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Sustainable mobility

**Inverting the
transport pyramid**



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EXECUTIVE SUMMARY

The countries of the Gulf Cooperation Council (GCC)¹ are building sustainability targets into their national development plans. To succeed, they must focus on transportation and mobility as a core element in these efforts. Most transportation in the region, particularly in cities, is dominated by road infrastructure and privately owned vehicles, leading to considerable CO₂ emissions, congestion, and the consequent economic costs. This prevents countries from achieving their sustainability goals.

To reverse this trend, several GCC cities are investing heavily in building new, and modernizing existing, public transport systems including new metro, tram, and bus networks. Some also have ambitious goals to adopt leading smart mobility technologies within the next decade. However, we believe governments must aspire to more. They need a comprehensive framework that will “invert the transport pyramid,” de-emphasizing privately owned cars and expanding public transport, along with electric- and hybrid-powered cars and trucks, vehicle-sharing programs, and micromobility solutions such as bicycles and scooters.

Such a comprehensive framework has two main effects. It can ensure that people and goods move around in a self-sustaining, intelligent, and carbon-neutral way. We also forecast that it can unlock about US\$400 billion in economic value over the next 20 years.

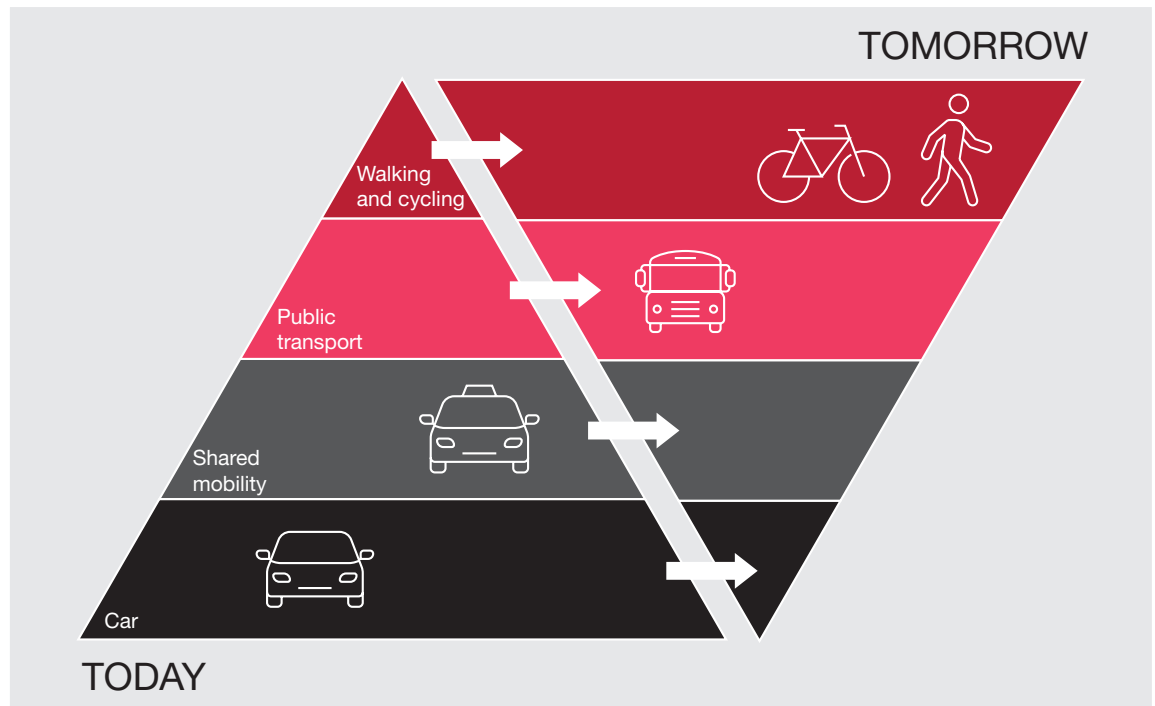
This comprehensive framework rests upon five pillars: public transport, electrification, shared mobility, soft modes of transport, and future communities. Supporting these pillars is a foundation composed of four elements: infrastructure, technology, policies, and funding.

