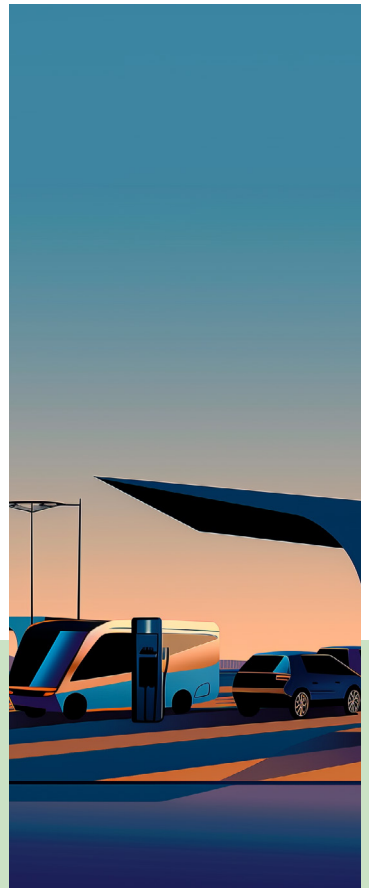
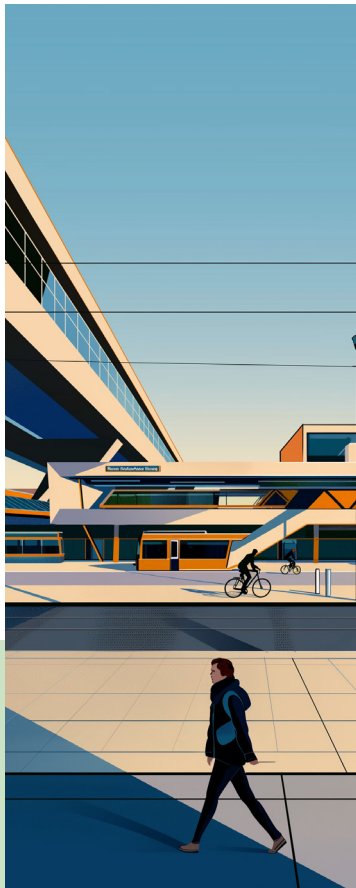




Author:  
**Charles Phillips**

# Transitioning to Sustainable Transport in Saudi Arabia

*How the Kingdom is Shaping the Future of Transport*



## ModeScore / ActiveScore at the Saudi Intermobility Expo 2024

ModeScore is teaming up with the Saudi Intermobility Expo 2024 to boost sustainability initiatives at this year's conference and elevate the conversation on sustainable transport.

ModeScore is advising on ways to integrate sustainable transport solutions for participants.

*ModeScore is the Sustainability Certification Partner at Saudi Intermobility Expo.*



### How do people move between buildings?

This is the focus of ModeScore, a sustainable transport certification that is currently expanding into Saudi Arabia. ModeScore assesses and certifies sustainable transport infrastructure in buildings, real estate developments, mega projects, and cities. It provides detailed guidance and educational insights to help developments integrate sustainable transport solutions.



### How can buildings support active travel?

This is the focus of ActiveScore, the sister certification of ModeScore. It assesses and certifies active travel infrastructure, such as walking and cycling facilities, in buildings, real estate developments, mega projects, and cities. ModeScore extends the scope of ActiveScore by assessing all types of transport used to move between buildings. ModeScore incorporates ActiveScore within its assessment criteria.



11 - 13 November 2024

Jeddah International Exhibition & Convention Center, Jeddah, Saudi Arabia

Get ready for Saudi Arabia's ultimate road, rail, and transport event—The Saudi Intermobility Expo! This powerhouse exhibition spans 8,000 sqm, packed with the latest innovations and groundbreaking solutions transforming the industry. Alongside the expo, the Saudi Road Infrastructure Congress will bring together top ministers and industry leaders to discuss the future of transport, aligned with the ambitious goals of Saudi Vision 2030. Join over 7,000 professionals for an unparalleled networking opportunity to supercharge your business in one of the world's fastest-growing markets!

7000+  
Participants

8000  
Sqm Exhibition  
Space

100+  
Exhibitors and  
Sponsors

50+  
Speakers

50+  
Live Seminars

# Table of contents:

Introduction	7
Map of Sustainable Transport Initiatives in Saudi Arabia	8
Why Do We Need Sustainable Transport?	10
The Emergence of Sustainable Transport in Saudi Arabia	12
The Redevelopment of Saudi Cities	14
The Role of Giga and Mega Projects	16
Case Studies	
Electric Vehicles	18
Riyadh Metro	20
Active Travel	22
Rail Network	24
Future Mobility	26
Net Zero Aviation	28
Saudi Intermobility Expo, Jeddah	30
Footnotes	32

## About the Author:

Charles Phillips is an independent consultant specialising in sustainable development in Saudi Arabia. He is an Advisor to both ModeScore and the UN Global Compact Network in Saudi Arabia. He is also an Associate at Aeon Collective. His work focuses on climate change and sustainability policy, the Kingdom's giga projects, and the country's emerging tourism and heritage sectors. He has travelled and worked extensively across the Middle East and holds an MPhil in Modern Middle Eastern Studies from the University of Oxford.



Follow him on [LinkedIn](#) or visit his website: [www.charlesphillips.co](http://www.charlesphillips.co)

**“We are fully aware of our responsibility in advancing the fight against the climate crisis, and (...) we will work to lead the coming green era.”**

Crown Prince Mohammed bin Salman



A national plan to address climate change and protect the environment, with 80+ initiatives.



A national ambition to reach net zero greenhouse gas emissions by 2060 and achieve 50% renewable electricity by 2030.



A national program to develop a circular carbon economy, focusing on 4 Rs: reduce, reuse, recycle, *remove CO<sub>2</sub>*.

## Introduction —

Saudi Arabia’s transport sector is experiencing a major transformation. The Kingdom is developing an electric vehicle (EV) manufacturing industry and preparing for widespread EV adoption. Flying taxis are being tested at different locations across the country, while bicycle and scooter sharing schemes are being introduced. Riyadh’s metro is set to open in 2024, and construction on a new 920 km railway connecting Riyadh and Jeddah is expected to begin in 2025. In the same year, Saudi Arabia’s new national airline, Riyadh Air, is set to launch.

What ties all of these initiatives together is a commitment to sustainability – economic, social and environmental. Sustainable development is now percolating throughout Saudi Arabia. This is being driven by the Kingdom’s far-reaching national transformation plan, Vision 2030, which seeks to diversify Saudi Arabia’s economy, reduce reliance on oil, enhance people’s quality of life, and safeguard the natural environment.

2023 marked a pivotal year in Saudi Arabia’s drive to adopt more sustainable modes of transport. Several new public bus networks launched within major Saudi cities including some electric buses. A national EV charging infrastructure company, EVIQ, was launched. Saudi Arabia’s first EV manufacturing facility was opened by California-based EV manufacturer Lucid, and the Kingdom’s first public network of electric bicycles and scooters launched in Medina.

