

# Roadmap for Sustainable Transport in the Jordan Tourism Sector

2026-2030



Ministry of Environment



Ministry of Transport



Ministry of Energy  
and Mineral Resources

**JORDAN**  
Ministry of Tourism & Antiquities

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MoEnv. "Roadmap for Sustainable Transport in the Jordan Tourism Sector 2026-2030"  
2025. Amman, The Hashemite Kingdom of Jordan.

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**"The climate of our world, in all its good and bad, is indivisible, and we must unite to address it. In the struggle for life on this Earth, there are no bystanders, and every action has its impact."**

His Majesty King Abdullah II Ibn Al Hussein



**“We must work together to develop policies, programs, and innovative solutions that ensure a green and sustainable future for this generation and for generations to come.”**

His Crown Prince Hussein Ibn Abdullah II

# Minister Preface

It is with great pride that I present the “Roadmap for Sustainable Transport in the Jordan Tourism Sector” on behalf of the government of the Hashemite Kingdom of Jordan. This document is not only a blueprint for reducing GHG emissions from the tourist transport sector but also a tool to enhance the overall tourist experience while fostering sustainable economic growth. The development of this roadmap is in line with the green growth efforts done by the Ministry of Environment across economic sectors, with the aim of contributing to greening the transport sector in tourism.



**Dr. Aiman A. Soleiman**

*Minister of Environment,  
Amman – Jordan*

Jordan stands at a unique crossroads where innovation, tourism, and environmental stewardship intersect. By adopting this roadmap, we aim to demonstrate that environmentally conscious transport solutions can go hand in hand with improved service quality, economic opportunities, and social inclusion. This initiative highlights the importance of collaboration across government institutions, private operators, and international partners to ensure that sustainable mobility is practical, efficient, and accessible to all.

I extend my sincere appreciation to the Global Environment Facility (GEF), the United Nations Industrial Development Organization (UNIDO), and the Global Green Growth Institute (GGGI) for their support through the development of this roadmap. With the strong engagement of national stakeholders, I am confident that Jordan’s transition to low-carbon transport practices in the tourism sector will accelerate, setting an example for the region and ensuring that our world-renowned sites are enjoyed sustainably by generations to come.

# Secretary General Foreword

The “Roadmap for Sustainable Transport in the Jordan Tourism Sector” represents a major milestone in aligning national strategic priorities with global climate and sustainability goals. It translates Jordan’s commitments under the Economic Modernization Vision, the Nationally Determined Contribution, and the Green Growth National Action Plan for the Transport sector into a practical framework for the tourist transport sub-sector.



**Dr. Omar Arabiyat**  
*Secretary General  
Ministry of Environment,  
Amman – Jordan*

Tourism is one of Jordan’s most dynamic economic engines, and its integration with clean mobility solutions will strengthen our competitiveness, protect our natural and cultural heritage, and enhance the experience of every visitor. This roadmap defines a high-level strategic objective of reducing GHG emissions as well as a set of clear actions to ensure that low-carbon transition will generate tangible economic, social, and environmental benefits.

I am confident that this roadmap will drive progress toward a greener, climate-resilient, and inclusive economy. I look forward to seeing sustainable transport solutions connecting visitors to Jordan’s world-renowned landmarks, from Petra and Wadi Rum to Jerash and beyond.

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# Executive Summary

Reducing emissions in the transport sector is a major objective under Jordan's Nationally Determined Contribution to the Paris Agreement. Sustainable transport systems also generate positive environmental, social, and economic impacts, while enhancing inclusiveness and resilience to changes and challenges. Due to its significance to the national economic development, the tourism sector can take the lead in the decarbonization of its transport related activities. This roadmap is a joint public and private initiative to structure and coordinate the transition of tourist transport to sustainability, drawing upon existing national strategies and adding value through its focus at the nexus of these two sectors.

An innovative 'results-based' approach is taken through the design of this roadmap, which is a proven method that prioritizes efficiency and effective achievements of objectives, featuring the principles of national ownership, mutual accountability and stakeholder engagement. Following a comprehensive assessment of existing practices in tourist transport, data collection, as well as thorough consultation of stakeholders, a high-level strategic objective for the roadmap is set as the reduction of greenhouse gas emissions from tourist buses. Baseline emissions are estimated then a conditional 31% emission reduction by 2030 target is selected, which is strictly in line with Jordan mitigation commitment in its NDC. In addition, the same quantitative target is applied to associated local pollutants such as PM2.5 and NOx emissions.