AMBITIOUS GOALS

Governments in the GCC have ambitious goals to reduce greenhouse-gas emissions and improve sustainability overall. However, they have made limited progress in terms of sustainable mobility, particularly in the region's cities. The mobility sector contributes about one-fourth of CO₂ emissions worldwide, placing the sector at the heart of any national sustainability agenda.²

Most municipal designs in the GCC still prioritize privately owned vehicles, with other forms of personal transport less popular and less important from a policy standpoint. To meet ambitious sustainability agendas, governments should aspire to “invert the transport pyramid,” deprioritizing private cars and giving greater emphasis to alternate forms of transportation. These include public transport, vehicle sharing, electric and hybrid powertrains, and less-energy-intensive modes of transport such as bicycles, scooters, and walking (see *Exhibit 1*). Inverting the pyramid in this way requires a comprehensive framework, building next-generation transport systems and integrating technology and sustainable thinking into policymaking, urban planning, and infrastructure development.

EXHIBIT 1 Inverting the transport pyramid in the GCC



Source: Strategy&

ROOT CAUSES OF THE PROBLEM

There are several reasons for the GCC's limited progress in sustainable mobility thus far.

Absence of holistic green and sustainable mobility strategies

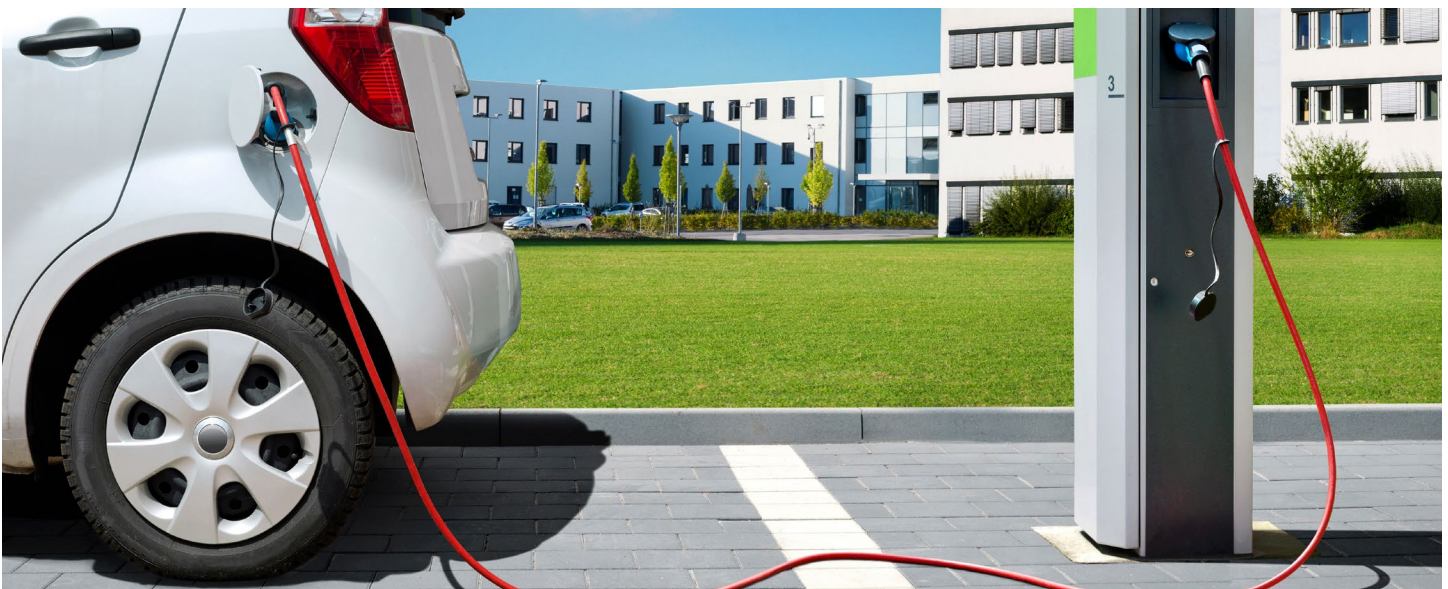
Most GCC cities have not sufficiently considered transportation in terms of sustainability. Instead, the priority has been large capital projects with long implementation time lines, primarily roads and other car-based infrastructure. There has been insufficient emphasis on coordinated initiatives to address issues such as reducing traffic congestion and emissions, or to improve safety in the shorter term. Some GCC cities have made progress in implementing sustainable solutions, although these can be isolated initiatives (see *"Sustainable transportation initiatives in the GCC,"* page 6).