New initiatives continue to launch every month. In October 2024, Saudi Arabia conducted a hydrogen-powered train trial and launched a hydrogen taxi pilot scheme. In early 2024, TASARU, a Public Investment Fund (PIF) mobility investment company, invested in three autonomous mobility firms with the aim of bringing this technology to Saudi Arabia.

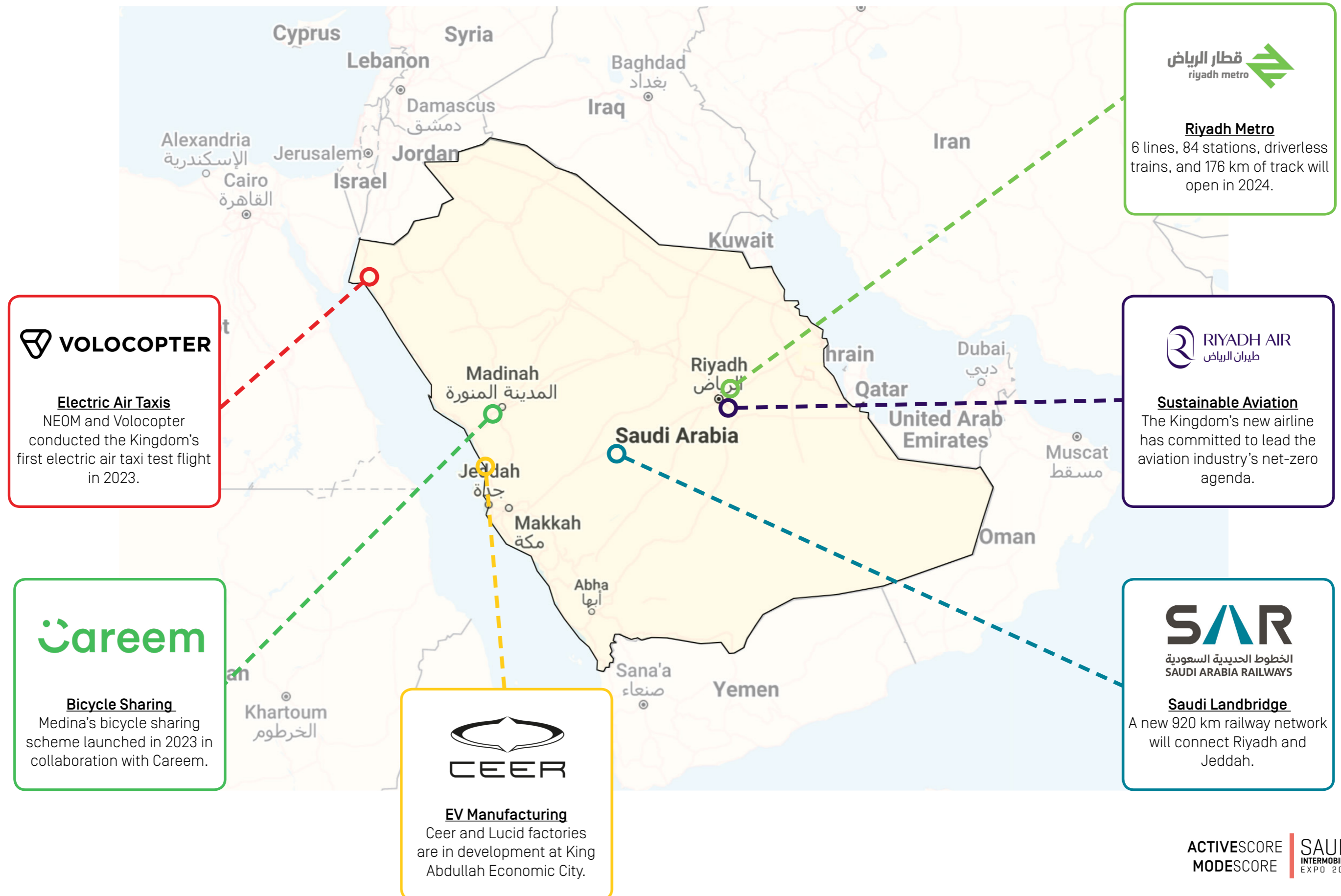
Across the country, the transportation network is receiving extensive upgrades alongside a series of mega and giga projects that are driving the adoption of sustainable transport solutions. At the same time, Saudi Arabia’s cities are being redeveloped to improve quality of life. This is increasing the need for more integrated transport networks and better connected buildings.

A multimodal transport system is gradually beginning to emerge. This promises to reduce Saudi Arabia’s transport emissions and boost the daily wellbeing of people across the country.



# Sustainable Transport Initiatives in Saudi Arabia —

The following are currently underway in Saudi Arabia (among others):



# Why Do We Need Sustainable Transport? —

The shift to sustainable modes of transport is accelerating worldwide. There are multiple benefits to this transition:

### Climate Change:

Transitioning from fossil fuel-powered transport reduces CO2 emissions. These emissions contribute to climate change, leading to rising temperatures and an increased frequency and intensity of extreme weather.

### Energy Consumption:

Switching from personal vehicles to shared mobility options like buses and metros, as well as encouraging walking and cycling, significantly reduces energy usage.

### Air Quality:

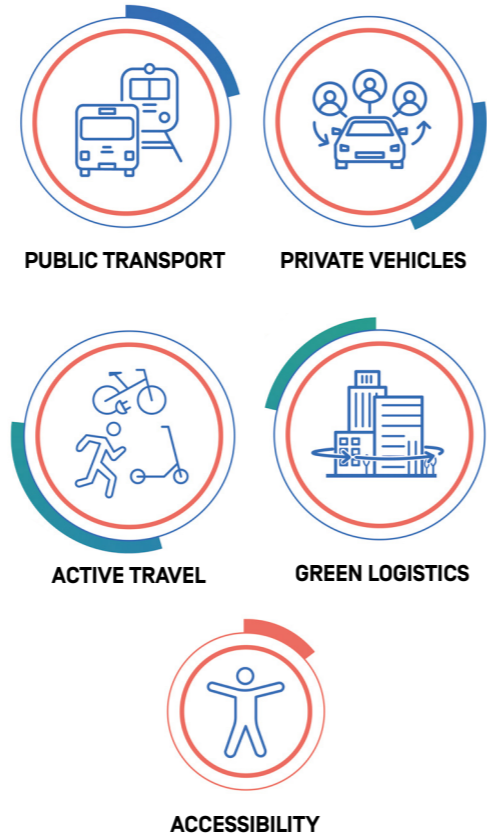
Switching from internal combustion engines (ICE) vehicles to electric vehicles (EVs) or other sustainable options decreases harmful air pollution in urban areas.

