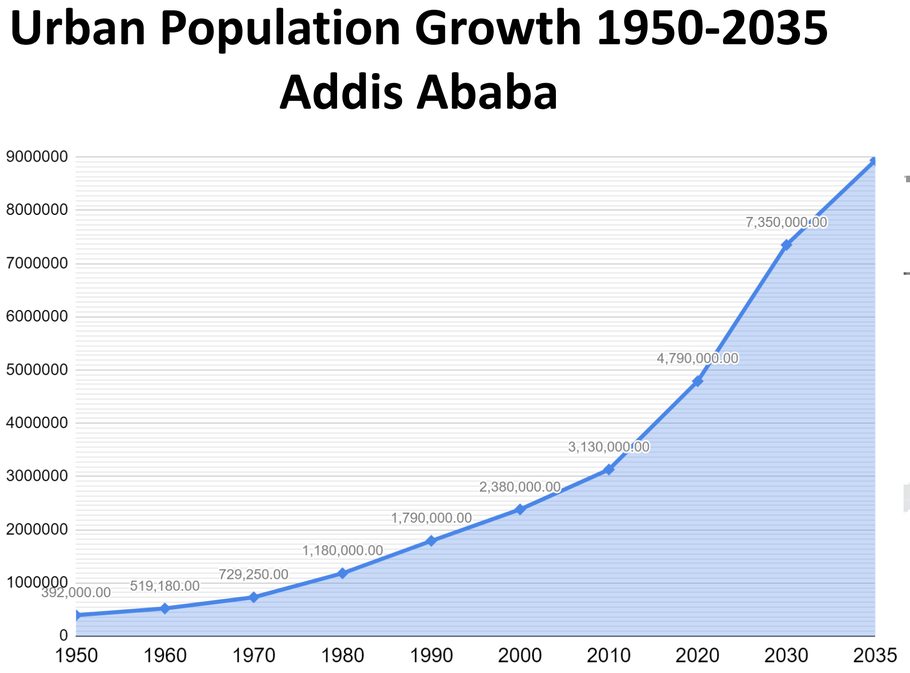
- Need for integration between regional connections and various modes of transport within cities, including good Public Transport and Non-motorised transport
- Ensure central position of train stations in the city and linking them with key points of interest
- Avoid traffic congestion around train stations and surrounding streets
- Ensure surrounding streets have adequate, inclusive street designs

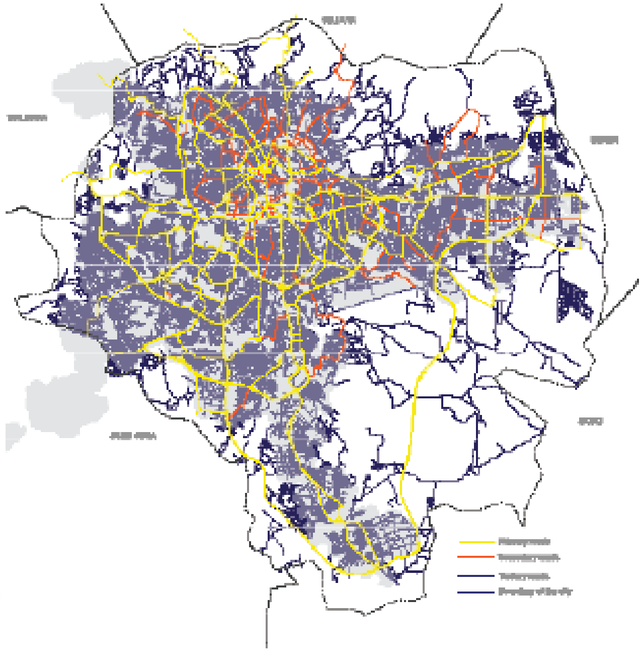
Source: Leeds City Council

EXAMPLE ADDIS ABABA

CHALLENGE







Existing Street Pattern, Addis Ababa

AN EXAMPLE FROM ADDIS ABABA

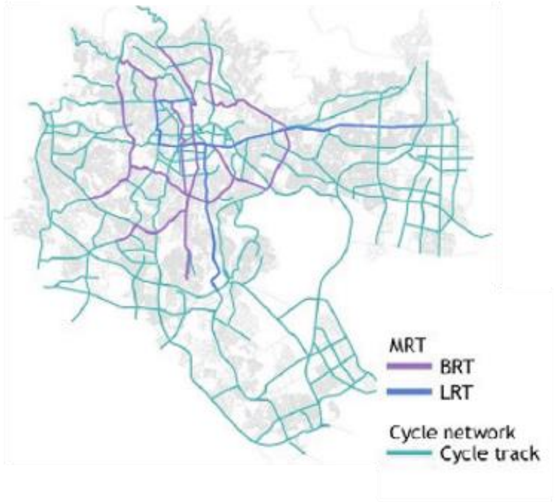
Light Rail

- ✓ High Passenger Demand
- X Low Capacity (maintenance issues)
- X Physical access barriers
- X Reduced property prices – leading to higher debt burden