Car-centric policies and infrastructure

Cars continue to be the prevalent mode of transport in GCC cities, with private transport constituting 91 percent of all travel, compared to about 30 percent in comparable cities (see *Exhibit 2*). The cost of owning a car in the GCC is lower than in many parts of the world, with subsidized gasoline and few policies that would increase that cost, such as congestion charges or emission taxes. Structurally, the urban sprawl that characterizes major GCC cities reinforces the reliance on private transport.

Limited incentives and investments in favor of alternate technologies

There are no significant fiscal incentives for people to switch to electric vehicles (EVs), and there is no large-scale development of the related infrastructure for EV charging stations. Although places such as Dubai offer some encouragement in the form of free parking and charging for EVs, this is not material or widespread enough to trigger a significant shift.



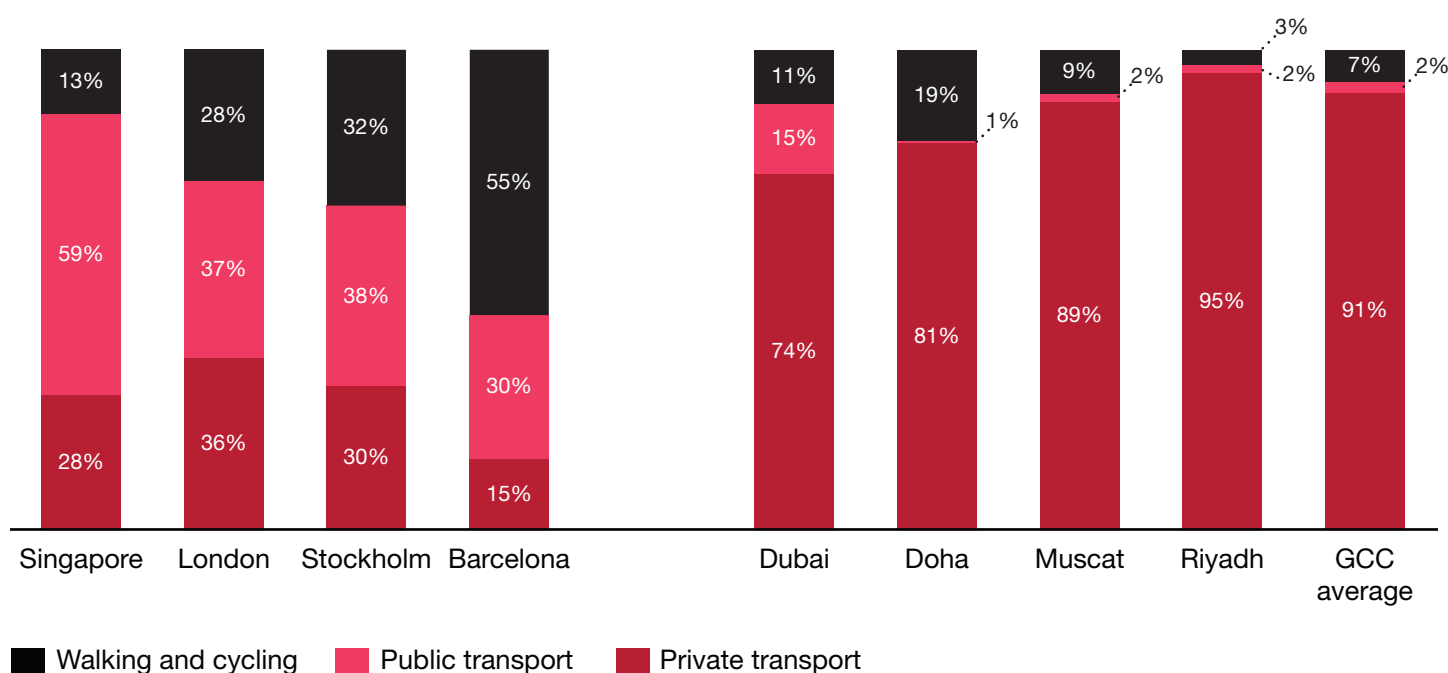
Unexplored micromobility solutions

Micromobility options such as e-scooters are among the fastest-growing transportation modes in the world. They are on track to surpass half-a-billion rides globally by 2021.³ However, GCC countries such as Bahrain, Kuwait, Oman, and Saudi Arabia have not yet adopted them on a large scale, while Qatar and the UAE are ahead in terms of deployment (see “Sustainable transportation initiatives in the GCC,” page 6).