### Wellbeing:

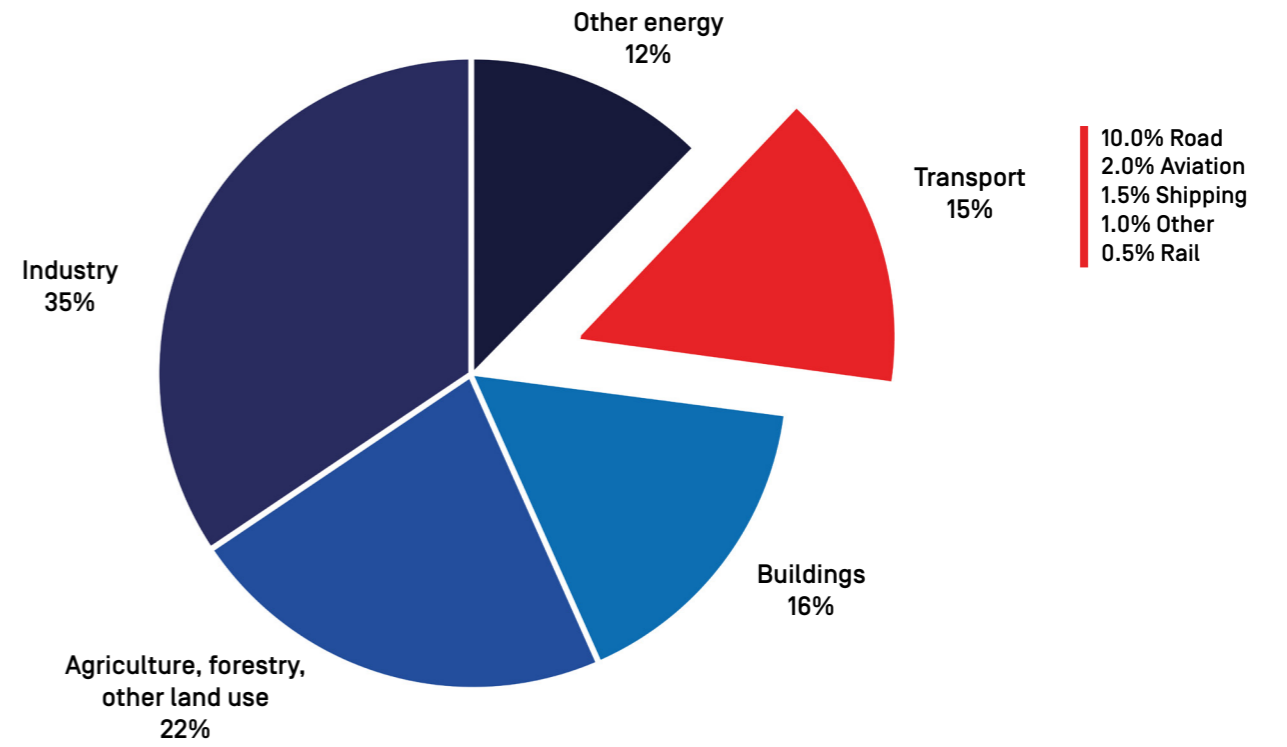
Using public transport reduces traffic-related stress. Incorporating walking and cycling into your routine boosts physical activity. Walking enhances social interactions, making you feel connected to your community, while cycling can be an enjoyable and joyful mode of travel (when safe and well-designed infrastructure is in place).

### Climate Resilient Infrastructure

Saudi Arabia's infrastructure will face greater physical stresses due to rising temperatures and more frequent extreme weather events caused by climate change. Temperatures in the Arabian Peninsula are rising 50% faster than other landmasses in the northern hemisphere.<sup>38</sup> The April 2024 flooding in Dubai showed the impacts that extreme weather can have on a city's ability to function. Saudi Arabia's transport infrastructure will need to consider this new normal and work to future-proof its infrastructure against climate impacts.



Transport is responsible for 15% of global greenhouse gas emissions.



Global Greenhouse Gas Emissions (2019)<sup>1</sup>

### Transport Challenges in Saudi Arabia:

<p><b>25% CO2 Emissions</b> Transport was responsible for 25% of Saudi Arabia's energy-related CO2 emissions in 2021.<sup>2</sup></p>	<p><b>3rd Largest Petrol Consumer</b> Saudi Arabia is the third-largest consumer of petrol per capita.<sup>3</sup></p>	<p><b>Air Quality</b> Air pollution is high in Saudi Arabia. Transport emissions contribute to this. Particulate matter is responsible for 9% of deaths in Saudi Arabia per year.<sup>4</sup></p>
<p><b>95% Car Trips</b> 95% of all trips in Riyadh are made by private cars.<sup>5</sup></p>	<p><b>Traffic Congestion</b> Drivers in Riyadh experienced a 136% increase in travel time during the weekday evening rush hour in 2023.<sup>6</sup></p>	<p><b>Growing Demand</b> Demand for passenger travel is expected to more than double by 2060.<sup>7</sup></p>

#### Sustainable Transport:

Sustainable transport refers to transportation methods that positively impact the environment and society. This includes public transport options like buses, metros, and trains, as well as electric vehicles, bicycles, scooters, and walking.

#### Active Travel:

Active travel refers to modes of travel that involve physical activity such as walking and cycling.





# The Emergence of Sustainable Transport in Saudi Arabia

Saudi Arabia's national transportation network is undergoing extensive upgrades, including the development and enhancement of roads, railways, ports, and public transport networks. Significant efforts are being made to expand sustainable transport options. As part of Vision 2030, the Kingdom is positioning itself as an EV manufacturing hub, investing in all aspects of the EV value chain. Public transport networks are being developed in major cities, while active travel – such as walking and cycling – is being promoted through various initiatives. A new focus on sustainable urban planning is also helping to drive the expansion of sustainable transport. The year 2023 marked a pivotal point in this transition, with the launch of multiple projects. As a result, a multimodal transport system is gradually beginning to emerge.

## Electric Vehicles:



### Charging Infrastructure:

Some charging stations can now be seen in Riyadh, Jeddah and other cities. A new Public Investment Fund (PIF)-backed company, The Electric Vehicle Infrastructure Company (EVIQ), launched in 2023, with a mandate to develop a nationwide network of fast charging hubs.

EVIQ

### Manufacturing:

Saudi Arabia has a target to produce 500,000 EVs per year by 2030, with a cluster of factories being developed in King Abdullah Economic City, near Jeddah. Lucid opened Saudi Arabia's first EV manufacturing facility in 2023. The Kingdom's own EV brand, Ceer Motors, plans to start manufacturing in 2025. Hyundai is also planning a manufacturing plant.

LUCID



### Electric Buses:

Saudi Arabia began deploying electric buses in 2023 starting in Jeddah, Medina, Dammam, and Qatif.

## Sustainable Urban Planning:



### Guidelines:

Updated *Sustainable Planning Guidelines for Urban Growth in Saudi Arabia* were released in 2024. This provides a comprehensive framework to improve the quality of urban life through better planning practices.

### Sustainable Buildings:

Saudi Arabia launched its own sustainable building rating system in 2019 called Mostadam. This includes a focus on transportation methods to and from buildings.



### Medina Humanization Program:

Launched in 2017, this aims to improve the experience of residents and visitors by rehabilitating streets, neighbourhoods, and public places. This includes ensuring safe pedestrian and bicycle paths and improving public transportation services.



## Public Transport:



### Train Network:

Saudi Arabia has 3 main train lines: East Train (Riyadh-Dammam), North Train (Riyadh-Qurayyat), Haramain High Speed Rail (Mecca-Medina). New lines are also planned.



### Intercity Buses:

A large intercity bus network connects the Kingdom's main cities. The network was renewed and relaunched in 2023.



### City Buses:

Several new public bus networks have launched within major Saudi cities since 2023.