EXAMPLE ADDIS ABABA: SUSTAINABLE MOBILITY

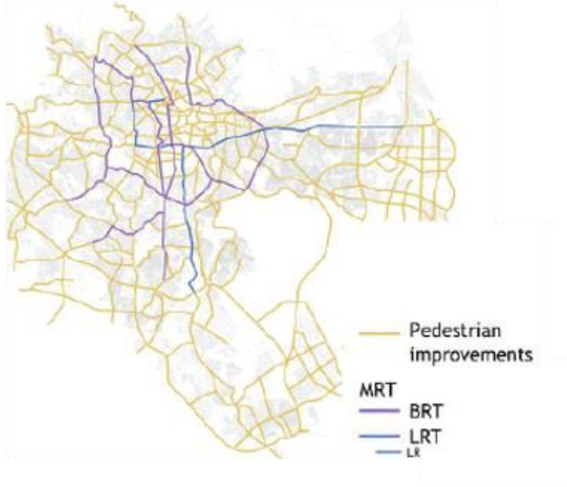
Target 2028

Cycle & NMT Network



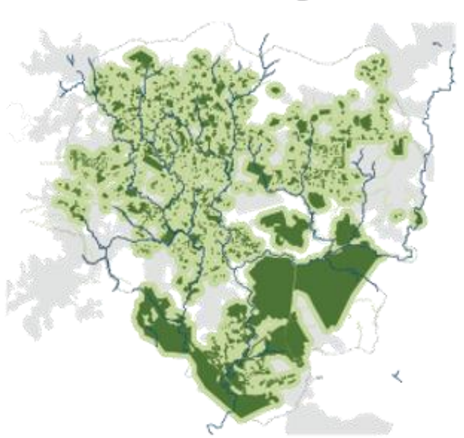
200KM
10,000
Bike Sharing

Inclusive pedestrian routes



600KM
(Inclusive walkways)
SAFE ACCESS TO ALL SCHOOL

Public Space & Greenways



56KM
River Front Rehabilitations to add
4m2 of green space per capita
improving other public spaces also undergoing

10 Years

31.6 KM
(SINCE 2015)
2 LINES
200,000 P. DAILY)
EXPANTION TO START

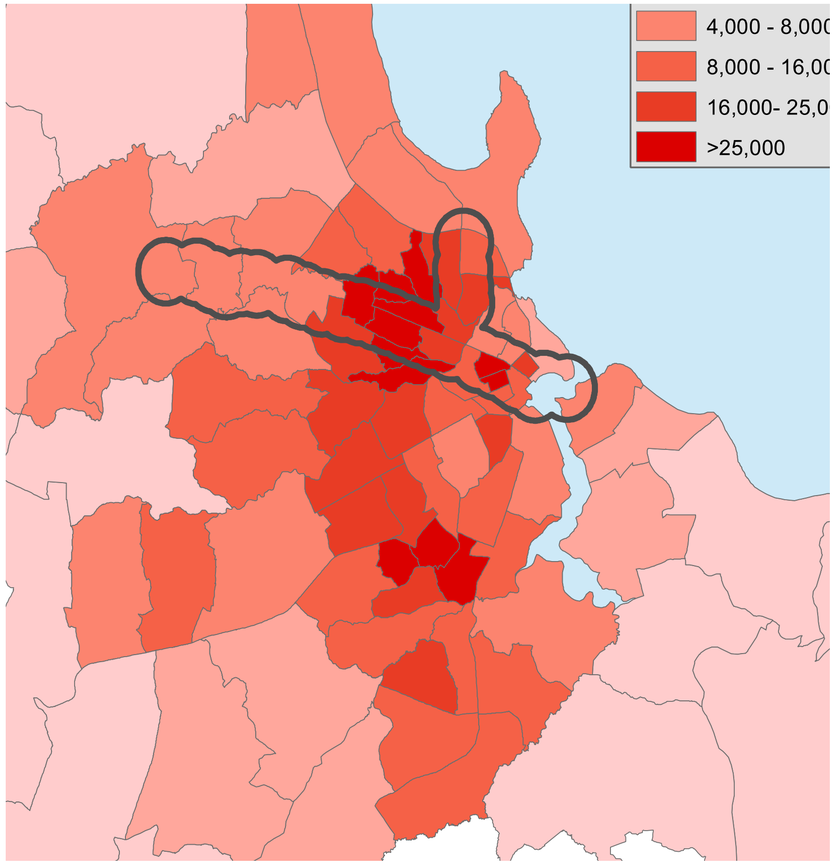
2,000 M2
NEGATIVE SPACES (Reclaimed)