Then, in Chapter 5, four instruments are brought forward to achieve the high-level objective, namely technology and infrastructure, regulatory and policy framework, access to finance, and knowledge sharing. After that, a series of actions are introduced under each instrument, and rationale is provided. Finally, the last chapter provides the implementation plan of the roadmap in a table format for easy access to key information. The tables include the indicator for every action, unit of measure, a selected quantitative target for every year throughout the duration of the roadmap, reporting frequency, responsible party, and data source.

The critical quantitative targets to achieve the roadmap objective are the unconditional reduction of 1,550 tons of CO<sub>2</sub> equivalent and the conditional reduction of 9,591 tons of CO<sub>2</sub>e from tourist transport by 2030 compared to business-as-usual scenario. Although this is not a very ambitious value when compared to the total emissions from the transport sector in Jordan, this will require coordinated efforts from private sector operators, policy makers, development partners and international finance. All stakeholders are therefore encouraged to join forces under the umbrella of the established Jordan High-level Forum on E-mobility (HFE) co-chaired by the Ministry of Environment, Ministry of Transport and Ministry of Energy & Mineral Resources to accelerate e-mobility transition at national level.

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# Acronyms

<b>GDP</b>	Gross Domestic Product	<b>HTU</b>	AlHussein Technical University
<b>GHG</b>	Greenhouse Gas	<b>PSUT</b>	Princess Sumaya University for Technology
<b>EMV</b>	Economic Modernization Vision	<b>GGGI</b>	Global Green Growth Institute
<b>NDC</b>	Nationally Determined Contribution	<b>UNIDO</b>	United Nations Industrial Development Organization
<b>SDGs</b>	Sustainable Development Goals	<b>USAID</b>	United States Agency for International Development
<b>RBM</b>	Results-Based Management	<b>FES</b>	Friedrich-Ebert-Stiftung
<b>UNDG</b>	United Nations Development Group	<b>KOICA</b>	Korea International Cooperation Agency
<b>HFE</b>	High-Level Forum on E-mobility	<b>GIZ</b>	Gesellschaft für Internationale Zusammenarbeit
<b>PPD</b>	Public-Private Dialogue	<b>GCF</b>	Green Climate Fund
<b>EVs</b>	Electric Vehicles	<b>IFC</b>	International Finance Corporation
<b>MoTA</b>	Ministry of Tourism and Antiquities	<b>JREEEF</b>	Jordan Renewable Energy and Energy Efficiency Fund
<b>MoT</b>	Ministry of Transport	<b>BAU</b>	Business as Usual
<b>MRV</b>	Monitoring, Reporting, and Verification	<b>TTW</b>	Tank-to-Wheel
<b>MoEnv</b>	Ministry of Environment	<b>WTT</b>	Well-to-Tank
<b>MEMR</b>	Ministry of Energy and Mineral Resources	<b>WTW</b>	Well-to-Wheel
<b>PDTA</b>	Petra Development and Tourism Region Authority	<b>NCV</b>	Net Calorific Value
<b>ASEZA</b>	Aqaba Special Economic Zone Authority	<b>NEPCO</b>	National Electric Power Company
<b>JU</b>	University of Jordan	<b>MODEE</b>	Ministry of Digital Economy and Entrepreneurship's
<b>JUST</b>	Jordan University of Science and Technology	<b>TCO</b>	Total Cost of Ownership
<b>GJU</b>	German Jordanian University:	<b>GEF</b>	Global Environment Facility
<b>EMRC</b>	Electricity and Minerals Regulatory Commission		
<b>JSMO</b>	Jordan Standards and Metrology Organization		
<b>MoPIC</b>	Ministry of Planning and International Cooperation		
<b>MOF</b>	Ministry of Finance		
<b>LTRC</b>	Land Transport Regulatory Commission		

01

# Introduction



## 1.1 Sustainable Transport for Tourism Development

Tourism is a key pillar of the Jordan economy, contributing significantly to employment, foreign exchange earnings, and GDP growth. Over the past decade, the sector has experienced significant growth, driven by the country's rich cultural heritage, unique landscapes, and strategic marketing efforts. Renowned for sites like Petra, Wadi Rum, Dead Sea, and Jerash, Jordan has established itself as a major destination for international and regional travelers. However, this growth has also placed increased pressure on the natural and the built environment. Tourist transport activities in Jordan are a significant source of GHG emissions, air pollution and noise. Moreover, reliance on imported fossil fuels to power the sector increases energy insecurity with negative impact on natural resources. In this context, the adoption of sustainable tourist transport practices is critical. Sustainable transport refers to systems that meet present mobility needs without compromising the ability of future generations to meet their own. It emphasizes energy-efficient, low-carbon, and inclusive transport solutions that reduce environmental impacts while enhancing accessibility and quality of life. The principles of sustainable transport include the following key elements in Figure 1:

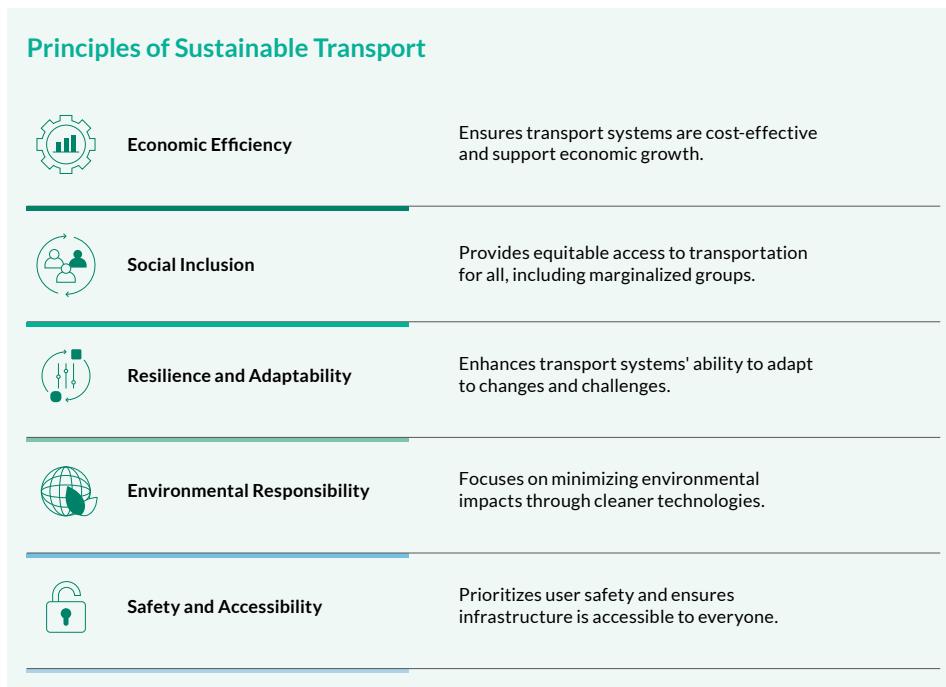


Figure 1: Principles of Sustainable Transport

The importance of promoting sustainable transport in the tourism sector was identified in the Ministry of Tourism and Antiquities' "Jordan National Tourism Strategy 2021-2025". Efficient and sustainable transport systems not only contribute to environmental sustainability but also enhance the accessibility and attractiveness of tourist destinations

including the growing demand for more eco-friendly travel options. Clean transport modes can also accelerate sectoral economic growth as well as social development through responding to the mobility needs for women and youth, thereby providing new economic opportunities.

## 1.2 Rationale for the Roadmap

Several national strategies were developed to improve the sustainability of the transport sector and support the green growth of the economy:

- The 2022 Jordanian Economic Modernization Vision (EMV) which is based on achieving sustainability in the economic growth and quality of life. The sustainability of the transport sector was identified as a key driver in the different activities and plans.
- The 2024-2028 National Transportation Sector Strategy which promotes the shift towards sustainable mobility in Jordan for the different key economic sectors. This mainly includes supporting national e-mobility adoption and improving the public transit share and services.
- The Transport Sector Green Growth National Action Plan 2021-2025 outlines the sector's green growth framework and actions to enhance its resilience through environmental sustainability and social inclusion.
- The Green Growth National Action Plan 2021-2025 for the Tourism Sector features five primary national objectives, namely sustainable economic growth, social development and poverty reduction, climate change adaptation and mitigation, resource efficiency, and enhanced natural capital.
- The 2021 updated submission of Jordan's Nationally Determined Contribution (NDC) which identifies the transport sector as the largest energy consumer and a primary service and infrastructure provider needed for the development of other economic sectors.

The roadmap builds upon these strategies to align Jordan's tourism sector with global trends toward sustainable mobility, to meet the country's commitments to international climate agreements, and to provide a clear pathway for the transition of the tourism sector to sustainable mobility practices. The purpose is to set realistic objectives, associated quantitative targets, then define priority actions and engage stakeholders to reduce the environmental footprint of tourism-related activities, while protecting Jordan's natural and cultural heritage from pollution and degradation. Simultaneously, Jordan's global appeal as a sustainable tourism destination will be economically boosted, the transformative

potential of public-private collaboration and innovation in driving sustainable development will be enhanced, while operating costs of tourist transport operators will be lowered by transitioning to new energy vehicles powered with renewable energy sources. Additionally, visitors' experience will be improved through modern, reliable, qualitative and environmentally friendly transportation options. Socially, sustainable tourist transport transition provides community benefits by creating job opportunities and supporting workforce re-skilling. Furthermore, the roadmap helps foster local community engagement in sustainable transport initiatives, promoting social inclusivity and contributing to the overall sustainability of the transport sector.