### Riyadh Bus:

Riyadh's bus network began operating in March 2023. The network will feature more than 86 bus routes, 2,900 bus stops, and 800 buses.

### Mecca Metro Line:

Saudi Arabia's first metro line launched in 2010. This single line is 18 km-long, with 9 stations, and shuttles pilgrims between holy sites in Mecca.



### Riyadh Metro:

Riyadh's metro is close to completion. Its first phase includes 6 lines, 84 stations, driverless trains, and 176 km of track. A 7th line is also planned.

## Hydrogen Vehicles:



### Hydrogen Taxis:

The Kingdom's first hydrogen powered taxi trial launched in Jeddah in October 2024.



### Hydrogen Train:

Saudi Arabia tested the Middle East's first hydrogen-powered train in October 2024.

## Active Travel:



### Bike Sharing:

Careem launched Saudi Arabia's first public network of electric bicycles and scooters in Medina in 2023.



### E-Scooters:

Electric scooters can now be found in Riyadh and other cities. Brands include TIER, Careem, BSKL, Gazal, HopOn and others.



### Cycle Paths:

New bicycle and pedestrian paths have opened since 2023 including 70 km of bike paths in Medina connecting key transport links and tourist sites, a 4.5 km waterfront track in Jeddah, and a 45 km cycling track in AlUla.

## Ride Sharing:



### Rekab:

Saudi Arabia's first ridesharing company launched in 2021. This on-demand service matches multiple passengers heading in the same direction and books them into a shared vehicle.



### Ride-Hailing:

Uber, Careem, and Bolt operate in Saudi cities.





# The Redevelopment of Saudi Arabia Cities

Vision 2030 aims to create more liveable cities with objectives centred on improving urban landscapes, increasing green coverage, and expanding public transportation infrastructure. This focus on a better built environment means city centres and neighbourhoods are being redeveloped and upgraded. At the same time, a vast building campaign is underway to construct one million new homes by 2030 in order to cater for the country's growing population. A more integrated transport network with diverse modes of travel will be needed to ensure the success of these initiatives.

## Key Stats:

<b>85% Urbanisation Rate</b> 85% of Saudi Arabia's population live in cities. <sup>9</sup>	<b>33.5 Million</b> Population estimate as of 2024. <sup>9</sup>	<b>Landmass</b> 13th largest country in the world.
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## National Targets:



<b>3 Top 100 Liveable Cities</b> 3 Saudi cities ranking among the world's top 100 most liveable cities by 2030. <sup>10</sup>	<b>1 Million New Homes</b> Construct 1 million new housing units between 2018 and 2030. <sup>11</sup>	<b>70% Homeownership</b> Increase homeownership for citizens from 47% in 2016 <sup>12</sup> to 70% by 2030. <sup>13</sup>
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## 15 Minute Cities

Many new developments across the Kingdom are adopting the concept of a 15-minute city. This is an urban planning concept in which most daily necessities and services can be easily reached within a 15 minute journey. This clustering approach allows residents to live, work, and play in the same area. This can help to reduce car trips and traffic congestion.

## Saudi Downtown Company



The Saudi Downtown Company (SDC) is redeveloping city centres in 12 Saudi cities. The company was launched in 2022 by the PIF to serve as a master developer and create vibrant mixed-use downtown projects. SDC has a strong focus on placemaking. The urban centres it is developing will reflect the culture and heritage of each region.



(Credit: Saudi Downtown Company)

## National Housing Company



The National Housing Company (NHC) is developing housing projects across Saudi Arabia. The company was launched by the Ministry of Municipal, Rural Affairs and Housing (MOMRA) in 2016. Large-scale developments include Khuzam Suburb in northern Riyadh which will provide more than 77,000 residential units across 30 sq km.<sup>14</sup>

## NHC in Numbers<sup>15</sup>

<b>381+</b>	<b>Projects Launched</b>
<b>43,832+</b>	<b>Units Delivered</b>
<b>163,995+</b>	<b>Residential Units Under Construction</b>
<b>107,346+</b>	<b>Residential Units Sold</b>

## ROSHN



ROSHN is a real estate developer tasked with developing over 400,000 new homes.<sup>16</sup> Owned by the PIF, it was launched in 2018 and is one of Saudi Arabia's five giga projects. To date, ROSHN has initiated 7 large new residential communities in Riyadh, Jeddah, Makkah, Dhahran, and Al-Hofuf.<sup>17</sup>

## ROSHN Projects initiated<sup>18</sup>

<b>Sedra, Riyadh</b>	<b>30,000</b>	<b>20 km<sup>2</sup></b>
<b>Warefa, Riyadh</b>	<b>2,000</b>	<b>1.4 km<sup>2</sup></b>
<b>Alfulwa, Al-Hofuf</b>	<b>18,000</b>	<b>10.8 km<sup>2</sup></b>
<b>Aldanah, Dammam</b>	<b>2,500</b>	<b>1.7 km<sup>2</sup></b>
<b>Almanar, Makkah</b>	<b>33,000</b>	<b>21 km<sup>2</sup></b>
<b>Alarous, Jeddah</b>	<b>18,000</b>	<b>4 km<sup>2</sup></b>
<b>Marafy, Jeddah</b>	<b>11km long canal</b>	<b>6.6 km<sup>2</sup></b>



# The Role of Giga and Mega Projects —

Saudi Arabia is developing a series of mega projects as part of its drive to diversify the economy. Many of these projects are designing their own multimodal mobility systems and pioneering cutting-edge sustainable transport solutions. There are around 20 projects in total (depending on how you count them). Five of these have been designated as 'giga projects' due to their scale.

The following are examples of sustainable transport initiatives within Riyadh's mega projects and the Kingdom's giga projects:

## Riyadh's Mega Projects:



### King Abdullah Financial District

A mixed-use financial hub.

**Monorail** – 3.6 km-long elevated monorail track with 6 stations.  
**Skywalk Network** – Enclosed walkways connecting KAFD's buildings, measuring over 1.5 km in length.



### Sports Boulevard

A 135 km long linear park with extensive pedestrian and cycle paths.

**Proximity** – 2.2+ million residents can access within 15 minutes by cycling or a 30-minute walk.  
**Cycling Paths** – 220 km+ of cycling paths for both professional and amateur cyclists.



### King Salman Park

A 16 km<sup>2</sup> urban park with expansive green areas and an arts complex.

**The Loop** – A 7.2 km circular promenade surrounding the centre of the park for walking or cycling.  
**Outdoor Spaces** – 11 km<sup>2</sup> of green spaces including 800,000 m<sup>2</sup> of natural valley areas.



### NEW MURABBA

### New Murabba

A new modern downtown centred around a 400-metre high cube-shaped building.

**Mobility Loop** – Pedestrianised loop connecting different sites within the development.  
**15-Minute City** – All major amenities within a 15-minute walk.

## Giga Projects:



### NEOM

A massive new region under development in the northwest corner of Saudi Arabia, pioneering futuristic technologies.

**Zero Cars** – NEOM's 170km-long linear city, The Line, will be car-free with daily necessities within a 15-minute reach.  
**The Spine** – A high-speed rail link will run alongside The Line, with an end-to-end transit of 20 minutes.