IMPLEMENTING THE NEW URBAN AGENDA

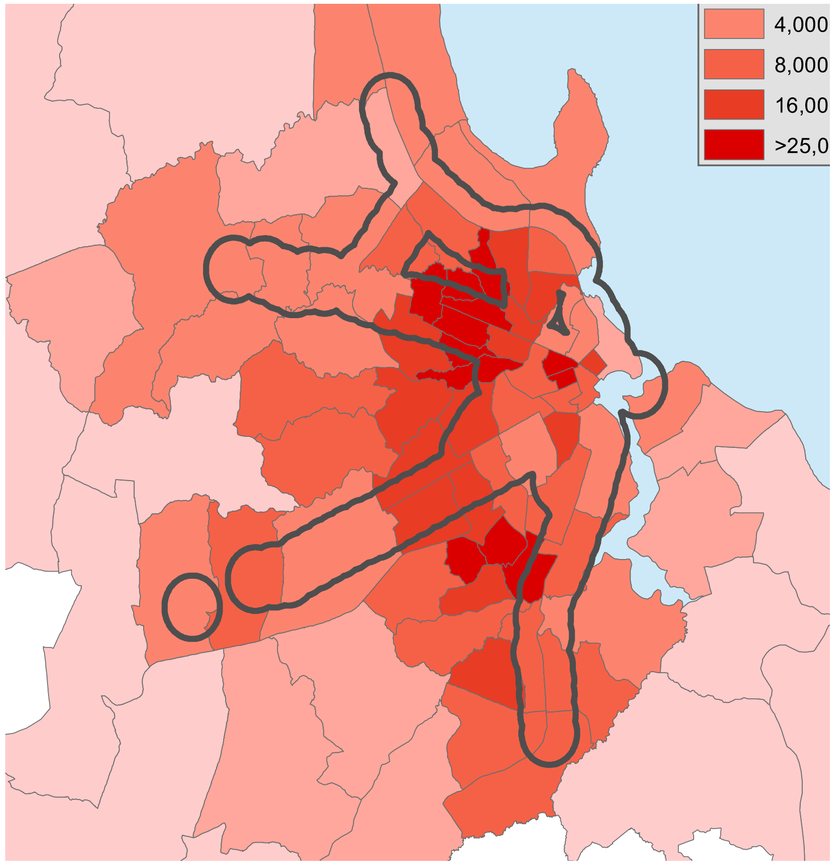
UN HABITAT
FOR A BETTER URBAN FUTURE

COMPACT DEVELOPMENT AND DENSIFICATION

Rapid Transit Coverage in Dar es Salaam



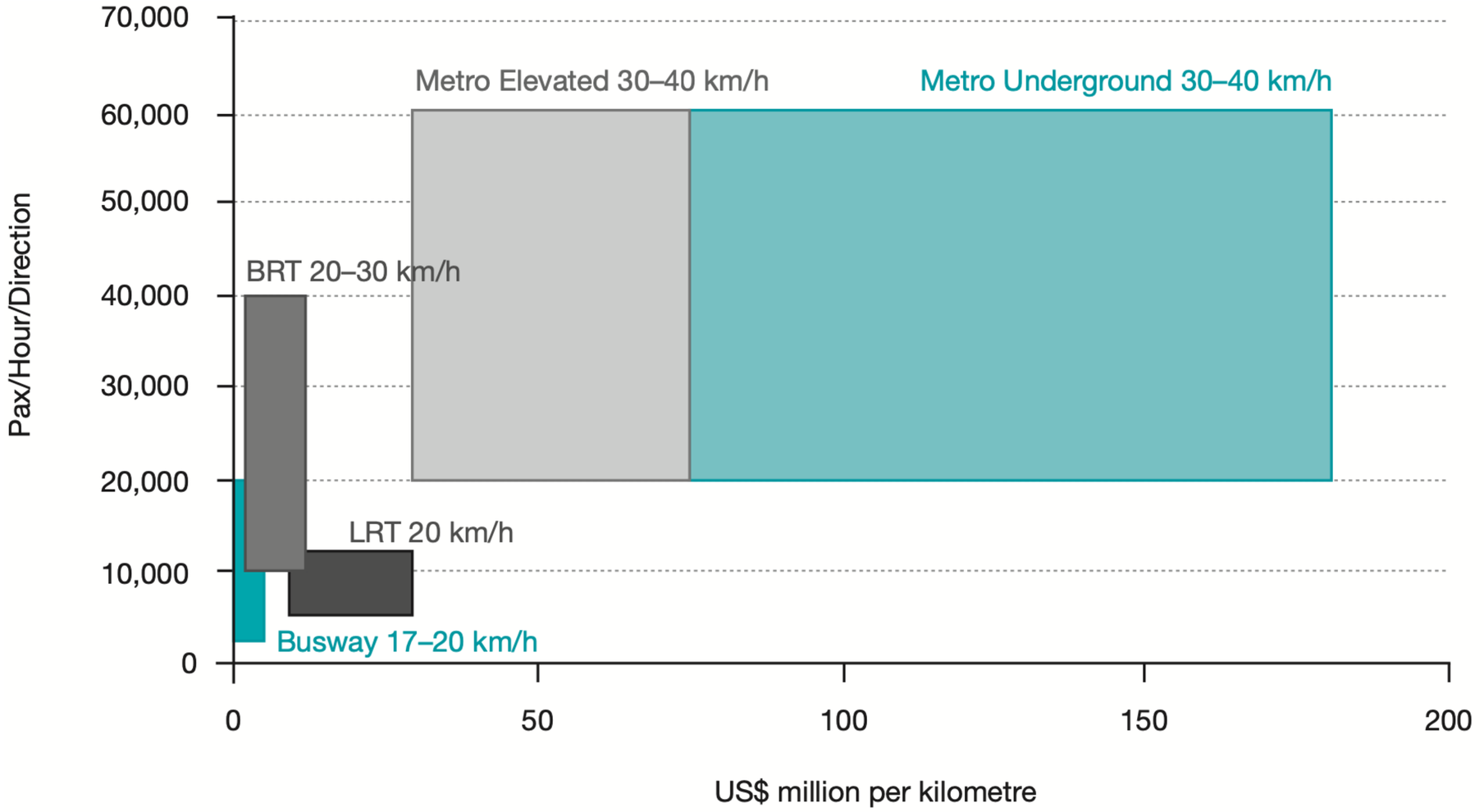
After BRT phase 1
8% of residents near rapid transit



After BRT phases 1-4
33% of residents near rapid transit

BRT can act as a backbone around which to transform and redevelop the city to further increase sustainability and functional effectiveness

Making the Right Choice : Balancing Passenger Demand , Investment and Spped



Source : GRHS 2013 Planning and Design for Sustainable Urban Mobility (UN-Habitat/Hindalgo)

Conclusion and a Perspective on the Way Forward

- ❖ Sustainable Urbanisation & intercity/interregional connectivity are both essential for Economic Development in Africa
- ❖ Rail is key for intercity and regional connectivity
- ❖ Rail more optimal beyond 30,000 passengers/hour/direction (large metropolis)
- ❖ Operations, Maintenance and Sustainable Business Models (debt servicing) very important for all Mass Transit Modes

Thank you!