EXHIBIT 2

Cars are the prevalent mode of transport in GCC cities

Share of transport modes in the GCC compared to cities in Asia and Europe



Source: London, Stockholm, and Barcelona (2018): European Metropolitan Transport Authorities, “Barometer 2020,” based on 2018 data, 14th edition, 2018 (<https://tinyurl.com/2fxbx7u5>); Doha, Dubai, Muscat, and Riyadh (2016–2020): Union Internationale des Transports Publics, “Public Transport Trends Report 2019: a global view on a redefined sector,” 2019 (<https://www UITP.org/news/public-transport-trends-report-2019-a-global-view-on-a-redefined-sector/>); GCC average: Strategy& analysis based on Union Internationale des Transports Publics, 2019; Singapore (2015): Singapore’s Land Transport Authority, cited in Union Internationale des Transports Publics, 2019

Sustainable transportation initiatives in the GCC

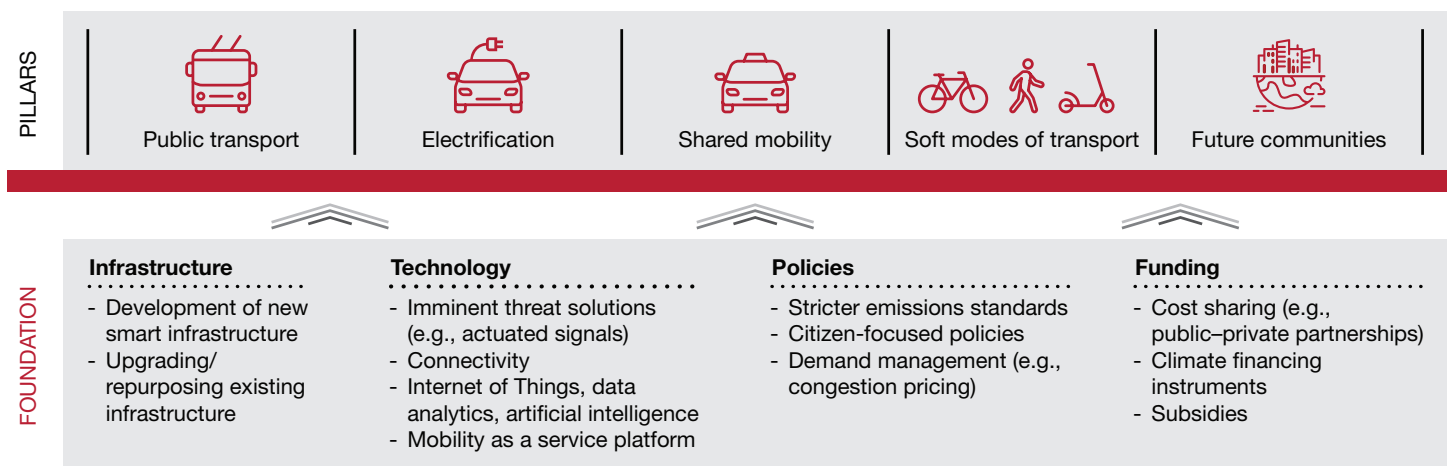
The GCC is not starting completely from scratch in terms of sustainable mobility. Governments have taken some initial steps to invest in new transportation modes and technologies.

- **Electric vehicles.** Electric bus trials have been under way and growing in Abu Dhabi and Sharjah since 2019. Dubai has initiated successful test-runs of dynamic wireless charging of electric vehicles and buses in motion using the Shaped Magnetic Field in Resonance technology in an effort to increase efficiency of the charging of electric vehicles and buses.⁴
- **Shared mobility.** Ride-hailing operator Careem, now owned by Uber, has acquired 33 million registered users, 250,000 active drivers, and logged more than 300 million rides in three years.⁵ In addition, existing taxi services, such as Dubai Taxi, are being integrated into the platform. Moreover, microtransit and on-demand bus and shuttle services like Swvl, as well as self-driving car rental options, such as ekar and Udrive in Dubai, are being introduced through a variety of players. Shared mobility options for goods movement are also growing, with vendors like Trukker providing a large on-demand truck aggregator across the region.
- **Micromobility.** In Dubai, Careem, Tier, Skrrt, Arnab, and Lime offer app-based e-scooters, and Careem also provides docked bicycles. Doha now has four brands that offer e-scooter rentals, and Abu Dhabi has witnessed a recent introduction of scooter-sharing on its streets.
- **Connected traffic systems.** In November 2020, Dubai opened a \$160 million intelligent traffic system center.⁶ Doha and Riyadh are currently implementing similar platforms.⁷
- **Autonomous vehicles.** Dubai aims to convert 25 percent of mobility journeys in the emirate to autonomous transportation by 2030.⁸ Saudi Arabia's landmark NEOM project aims to achieve 100 percent electric and shared mobility, along with regional predominance in terms of autonomous vehicles.⁹ All the major metro projects in the region will be driverless.
- **Mass transit.** There has been a significant investment in bus and metro projects in the major cities in recent years across the GCC. The \$22.5 billion Riyadh metro is set to open its first lines by the end of 2021.¹⁰ The \$36 billion Doha metro, which covers 76 kilometers over three lines, has been fully functional since late 2019.¹¹ Dubai Metro, the region's first metro system, recently opened the first line of its planned expansion for the delayed Expo 2020.¹² Similar large-scale bus and metro projects in Abu Dhabi, Bahrain, Jeddah, Kuwait, and Mecca are in various stages of implementation. All should begin operating within the coming decade.