### The Red Sea Project

A series of luxury island resorts centred around a coral reef lagoon on Saudi Arabia's Red Sea coast.

**Biofuels & EVs** – RSG's delivery trucks now operate on biofuels and its EV fleet uses 100% solar-sourced electricity.<sup>19</sup>  
**Sustainable Aviation** – RSG's fleet of seaplanes will use Sustainable Aviation Fuel (SAF).<sup>20</sup>



### Diriyah

A historic oasis town, home to an 18th century mud-brick city.

**Walkability** – A 100% walkable city, planned as Riyadh's most walkable city neighbourhood.  
**Parking** – 60,000+ parking spaces. Large underground car parks to support pedestrianised spaces above.



### Qiddiya

An entertainment city, 45 km to the west of Riyadh.

**Q-Express** – High-speed railway connecting Riyadh's airport and Qiddiya using magnetic levitation technology.  
**Zero Cars** – Zero internal car trips, supported by several Park & Ride sites encircling the city.



### ROSHN

A real estate development company tasked with developing over 400,000 new homes.

**Amenities** – ROSHN's neighbourhoods provide residents with convenient access to key services and transportation networks.  
**EVs** – ROSHN is working with EVIQ to accelerate EV adoption across its developments.

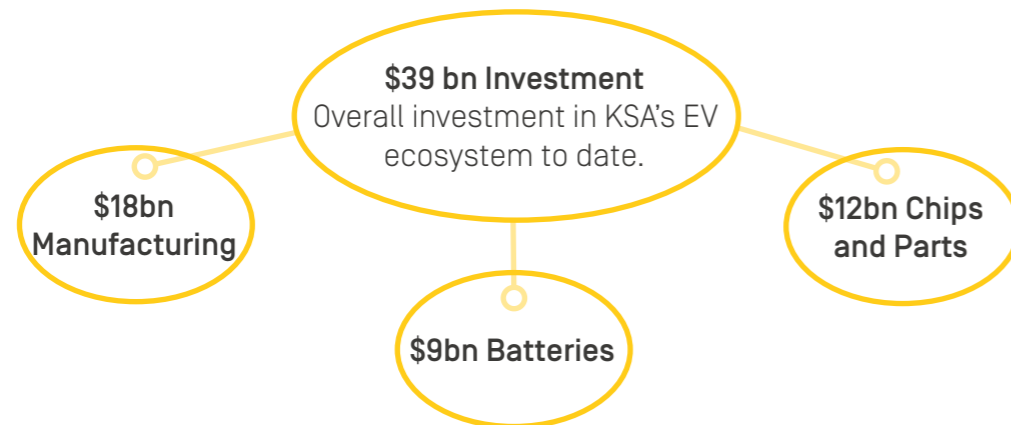
# Electric Vehicles —

Saudi Arabia is beginning to roll out infrastructure to support widespread EV adoption across the country. It is also developing an EV manufacturing industry as part of its economic diversification push. This will make the Kingdom a regional hub for EV production, capitalising on its strategic location between Africa, Europe, and Asia.

## Targets:



## Investments:



## Adoption

**1% Sales** – EVs currently account for around 1% of car sales in Saudi Arabia.<sup>23</sup>  
**40% Considering Purchasing** – PwC surveys indicate more than 40% of consumers in Saudi Arabia are considering purchasing an EV in the next three years.<sup>24</sup>  
**Brands** – A growing number of EV brands are entering the Saudi market. Lucid, Tesla, BYD, Geely, Hyundai, Porsche, Audi, BMW, and many other brands are now available.  
**Electric Buses** – Chinese brand Yutong is now operating in Saudi Arabia.  
**60% Sales by 2035** – PwC forecasts EVs will represent 60% of new light-duty vehicle sales in the Kingdom by 2035.<sup>25</sup>

## Charging Infrastructure



Significant infrastructure needs to be developed to ensure widespread EV adoption and a seamless user experience. The current electricity mix also needs to transition to clean energy sources in order to ensure EVs reduce emissions.

**Fast Chargers** – The Electric Vehicle Infrastructure Company (EVIQ) is developing a nationwide network of 5,000 fast charging stations.  
**Electricity Mix** – 20GW of renewables are expected to be tendered every year between 2024 and 2030, supporting the national target for 50% renewable electricity by 2030.  
**Electricity Grid** – The national grid will need to be upgraded to support growing electricity demand from EV charging.

## EV Manufacturing:

King Abdullah Economic City (KAEC) has been chosen as an EV manufacturing hub for Saudi Arabia. Located around 100km north of Jeddah, it is strategically positioned along the Red Sea coast and includes a port.



(Credit: Lucid Motors)

### Ceer



- Saudi Arabia's first EV brand
- **KAEC Facility:** construction contract awarded March 2024
- **Manufacturing Start Date:** 2025
- **Production Target:** 150,000 EVs per year
- **Company Structure:** joint venture between PIF and Foxconn

### Lucid



- California-based company
- **KAEC Facility:** opened 2023
- **Manufacturing Start Date:** 2023
- **Production Target:** 155,000 EVs per year<sup>21</sup>
- **Company Structure:** majority owned by PIF

### Hyundai



- Korean multinational automotive manufacturer
- **Manufacturing Facility:** agreement signed October 2023 to establish a vehicle manufacturing plant in Saudi Arabia
- **Production Target:** 50,000 vehicles per year
- **Agreement Structure:** joint venture between PIF and Hyundai

### Human Horizons



- Chinese EV manufacturer
- **Agreement:** US\$5.6 billion investment agreement signed in June 2023 with Ministry of Investment to collaborate on the development, manufacture and sale of EVs<sup>22</sup>

## Challenges

### Hot Conditions –

Batteries need to be cooled in hot conditions to maintain performance. In 40°C temperatures, the additional energy used for cooling compared to 20°C can reduce the vehicle's range by around 23%.<sup>26</sup> Efficient battery cooling systems will be needed. Elsewhere in the world, cold conditions are a challenge. Cold conditions have a greater impact on EV performance than hot conditions.

### Supply Chains –

The Kingdom will need to ensure a stable supply of critical minerals for the batteries it manufactures.

Riyadh is aiming to rank among the top 10 largest city economies in the world by 2030. It will need a modern and sophisticated transport system to facilitate this growth. In 2024 Riyadh's metro will launch and it is expected to bring a number of benefits to the city, significantly improving people's ability to move around the city. Riyadh Metro is one of the world's largest metro projects in the world and the largest public transport system in the Middle East. Rather than opening incrementally, the new metro network will open all at once.

## Targets:

### 20% Public Transport Use

Increase the population's use of public transport in Riyadh from 5% to 20% by 2030.