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Connecting African railways: challenges and opportunities

Placide
BADJI

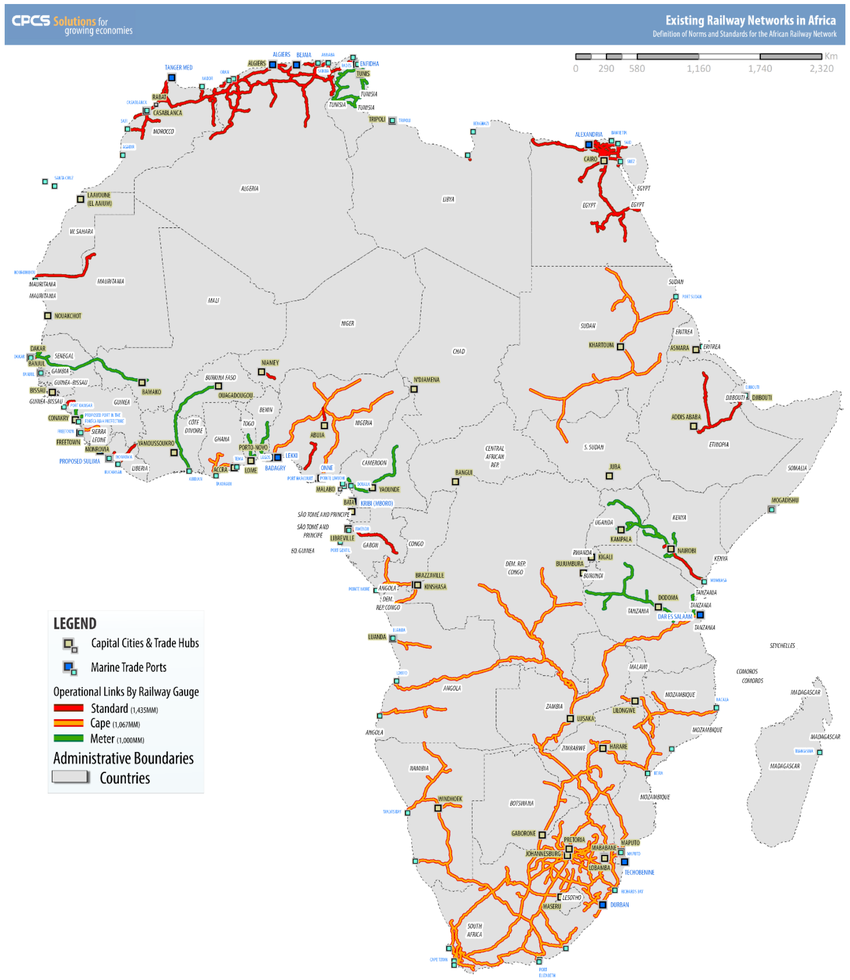
The future of African rail: a sustainability-oriented policy

Placide Badji (PhD) , AUC

Outline

- Background
- Transport and sustainability
- Railway and electrification
- Benchmarking: Recent SGR Projects in Africa – Electrification
- Conditions for a better future for railway transports
- Toward an African Railway market

Background



- 85,000 route-km and uses multiple standards
- Gauge:

✓ 61% of OL : cape gauge (1,067 mm),

✓ 20% of OL: standard gauge (1,435 mm).

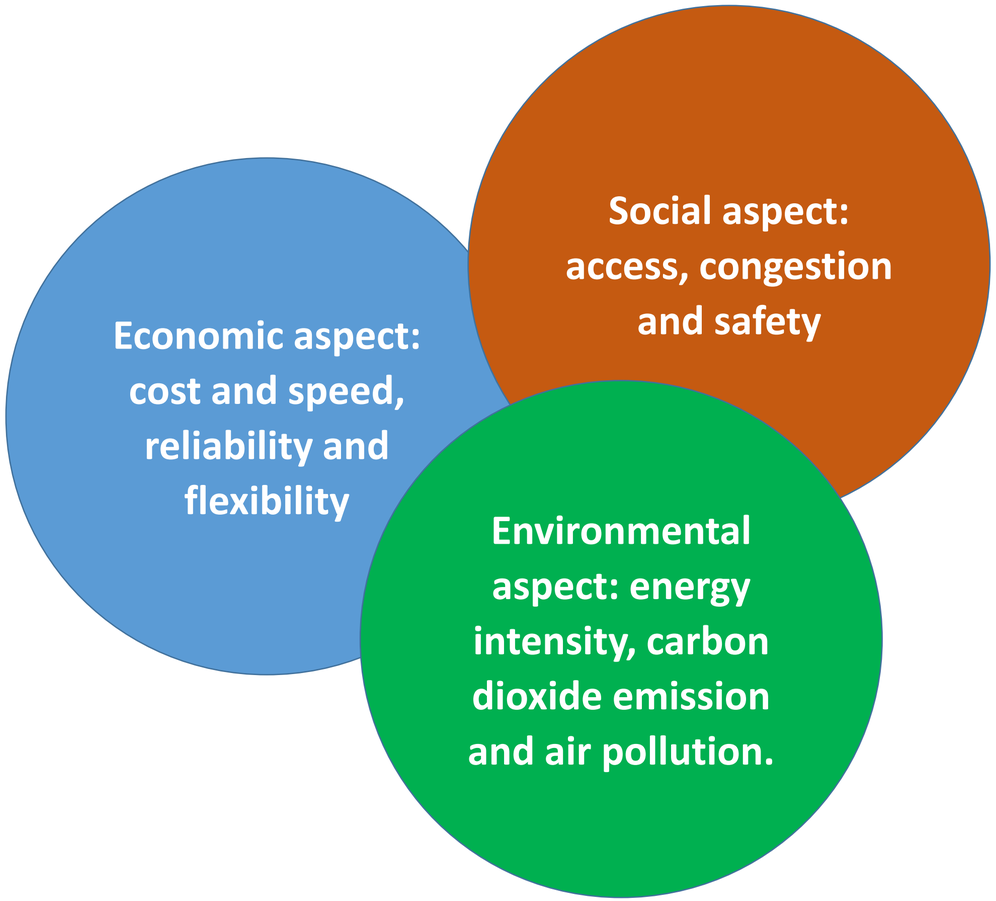
- Electrification:

✓ 15% with 3kV direct current (DC) the most common standard,

✓ 25 kV alternating current.