A FRAMEWORK FOR ACTION

GCC countries need to adopt a comprehensive framework consisting of five pillars on a foundation of four enabling elements to modernize the transportation sector sustainably (see *Exhibit 3*).

EXHIBIT 3
Framework for action on sustainable mobility



Source: Strategy&

Five pillars

The five pillars represent different solutions that affect transportation.

Public transport

A multi-modal, integrated, and robust public transport system is central to sustainable mobility systems. Governments should continue to invest in these systems, with the goal of eventually shifting to a fully electric fleet. Advancing public transport ridership has allowed urban areas across the globe to overcome many less-than-efficient mobility and societal outcomes.

Electrification

Governments should enable and incentivize greater adoption of EVs. In 2020, 3.2 million EVs were sold worldwide, up 43 percent over 2019, during a pandemic and an economic slowdown, when the overall car industry shrank by 14 percent.¹³

Shared mobility

Cities can move commuters more efficiently by reducing the reliance on personal vehicles and using shared mobility solutions to increase riders per vehicle. The market expansion of ride-hailing players has proven that shared mobility as a business model works well within a lightly regulated market, while improving asset utilization.

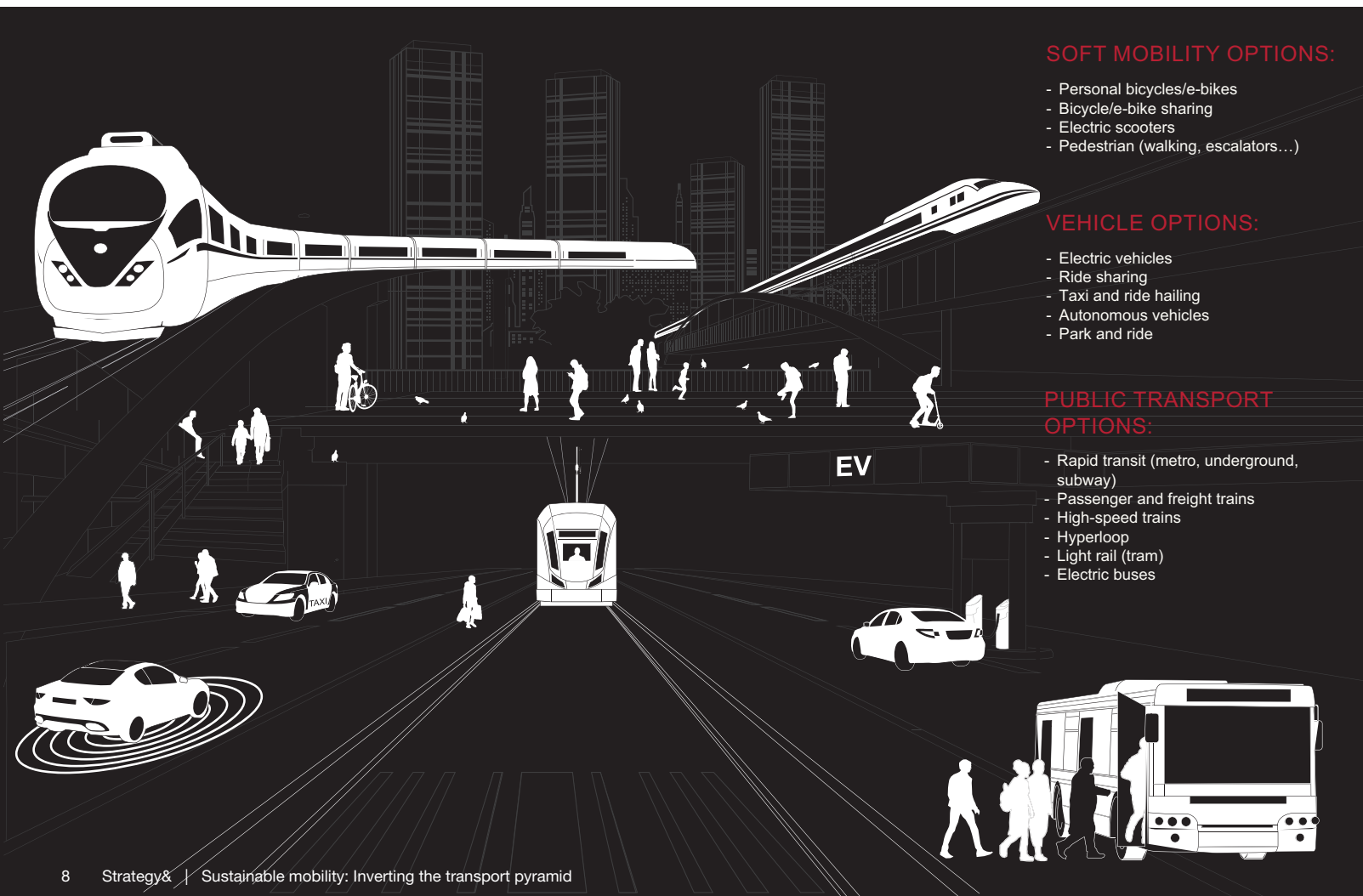
Soft modes of transport

Micromobility solutions can increase the options for urban residents and increase usage of public transport by addressing first-mile and last-mile connection challenges. City governments should continue to deploy such alternatives as bike-sharing and e-scooters in major cities.

Future communities

Governments can reduce the need for transportation through sustainable urban designs that use new living and community concepts to make vital goods and services available within walking distance from residential areas. Roshn and the Line at NEOM in Saudi Arabia are good examples of this approach.¹⁴

Established GCC cities can start by creating “sustainable mobility districts.” These would be new developments with carbon-neutral transportation modes, drones for delivery, work from home options, and variants of e-scooters and e-cycles. Dedicated test areas can also be created within certain parts of the city, such as running an autonomous shuttle on dedicated low-risk lanes connecting multiple tourist spots. This can validate the increased safety, sustainability, and accessibility benefits and train the automated vehicle algorithms on GCC-specific terrain and traffic conditions, paving the way for wider adoption.