### Increase Population

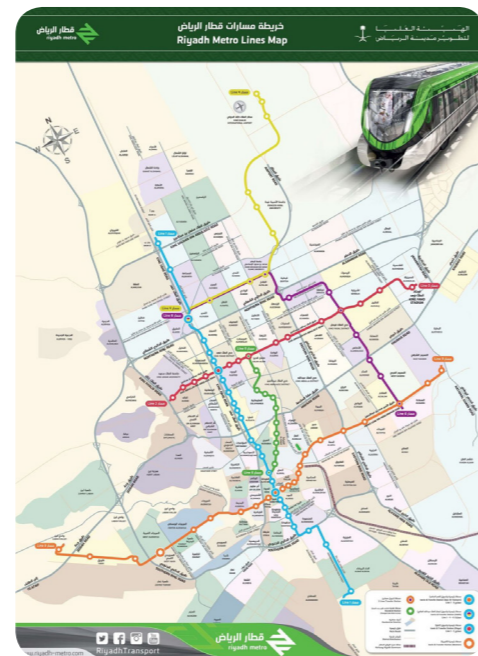
Increase Riyadh's population to 10 million by 2030, up from 7.7 million in 2023.

### Top 10 City Economy

Rank among top 10 largest city economies in the world by 2030.



[Credit: Webuild]



[Credit: Riyadh Metro]

## Utilisation Rate

How can Riyadh's metro be made the transport mode of choice?

**Private Cars** – Given that 95% of all trips in Riyadh are currently made by private vehicle, it is likely private cars will remain the primary mode of choice for the foreseeable future. However, there are significant motivating factors that are likely to encourage people to utilise the metro.

**Traffic Congestion** – Riyadh has significant traffic congestion problems which have worsened over the past five years. Deadlock on roads is common and the daily experience of many commuters is long periods sitting in traffic. Demand for parking at destinations has also increased since women and more young people have started driving. These trends are lowering people's quality of life and daily wellbeing. This is expected to be a strong motivating factor for people to switch modes and use the metro rather than private cars.

**Connecting Destinations** – The opening of Riyadh's new mega projects is likely to increase public transport demand. The mega projects provide points of gravity and places for people to go to. They will all eventually be connected by the metro allowing residents and tourists to seamlessly move between these destinations.



## First and Last Mile

The metro can only succeed if solutions are put in place to get people to and from metro stations with ease. Commuters will need to be well connected from their starting points and to their final destinations. This is referred to as the first and last mile challenge. A range of supplementary transport services will need to be introduced to help achieve this.

**Bus Network** – Riyadh's bus network began operating in March 2023. The network integrates with Riyadh's metro and will feature more than 86 bus routes, 2,900 bus stops, and 800 buses.

**Shuttle Buses** – Small shuttle services such as those now in use at KAFD and operated by ReKab Solutions Company, could be used to move people from metro stations to popular final destinations.

**Micromobility** – Riyadh's city authorities are working on plans to integrate micromobility such as bicycles and scooters on a city-wide scale.

## Transit-Oriented Development



TOD is becoming more important in Riyadh as the metro launches:

**TOD** – Transit-oriented development (TOD) is a type of urban planning that clusters workplaces, housing, commercial services and various amenities around public transport hubs.

**Sustainable** – TOD is a more sustainable form of urban planning. The clustering approach helps to increase access to public transport hubs, reduce dependency on cars, and boost walking and cycling.

**RCRC** – RCRC is integrating TOD in its urban master planning which will help to shape the city, upgrading the areas around the new metro stations.

**Popular Locations** – Riyadh's residents are now more likely to want to live closer to the new metro stations for ease of accessibility to different parts of the city.

## Line 7

**New Line** – The metro is a legacy project that was designed before the launch of Riyadh's new mega projects and does not currently connect all of the mega projects to each other. A 7th line is now being developed to connect these projects.

**Mega Projects** – The new line will link Qiddiya, King Abdullah International Gardens, Misk City, Diriyah, New Murabba, and Riyadh's airport. This new line will connect to existing lines, providing access to King Salman Park, KAFD, and Sports Boulevard.

**2030** – The estimated completion date is 2030.

## Challenges

### Behavioural Change

Riyadh's residents are now used to commuting and moving around in private vehicles. This offers a strong degree of privacy and personal space, which has been especially important in Saudi Arabia's socially conservative society. The metro will involve travelling and commuting in the public realm. A number of behavioural change patterns are likely to be observed, such as more mixing in public, as utilisation rates increase.

### Urban Density

Riyadh's low urban density will remain an enduring challenge to high utilisation rates of public transport. The city is very flat and spread out with a relatively low number of people living in any given sq km area. Typically, a high number of people are needed in a given area in order to justify the development of a public transport station.



# Active Travel

As Saudi Arabia's cities are being retrofitted to improve quality of life, more areas are becoming walkable and cycling paths are beginning to emerge in some districts. These active means of travel are becoming more important as social norms change and as healthy lifestyles become a priority. More public entertainment and leisure spaces are now available, increasing demand for walkability and active ways of moving around in these spaces. In Riyadh, King Salman Park and Sports Boulevard are examples of spaces that will be open to the public and easily accessible for active travel use.

## Targets:

### Regular Exercise

40% of people exercising on a weekly basis by 2030.

### 9% Green Spaces

Increase Riyadh's green coverage from 1.5% to 9% of the city, with 7.5 million trees by 2030.

### Public Services

Improve quality of services provided in Saudi cities.



[Credit: Destination KSA]

## Latent Demand<sup>39</sup>

**Ease of Movement** – There is significant demand for people to be able to move around Saudi cities with greater ease. At present, traffic congestion deters people from travelling. Active modes of travel can enable greater movement where people can more easily travel to reach daily necessities such as a supermarket or participate in leisure experiences.

**Women** – A lot of the housework and caregiving, such as food shopping and taking children to school, is done by women in Saudi Arabia. Active travel that is well integrated with public transport can help improve ease of travel between places for these daily activities.

**Low-Income** – Well developed walking and cycling infrastructure can offer greater mobility opportunities for low-income and marginalised communities who are unable to afford other modes of travel.

## Cycle Tracks

**Jeddah Cornice** – Jeddah has introduced a new 4.5 km-long cycling and walking track along the Corniche, its waterfront promenade.<sup>27</sup>

**AlUla** – AlUla has developed a dedicated 45 km-long cycling track taking riders through diverse landscapes and ancient heritage sites.<sup>28</sup>

## Medina Bike Scheme



**Careem** – Careem, in partnership with Al-Mqr Development Company, launched Saudi Arabia's first public network of electric bicycles and scooters in Medina in 2023.

**Connectivity** – The scheme has created a connected network enabling residents and tourists in Medina to travel around with ease.

**61 Stations** – Phase 1 bike stations link to transport hubs including Medina train station and bus station network. Future network expansion will include 165 stations in several phases.

**Utilisation** – High ridership and utilisation has been recorded across Medina's communities.

**Streets** – At the same time, Medina has embarked on a campaign to transform its roads with dedicated bike paths and trees that line streets offering shade.

## HopOn



**Mobility Options** – HopOn is a Saudi micromobility startup offering a range of micromobility options including e-scooters, bicycles, electric bicycles, electric cargo bikes, electric mopeds, and electric wheelchairs.

**Locations** – HopOn operates at 8 locations around the Kingdom.

**Charging** – HopOn has developed a 100% solar powered station providing wireless charging for its vehicles in NEOM. The station is designed and manufactured in Saudi Arabia.

**Liveability** – HopOn is helping to make Saudi cities more liveable by reducing car usage, traffic, and carbon emissions.