- Majority: Rolling stock: Association of American Railroads (AAR) (Janney) type couplers
- Axle load: new railways >= 22.5 t per axle.

Transport and sustainability



Transport and sustainability: environmental considerations

- **Overconsumption of energy and the impact of greenhouse-gas (GHG) emissions are the signature challenges of this century.**

- **Oil and transport are interdependent:**
  - **90% of transport fuels are oil-based**
  - **50% of oil produced worldwide is consumed by the transport sector.**

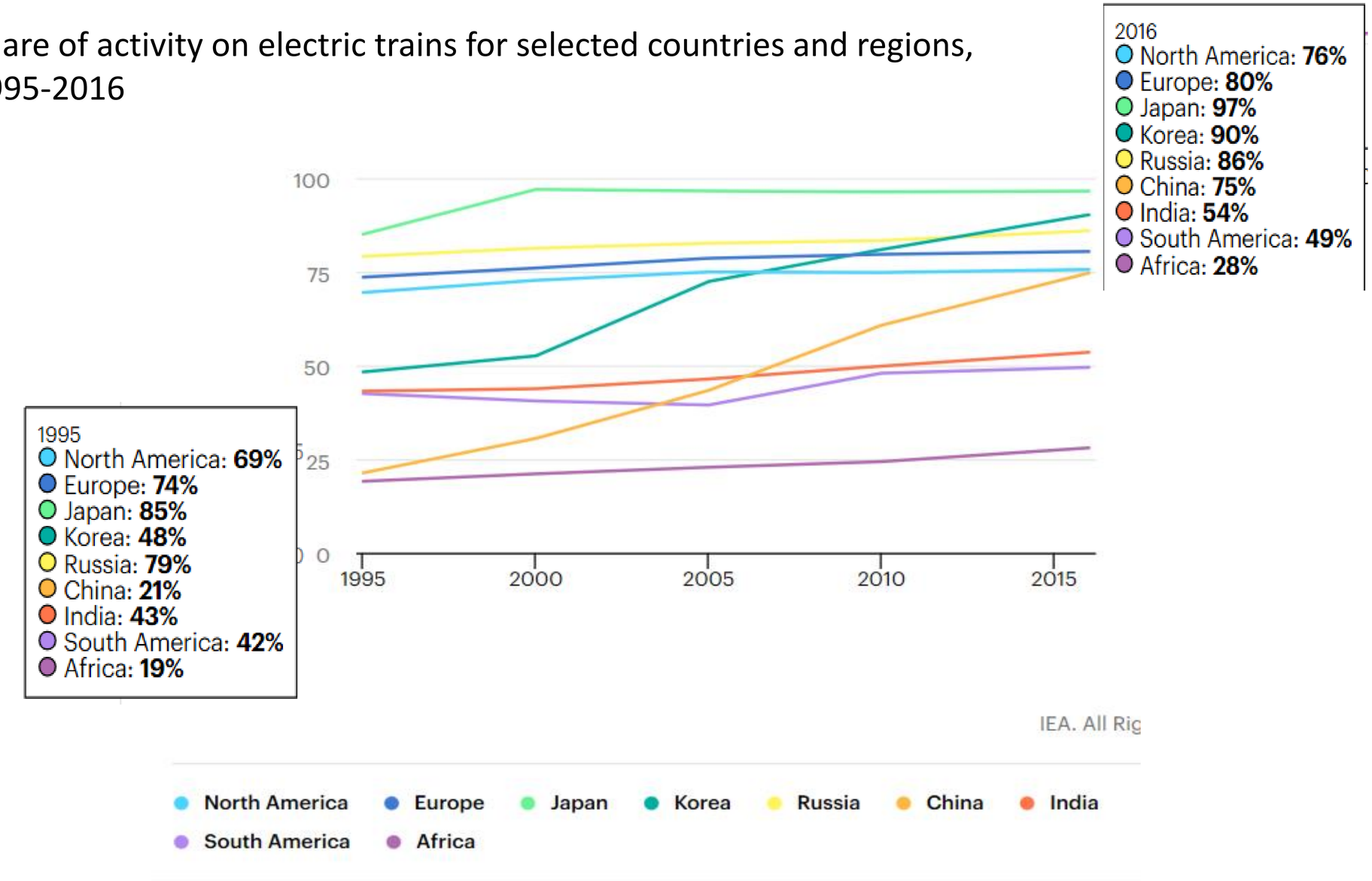
- **In many geographies, 40% of GHG emissions are associated with transportation.**

Sustainability of Railway

	Cost	*Speed*	*Reliability*	*Flexibility*	*Access*	*Congestion*	*Accident*	*Energy intensity*	*Carbon dioxide emission*	*Air pollution*
	Moderate	Moderate	Very good	High	High	High	High	High	High	High
	Low	Moderate	Good	Low	Medium	Minimal	Low	Low	Low	Electric: Lowest Diesel: High
	Low	Slow	Good	Low	Low	Minimal	Low	Low	Low	Low
	High	Very high	Very good	Medium	Low	Minimal	Low	High	High	Low