Four foundational elements

A foundation of four elements supports the five pillars.

Infrastructure

GCC countries should allocate infrastructure investment to enable sustainable mobility. This entails upgrading current facilities and equipping existing infrastructure to meet the needs of the cities while also adjusting subsequent investments to build the transportation networks of the future.

For example, “road diets” — small-scale, low-cost initiatives to repurpose current road infrastructure — can generate significant impact by prioritizing bicyclists, pedestrians, and public spaces over cars. Barcelona is a pioneer in creating pedestrian-friendly squares that are three city blocks on each side. This only allows vehicle traffic on the periphery. Existing roads in each square are made narrow to allow more room for sidewalks and bike lanes, greenery, and pedestrian plazas. Along with reducing air and noise pollution, and inducing residents to take public transport rather than driving, these designs foster community cohesion and make neighborhoods quieter and safer for children and senior citizens.¹⁵

On the other hand, supporting the mass adoption of EVs will require strategic investments to create a network of charging stations. GCC countries could prioritize building charging stations in parking lots in high-traffic areas. This would entail building large-scale energy storage infrastructure. Similar to the GCC’s traditional energy sources advantage given that the region is home to vast petroleum reserves, the region also has a renewable energy advantage given that it has some of the highest solar exposures in the world.



Technology

GCC countries should replace traditional, static traffic management systems with more dynamic solutions to enable core traffic infrastructure. This would integrate Internet of Things (IoT, the network of connected devices) items such as speed cameras, and advanced algorithms like automatic number plate or incident detection. Traffic signal control systems and variable message signs can respond autonomously, and in real time, to changing security, traffic, weather, and other conditions.