## Green Riyadh



**7.5m Trees** – The Green Riyadh program is planting millions of trees across Riyadh to provide much needed shade, improve urban streetscapes, help cool the city and improve air quality.

**Shade** – The trees being planted will help to create walkable shaded spaces.

**Acacia Trees** – Acacia trees are the most popular trees being planted in Riyadh. They provide a large canopy for shade, are adaptable to climatic conditions and require low maintenance compared to palm trees.

## Challenges

**Retrofitting** – The nature of the urban layout of Saudi cities poses limits on how much urban spaces can be retrofitted to integrate cycling and walking routes. Saudi cities are very spread out and many roads and highways form hard barriers preventing people from being able to cross roads. More flyovers and tunnels may be needed to enable people to cross these hard barriers by foot or bicycle.

**Hot Conditions** – Cold, hot, and rainy weather conditions pose challenges to active travel in many parts of the world, impacting comfort levels when walking or cycling. Extreme heat is a challenge in the summer months in Saudi Arabia. Active travel can however provide an important mobility solution outside of summer months, for 6-8 months of the year, and during evenings.

**Public Acceptance** – Public engagement about the benefits of walking and cycling in addition to public acceptance will be key for increasing more active modes of travel and ensuring behavioural change.

# Rail Network

Work is underway to expand and modernise the Kingdom's railway network in order to connect more destinations and boost the logistics sector. Rail is an important part of the Kingdom's National Transport and Logistics Strategy which aims to position Saudi Arabia as a logistics hub between the three continents of Africa, Asia and Europe.

## Targets:

### Top 10 in Logistics

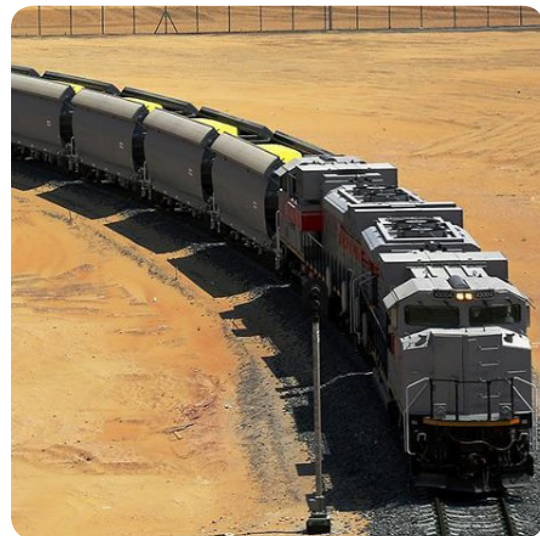
Rank among top 10 countries in the World Bank's Logistics Performance Index by 2030, up from 38th in 2023.

### 8,080 km Track

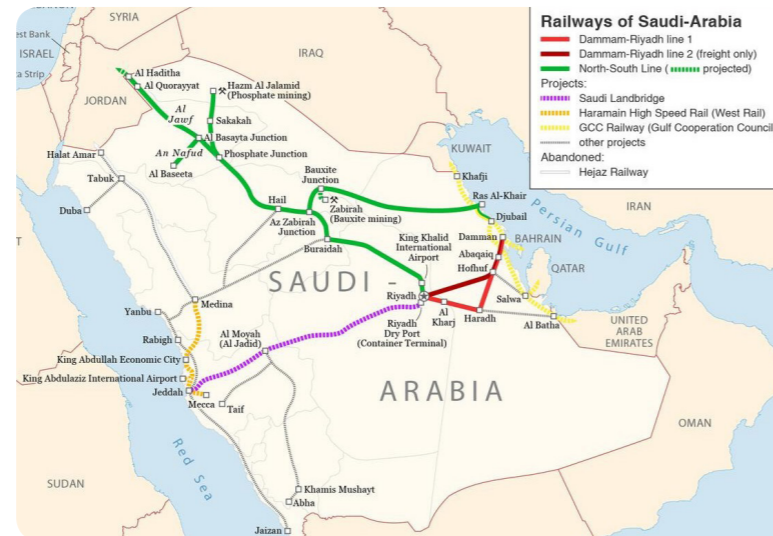
Increase network from 5,330 km track to 8,080 km.

### 10% GDP Logistics

Raise contribution of logistics sector to 10% of GDP by 2030.



[Credit: Systra]



[Credit: MEED]

## Key Stats:

### 5,330 km Existing Track<sup>29</sup>

Serving both passengers and freight.

### 450 km High-Speed

The Haramain High-Speed Railway connects Mecca and Medina via Jeddah.

### \$7bn Landbridge Project

A new rail line connecting the Arabian Gulf with the Red Sea coast.

## Logistics Hub

**Efficiency** – The Kingdom's upgraded and expanded network will help to facilitate faster movement of goods for import and export, offering efficient and reliable land connectivity.

**Sustainability** – It will also offer a more environmentally sustainable alternative to road freight and reduce costs.

**59 Logistics Zones** – 59 logistics zones will be developed by 2030 to strengthen supply chain connectivity and boost cargo capacity.

**SEZs** – The expanded network will help to grow and better utilise the Kingdom's pre-existing special economic zones and industrial cities.<sup>31</sup>

## Land Bridge<sup>30</sup>

**East-West** – The project will run across the centre of Saudi Arabia, connecting seaports on the Red Sea coast with the seaports on the Arabian Gulf.

**1,500 km** – The \$7bn project will consist of 1,500 km of track connecting Yanbu, King Abdullah Economic City, Jeddah, Riyadh, Dammam, and Jubail. This includes 920 km of brand new track between Riyadh and Jeddah.

**50m tons** – It will have a capacity for more than 3 million passengers and 50 million tons of freight annually.

**Route** – In 2023, the Minister of Transport announced that design works had been completed and the detailed route had been determined.

**Developers** – The project is being developed by Saudi Railway Company (SAR) and China Civil Engineering Construction Company.

**2025 Start** – Construction work on the project is expected to start in 2025.



## Modernisation

**North-South Fleet** – In October 2024 SAR announced plans to expand and modernise its North-South passenger rail fleet with 15 new train sets capable of reaching up to 200 km/h.

## Tourism Experiences

**AlUla Tram** – A 22.4 km battery-powered tramway line is being developed to transport tourists between heritage sites in the ancient oasis region of AlUla. Alstom signed a contract to develop the project in January 2024.

**Dream of the Desert** – A luxury train service was announced in 2024 that will take tourists from Riyadh to the town of Qurayyat, near the border with Jordan. It is expected to start operating end of 2025.

# Hydrogen Mobility

Saudi Arabia is making huge investments in its hydrogen industry with ambitions to become the world's leading producer of clean hydrogen. Hydrogen vehicles are advantageous for long range journeys and vehicles that require fast refuelling. They could be especially useful for traversing Saudi Arabia's enormous landmass, the 13th largest country in the world, and for use in key sectors.

### Hydrogen Trains

Saudi Arabia tested the Middle East's first hydrogen-powered train in October 2024.

### \$8.4bn NEOM Plant

Set to produce 600 tonnes green hydrogen per day by end of 2026.<sup>32</sup>

### Hydrogen Taxis

The Kingdom's first hydrogen powered taxi trial launched in Jeddah in October 2024.