Railway and electrification

Share of activity on electric trains for selected countries and regions, 1995-2016



Benchmarking: Recent SGR Projects in Africa – Electrification

Railway	Dar es Salaam - Kigali (Tanzania to Rwanda)	Mombasa - Nairobi (Kenya)	Addis Ababa–Djibouti (Ethiopia to Djibouti)	Benin City - Obudu (Nigeria)	Trans-Maghreb (Morocco-Algiers-Tunisia)
Stage	Under construction (part) Feasibility Study (part)	Operational	Operational	Feasibility assessment complete	Under Construction
Track gauge	Standard	Standard	Standard	Standard	Standard
Passenger Design (or maximum operating) speed (km/h)	160	120	120	120	120-160
Freight Design (or maximum operating) speed (km/h)	120	80	80	80	80-120
Permissible (design) axle load (tonnes)	35	25	25	25	22.5
Kinematic envelope to permit double-stacked containers	Yes	Yes	yes	yes	No
Traction	Electric - Overhead 2x25 kV AC Auto-transformer	Diesel-electric with provisions for future electrification.	Electric - Overhead 25 kV AC / 50 Hz	Diesel-electric	Electric 25 kV AC 50 Hz
Signalling	Centralized Traffic Control (CTC) with ETCS/ERTMS based systems	Automatic Block System (ABS)	Semi-automatic and Automatic Block and ETCS Level 2	"Colour Light" Signalling System	CTC with ETCS/ERTMS
Control & Communications	Railway (GSM-R) base stations and Signaling system with continuous Fiber Optic system	Microwave backbone	Fibre optic based; Fixed Line and mobile telephones.	Microwave Backbone System with on-board computer system	GSM-R
Crossing loops length / Design length of trains (m)	2,000	880	880	2,500	880
Couplers	Janney (AAR)	Janney (AAR)	Janney (AAR)	Janney (AAR)	UIC
Freight Train Brakes	Compressed Air	Compressed Air	Compressed Air	Compressed Air	Compressed Air
Design standards	AREMA	National standards for PRC; China Railway Class I	National standards for PRC; China Railway Class II	TBD	Similar to EU/France

Benchmarking: Recent SGR Projects in Africa

Countries	Line	Length (km)	Gauge (mm)	Electrification	Status
Namibia and Botswana	Trans-Kalahari Railway (TKR)	2,000	TBD	TBD	Early Planning
Tanzania	Dar es Salaam-Morogoro	200	1,435 (standard)	25 kV AC	Under Construction
	Morogoro-Dodoma	300			Under Construction
	Makutopora-Isaka	435			Various Stages of Planning
	Isaka-Mwanza	220			
Tanzania and Rwanda	Isaka, Tanzania-Kigali, Rwanda	571			
Kenya	Mombasa-Nairobi	485	1,435 (standard)	None; 25 kV AC planned	Operational
	Nairobi-Naivasha	120			Operational
	Naivasha-Kisumu	370		25 kV AC	Advanced Planning
Uganda	Malaba-Kampala	215		25 kV AC	Early Planning
Ethiopia and Djibouti	Addis Ababa, Ethiopia-Djibouti	759	1,435 (standard)	25 kV AC	Operational
Ethiopia and Sudan	Weldiya, Ethiopia- Port Sudan, Sudan	1,500		TBD	Early Planning
Cameroon	Mbalam-Atlantic Coast	500	1,435 (standard)	None	Early Planning
Cameroon and Chad	Ngaoundere, Cameroon-N'Djamena, Chad	700	TBD	TBD	Early Planning
Nigeria	Lagos-Ibadan	156	1,435 (standard)	None	Under Construction
	Ibadan-Abuja	2,052			Early to Advanced Planning
	Abuja-Kaduna	187			Operational
	Kaduna-Kano	305			Advanced Planning
Cote d'Ivoire- Ghana-Togo- Benin-Nigeria	West Coast High-Speed Rail Project	1,174	1,435 (standard)	TBD	Early Planning
Ethiopia	Awash-Weldiya- Mekelle	608	1,435 (standard)	25 kV AC	Under Construction
Morocco	Tangier - Kenitra HSL	323	1,435 (standard)	25 kV AC	Operational
	Kenitra-Casablanca HSL	150	1,435 (standard)	25 kV AC	Under Construction; to be operational by end of 2020
	Casablanca- Marrakech-Adagir HSL	475	1,435 (standard)	25 kV AC	Early Planning
Morocco- Algeria-Tunis	Trans-Maghreb Line	1,500	1,435 (standard)	Varies	Existing Line Upgrades, New Line between Algeria and Tunisia
Egypt	Alexandria-Aswan	500	1,435 (standard)	TBD	Early Planning

Recent SGR Projects in Africa: level of electrification

Countries that have electrified parts of their rail systems include Algeria, Djibouti, Ethiopia, Morocco, Senegal, South Africa, Tunisia and Zimbabwe. A total of 12,882 km or approximately 15% of the total rail network on the African continent is electrified. The most common electrification systems are 3 kV DC and 25 kV AC.