Furthermore, a smart and sustainable mobility ecosystem generates and thrives on the data from its various elements. Robust data collection, combined with advanced analytics powered by artificial intelligence and machine learning, can generate insights into traffic patterns, consumer trends, and emissions performance, which can then be used to develop the industry without extensive infrastructure investments. By adopting open-data principles, in conjunction with a robust privacy framework, GCC governments can help adjacent industries such as energy, insurance, and telecoms adopt new business models, initiating a virtuous cycle of further investments.

Policies

Sustainable mobility policies can vary widely. Some are more punitive, such as environmental fees for older cars, higher parking charges in business districts, and road tolls. Others are designed to incentivize targeted behaviors or transportation modes, such as removing customs and registration fees and providing priority parking and temporary free charging for EV owners.

London's congestion-pricing scheme, which charges drivers to enter the city center, has led to a 30 percent reduction in car traffic and an associated reduction in car sales. Similarly, the city recently introduced emissions charges, which is expected to eliminate about 62,000 older vehicles and lead to a corresponding increase in the adoption of public transport.¹⁶

China adopted a combination of subsidies, priority allocation of license plates, exemption from traffic restrictions, and dedicated parking spaces for EV owners. The country is the world's largest EV market, with 1.2 million vehicles sold in 2019. A credit system linked to fuel efficiency and a minimum threshold of EV production helps incentivize auto manufacturers to increase EV production.¹⁷

In a rapidly developing market, sequencing these enabling policies becomes critical. For example, governments should not enact consumer-facing policies before industry-level initiatives are in place to encourage manufacturers to enter the market and establish supply chains, along with sales and distribution networks.

Funding

GCC countries should seek cost-sharing opportunities between public and private entities. For major road and metro projects, governments could look at public-private partnerships as an alternative to state funding. This would ensure leading global players assist in developing the talent pool in the region and have a financial interest in completing projects on time and operating them efficiently, in exchange for a share of future revenue.

Similarly, successful partnerships between tech companies, ride-sharing providers, and public transport entities can expand mobility alternatives based on mutually beneficial commercial arrangements.

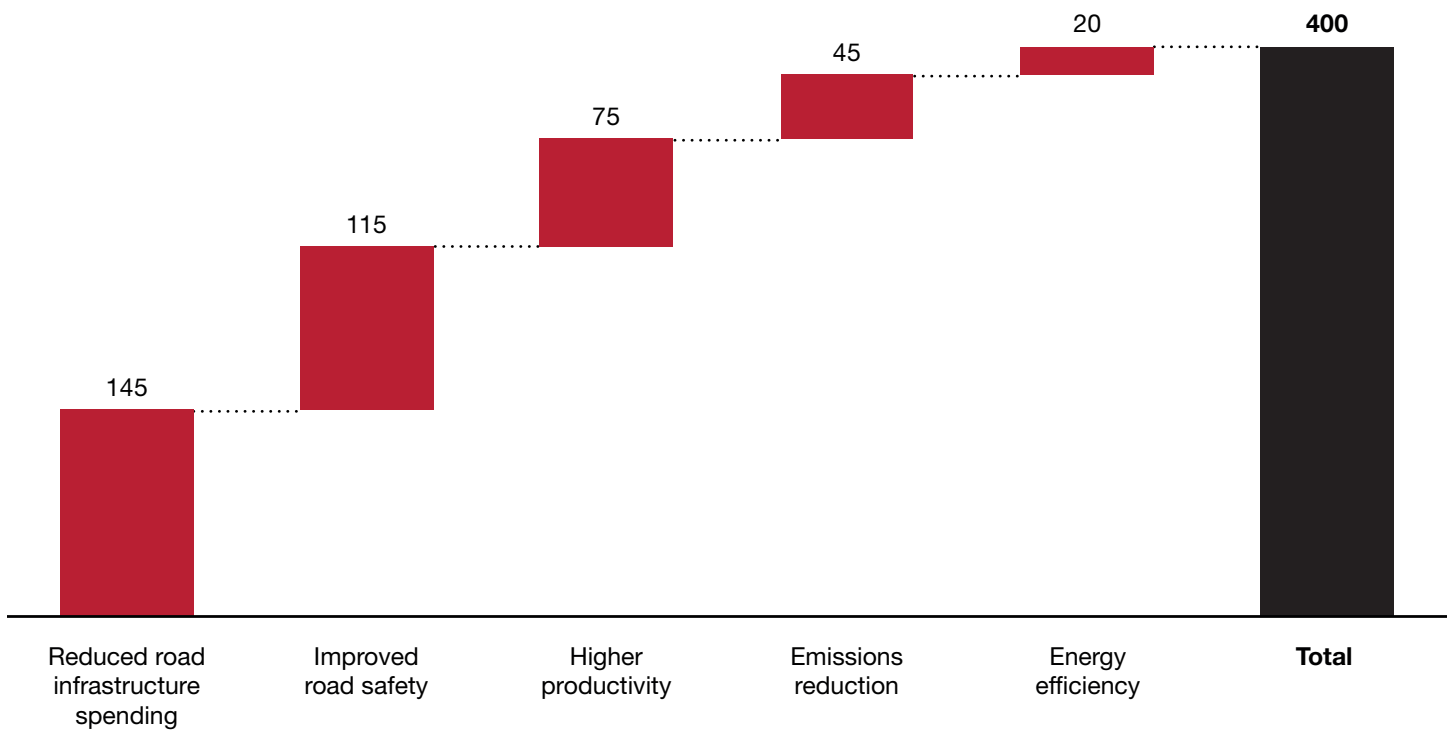
To take advantage of the digital transformation opportunities, governments could put money into promising transportation startups by combining public procurement funds with seed capital in the form of grants and equity. They can exploit the combined scale of GCC markets to introduce private funds from global venture capital firms. This can encourage further the development of sustainable mobility ecosystems in the GCC.