# Future Mobility —

What will Saudi Arabia's transport system look like in 10 years, 20 years, and 30 years? A number of new technologies are on the Kingdom's horizon including flying taxis and autonomous vehicles (AVs). The Ministry of Transport and Logistics has announced its readiness to embrace and pilot new transportation methods. There have been several recent test flights of flying taxis and Saudi Arabia is one of the leading countries pioneering this technology.

## Targets:

<p><b>15% Autonomous</b> 15% of public transport vehicles to operate autonomously by 2030.</p>	<p><b>Pioneer</b> The Kingdom is aiming to pilot and utilise the latest transport technologies.</p>
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(Credit: Volocopter)

## Initiatives:

<p><b>Flying Taxis at Expo 2030</b> Electric air taxis are expected to be used at Riyadh Expo 2030.</p>	<p><b>Self-Driving Cars</b> Driverless cars could start to be used in 2025.</p>	<p><b>Investments</b> PIF company TASARU is investing in next-gen AV technology.</p>
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## Electric Jets

**Saudia** – In July 2024 Saudia signed an agreement to purchase 100 electric jets from German startup, Lilium, which can accommodate six passengers and one pilot.

## Flying Taxis



A number of pioneering urban air mobility startups have been collaborating with various institutions in Saudi Arabia to conduct test flights:

- NEOM** – German startup Volocopter conducted the Kingdom's first electric air taxi test flight in NEOM in 2023.
- Expo 2030** – Austrian startup FlyNow Aviation is set to provide thousands of electric air taxis for Riyadh Expo 2030, following an announced in July 2024, and is planning to open an assembly line for local production and export.
- Hajj 2024** – Chinese startup EHang conducted the world's first air taxi flight to be licensed by a civil aviation authority in June 2024 in Mecca, during the Hajj pilgrimage.

## Self-Driving Vehicles

- KAUST** – In 2019 KAUST tested Saudi Arabia's first self-driving shuttles on its university campus.
- AIUla** – In 2022 AIUla launched autonomous shuttles as part of a park-and-ride service for tourists.
- ROSHN** – In 2023 the Ministry of Transport and Logistics launched a self-driving electric shuttle, called Dhahaina, at ROSHN Front in Riyadh with the aim of boosting awareness of AV technology.
- Saudi Road Code** – A new Saudi Road Code was announced in August 2024 which will see the installation of smart communication devices along roadways that interact with AVs. This will come into effect from early 2025.

## TASARU



- Investment** – In 2023 the PIF launched a mobility investment company called TASARU, tasked with building local manufacturing and supply chain capabilities. Future mobility is one of its focus areas.
- Localisation** – TASARU invested in three AV companies in February 2024 with the aim of bringing these technologies to Saudi Arabia:
  - Holon – A German autonomous electric shuttle manufacturer which plans to establish production plants in Saudi Arabia.
  - P3 – A Croatian mobility solutions company intending to introduce its robo-taxi technology to Saudi Arabia.
  - Recogni Inc. – A US artificial intelligence startup that develops next generation chips to support AVs.

<p><i>Advanced air mobility (AAM) Urban air mobility (UAM)</i></p>	<p><i>Electric Vertical Take-Off and Landing (eVTOL) Autonomous Vehicle (AV)</i></p>
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## Challenges

- Startup Failure Rates** – As new technologies like flying taxis are developed, many startups will inevitably fail while only a few will succeed. Perseverance and a trial-and-error approach will be essential in order to identify viable solutions.
- Regulations** – A national regulatory framework needs to be developed to determine how these technologies will be used and operated safely. Airspace regulations, liability, and cybersecurity will all be important to determine.
- Infrastructure** – Specialist digital and physical infrastructure will need to be developed in order to integrate these technologies. This will include digital twins, weather data, air traffic control systems, landing stations, and possibly dedicated lanes for AVs.



# Net Zero Aviation —

The Kingdom is aiming to become a regional and global aviation hub with a series of massive airport expansions in the works. It is also launching a new national airline. This comes at a time when the international aviation industry is pushing to decarbonise by 2050 through the use of sustainable aviation fuel (SAF), hydrogen, and batteries. Saudi Arabia's expanding aviation industry will need to be in line with these decarbonisation targets and be a leading pioneer in clean fuel technologies in order to compete in a crowded industry.

## Targets:



(Credit: Riyadh Air)

## Investment<sup>33</sup>



## Saudi Air Connectivity Program



**New Routes** – Tasked with developing existing and prospective air routes connecting international destinations to KSA.  
**250 Destinations** – Target to connect to more than 250 destinations.  
**Tourism** – The program will help to boost tourism in Saudi Arabia by connecting more people by air.



## Riyadh Air

**2025 Launch** – A new national airline, Riyadh Air, was announced in 2023 and is set to launch in 2025.  
**100 Destinations** – Has a target to reach 100 destinations by 2030.  
**Net Zero** – Riyadh Air has pledged to lead the aviation industry's net-zero agenda and be at the forefront of sustainability.  
**Fuel-Efficiency** – 60 next-generation Airbus A321 aircraft ordered in October 2024, enabling Riyadh Air to operate one of the most modern, fuel-efficient fleets in the world.



## Saudia Airlines

**Net Positive** – In 2022, Saudia operated the world's longest net positive flight by offsetting emissions using the platform CarbonClick.  
**VCM** – The first airline in the MENA region to join the PIF's Voluntary Carbon Market (VCM) initiative which launched in 2022.

## Riyadh's Airport Expansion<sup>34</sup>



**120m Passengers** – Increase passenger numbers from 30m per year to 120m by 2030 and 185m by 2050.  
**3.5m Tons Cargo** – processed per year by 2050.  
**57 sq km** – The masterplan will cover a total area of 57 sq km.  
**Renaming** – Riyadh's airport will be renamed from King Khalid International Airport to King Salman International Airport.

## Decarbonisation Technologies<sup>35</sup>

International demand for aviation is increasing significantly. 4.5 billion air passenger journeys were recorded worldwide in 2019 across 42 million flights. Industry projections indicate passenger numbers could reach 10 billion by 2050.<sup>36</sup> At the same time, new technologies are being developed to decarbonise aviation. Work is underway globally to increase investment in these technologies, boost global production capacity, prepare airlines for adoption, and develop regulations.

**SAF** – Sustainable Aviation Fuel (SAF) refers to biofuels or synthetic hydrocarbons (also known as e-fuels). The latter involves extracting hydrogen molecules from water using renewable electricity and combining this with captured carbon from industrial power stations, or directly from the air. SAF is seen as the most promising fuel by the industry. It can be used in existing engines and is therefore known as a 'drop-in' fuel. The International Air Transport Association (IATA) estimates SAF could account for 65% of the emissions reductions needed by 2050.

**Batteries** – Batteries could be used in smaller aircraft and for short distance flights. However, the current generation of batteries are too heavy for long-haul flights.

**Hydrogen** – Hydrogen powered planes are being considered. However, liquid hydrogen fuel takes up four as much space as traditional jet fuel (kerosene), so planes would need to be redesigned with larger fuel storage systems in addition to installing new airport refuelling infrastructure.

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