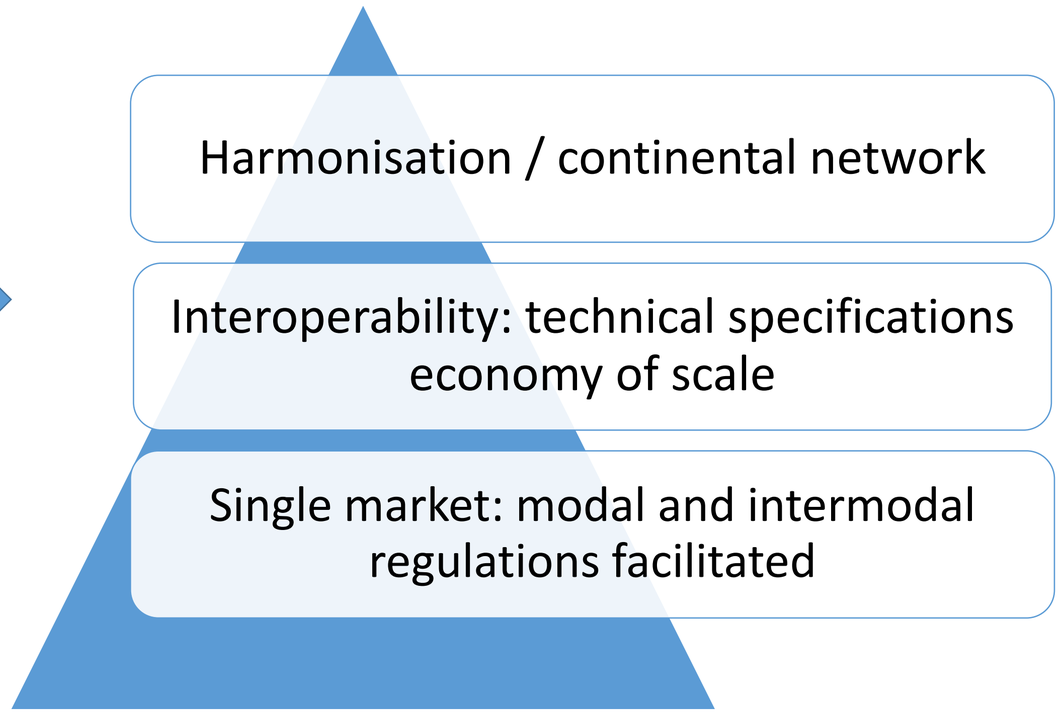
Figure: Length (in km) of Electrified Track in Africa, by Electrification Type
Source: CPCS analysis of multiple data sources

Electrification Voltage and Current			Total Electrified km
50 kV AC	25 kV AC	3 kV DC	
861	4,922	7,099	12,882
7%	38%	55%	100%

Conditions for a better future for railway transports

The future of rail will be determined by how it responds to both rising transport demand and rising pressure from competing transport modes.

- minimising costs per passenger-kilometre or tonne-kilometre moved,
- maximising revenues from rail systems, and
- ensuring that all forms of transport pay not only for the use of the infrastructure they need, but also for the adverse impacts they generate.



Proposed African Railway Network (ARN)

- **44 links proposed links**
  - ✓ East-West Links;
  - ✓ North-South Links;
  - ✓ *North-South Spine*

- **Numbering**
  - ✓ The network numbering system ensures that any additional lines that are added may be incorporated in the line numbering system.

- ✓ Line numbers may range from 1 to 100. Each line may have one or more segments, appended to the line number by a decimal point (e.g. “1.1” means line 1, segment 1)
- ✓ North-south lines: end in odd numbers (e.g. 1, 3, 5, 7, and 9).
- ✓ East-west lines: end in even numbers (e.g. 0, 2, 4, 6, and 8).
- ✓ The continent will be roughly divided into 10 sections, so that the line numbers will increase by 10 as they move 10% across the continent.