THE \$400 BILLION REWARD

We analyzed the potential value that GCC governments could unlock by implementing this comprehensive framework for sustainable mobility. We estimate the reward to be worth approximately \$400 billion over the next 20 years. The value opportunities lie in five key areas (see *Exhibit 4*).

EXHIBIT 4

Total economic value created through sustainable mobility in the GCC (US\$ billions by 2040)



Source: Strategy&

Reduced road infrastructure spending

Major mass transit projects will transform mobility in the region, shifting a growing number of trips to public transport. As flagship metro projects go live, they will bring greater accessibility to underserved communities of key GCC cities, reducing the reliance on personal cars.

Combined with policies to discourage car ownership, we expect the share of public transport to go from 2.2 percent to 13.6 percent by 2040. We estimate that the shifts in travel needs and modes thanks to sustainable transport will save a cumulative potential investment in new infrastructure of \$145 billion.

Improved road safety

Reduced reliance on driving personal cars and greater adoption of intelligent transport systems, combined with increased sharing and automation in vehicles, could lead to a drop of 13 percent in accidents by 2040. In addition to the human lives saved, this translates into \$115 billion in safety benefits by reducing incidents and their associated costs.

Higher productivity

Currently, drivers in the region spend a considerable amount of time in congestion, especially in major cities like Mecca or Riyadh.¹⁸ Sustainable mobility can turn a portion of hours wasted by commuters in congestion into productive hours, increasing the overall society's productivity. This equates to about 1.2 billion hours freed up, or \$75 billion in improved productivity over the next 20 years.

Emissions reduction

Air pollution from CO₂ emissions leads to multiple respiratory and cardiovascular diseases, adding to a significant healthcare cost in GCC economies. As GCC governments enact fiscal and non-fiscal incentives for consumers and automakers, combined with stricter emissions norms, we expect a sharp increase in the share of EVs starting in 2021, reaching 30 percent by 2040. Sustainable mobility options can cut emissions by an estimated 368 million tons by 2040. The economic value created through emissions reduction adds up to \$45 billion. In addition, sustainable mobility can reduce noise pollution, which directly affects residents' quality of life and causes high stress levels, sleep disturbances, and other health issues. With more bike lanes, pedestrian space, and tree cover, GCC cities can promote cycling, scooters, and walking, thereby encouraging the healthier lifestyle needed to reduce the high prevalence of obesity and other lifestyle diseases.

Energy efficiency

Sustainable mobility can unlock significant savings through the increased use of shared and energy-efficient modes. We estimate that the greater share of mass transit and EVs will unlock \$20 billion in economic value from an energy savings perspective.

CONCLUSION

GCC countries have taken important steps to build sustainability into their national development. They must now apply this approach to the mobility sector. By “inverting the transport pyramid,” governments can improve their sustainability performance, making GCC cities safer, healthier, and more economically relevant for today’s residents and future generations.

ENDNOTES

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