Proposed ARN: Other considerations

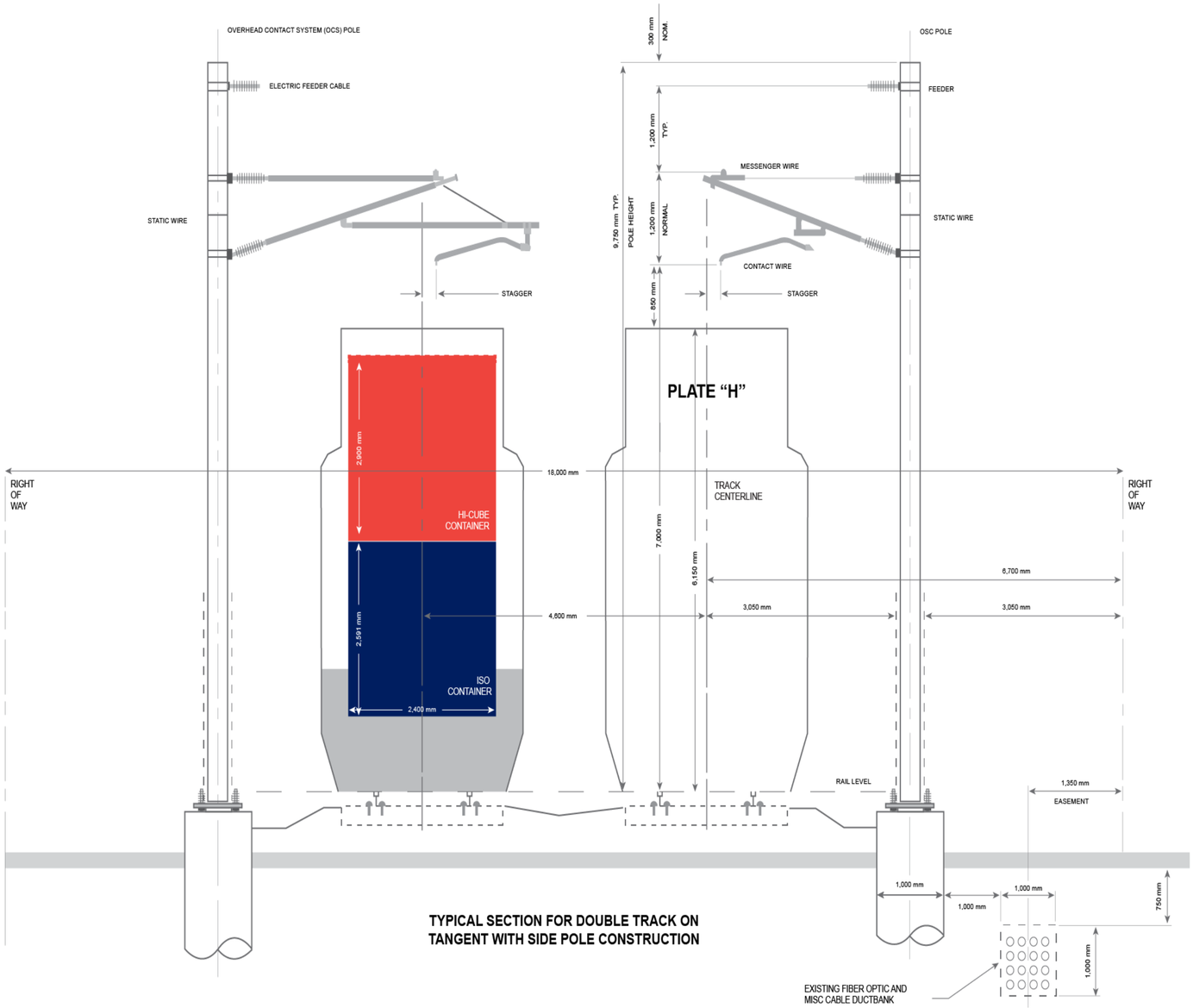
- ARN will be a freight-focused network:
  - Fully interoperable freight backbone network for the continent
  - Does not include any passenger-only lines.
  - Interconnects different regions of the continent and provide seaport access to landlocked countries
  - Subject to common standards to ensure interoperability
  - Scope: lines of continental importance
- Transition/applicability period
  - New Lines: at time of entry into service
  - Existing lines: 30 years
- Exceptions for some lines (southern Africa)
- While ARN standards **DO NOT APPLY** to lines that are not part of the network, use of these standards is encouraged

Proposed Common Technical Standards

Parameter	Recommendation	Exception or further consideration	Importance for Interoperability
Design Standards	AREMA or UIC	With consideration given to China Railway Class I standards	High
Design Speed	Freight: 120 km/h Passenger: 160 km/h	Reduction to 80 km/h and 90 km/h, respectively, is possible provided that a cost-benefit analysis is carried out to justify the reduction in initial investment costs vs. lifetime operating costs	High
Track Gauge	Standard	With the possibility of dual gauge track on some lines	High
Loading Gauge, relevant Structure Gauge	AAR plate H (double-stacked container transport)	The goal is to transport double-stacked containers. This may be lowered to AAR plate F on existing lines where upgrade not possible.	Very High
Axle load	30 tonnes per axle	Could be greater on lines expected to have high levels of bulk traffic. May be lowered to 25 tonnes per axle on existing lines where upgrade is not feasible.	High

Proposed Common Technical Standards (2/2)

Parameter	Recommendation	Exception or further consideration	Importance for Interoperability
Passenger Platform Height	High: 760 mm Low: 550 mm	Existing platforms should be upgraded to 550 mm or 760 mm, depending on the type of rolling stock used.	Medium
Passenger Train Length	600 metres	-	Medium
Freight Train Length	2,000 metres	-	High
Diesel versus Electric Traction	Case-by-case basis	If a decision is made to opt for diesel operation from the outset, certain provisions should be made to implement electrification in the future. Line design should not preclude electrification (e.g., loading gauge)	Medium
Electric Traction Voltage	25 kV 50 Hz AC	In the event there is a decision to opt for electrification	Medium
Signalling & Control System	ETCS with the level determined by the specific operating requirements and environment	-	Medium
Communications System	GSM-R and its subsequent upgrades	-	Medium
Couplers (Freight trains)	Janney (AAR) couplers	-	High
Train Brakes (Freight trains)	Compressed Air	-	High



TYPICAL SECTION FOR DOUBLE TRACK ON TANGENT WITH SIDE POLE CONSTRUCTION

Toward an African railway market

No.	Action
1	Adopt a roadmap for the Market
2	Draft and adopt the African railway network as well as adequate numbering/codes and routes
3	Establish and adopt technical standards of interoperability at a continental level for the continental network
4	Define general governance rules (infrastructure development, operation and maintenance)
5	Launch a collaborative platform on railway for Africa, for experience et best practices sharing – Governance and concession
6	Revive the African Union of Railways (AUR) as implementing Agency to monitor the implementation of adopted standards
7	Establish an independent railway regulator, who will be tasked with setting and enforcing safety, market and interoperability regulations in each state
8	Adopt a market scheme for the entire continent - regulatory frameworks: ▪ Core document with rationale, and terms and conditions ▪ Annexes: consumer protection rules; fare rules; railway rolling stock identification ▪ Regulation on competition, dispute settlement mechanism ▪ Regulation on the governance architecture of the market.
9	Action plan for the implementation of the Single market
10	Adopt railway market structure into national legislation
11	Define specific aspects of industry structure and update rail standards

African Union

Thank you
Merci
شكرا
Obrigado

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05 May 2021

Q&A