This roadmap is in line with the United Nations' Sustainable Development Goals (SDGs) including 'affordable and clean energy' (SDG 7), 'industry, innovation, and infrastructure' (SDG 9), and 'climate action' (SDG 13).

02

# Methodology



The methodology for developing the roadmap for sustainable transport in the Jordan's tourism sector follows a results-based and participatory approach. It is designed to identify and address the most critical sustainability issue in the sector within a 5-year timeframe. The process starts with a baseline assessment including an overview of tourist trends, destinations and stakeholders in Jordan, together with the contribution of the sector to the national economy. Mobility modes, types of vehicles and tourist transport-related challenges are also presented. Next, a unique high-level strategic objective is set, as well as an associated quantitative target. The benefits of this approach are to strengthen the engagement of stakeholders, which will have a clear understanding of the expected outcome, to facilitate periodic monitoring and reporting and to focus on addressing the primary challenge identified. After that, the different instruments that can comprehensively be leveraged to reach the objective are introduced. Then, under each instrument, a series of actions are selected. The final part focuses on implementation timeline, responsibilities, performance indicators to monitor and report progress as well as inform strategic adjustments.

## 2.1 Results-Based Approach

This roadmap follows a results-based approach drawing upon the principles of Results-Based Management (RBM). RBM is a management strategy that prioritizes efficiency and effective achievement of results, featuring the principles of national ownership, 2) mutual accountability and stakeholder engagement, which were identified by the United Nations Development Group (UNDG).

National ownership ensures that the roadmap is aligned with national policies and development strategies as well as the sustainable development goals. Mutual accountability can be interpreted as the respective accountability of parties working together toward shared outcomes. Appropriate mechanisms are therefore put in place in the roadmap to enable the tracking of progress and the evaluation of the extent to which objectives have been achieved. Finally, engaging diverse stakeholders allows national ownership to go beyond a few selected persons. Hence, it is essential to map out and consult the relevant stakeholders such as government institutions at national, sub-national and local levels, as well as civil society organizations and communities themselves at all levels during the entire duration of the roadmap.

RBM focuses on strategic, results-oriented design and planning as well as the use of performance information to improve decision-making. Practically speaking, that means defining realistic expected results at the design stage, ensuring that there are appropriate metrics and systems in place to assess performance, monitoring progress, evaluating achievement of higher-order results and integrating lessons learnt into management decisions and programme planning.

## 2.2 Data Collection and Consultation Process

The process involves identifying, mapping and consulting key stakeholders in the tourism and transport sectors. These stakeholders include government bodies, private sector operators, tourism businesses, civil society and non-governmental organizations (See next chapter for the detailed list). By mapping stakeholders, the methodology helps identify opportunities for collaboration and resource-sharing, addressing challenges and fostering the successful implementation of sustainable transport solutions. Ongoing engagement with stakeholders will ensure that the roadmap remains flexible and adaptable to evolving needs and challenges.

The consultation process was undertaken through formal institutional arrangements designed to ensure that all relevant stakeholders were effectively engaged. The platforms for interaction included the organization of a High-Level Forum on E-mobility (HFE) and Public-Private Dialogue (PPD) on a yearly basis, which played a central role in shaping the roadmap's direction.

The High-Level Forums (HFE) brought together senior decision-makers from the public and private sectors to discuss the strategic direction of the roadmap. The forums fostered collaboration between high-level government officials, private sector leaders, and international experts. The primary objective was to discuss how to align national policies with broader sustainability goals, such as reducing GHG emissions in the tourism transport sector. Key decisions were validated about the overarching project framework, funding mechanisms, and regulatory gaps.

A series of Public-Private Dialogues (PPDs) were also conducted to ensure that all stakeholders, particularly those from the private sector in the tourism sector, had an active role in shaping the priorities of the roadmap. These dialogues provided opportunities for open discussions on the challenges faced by businesses in adopting sustainable tourism mobility solutions. They were particularly valuable for addressing issues related to the integration of electric vehicles (EVs), charging infrastructure, regulatory hurdles, financing and return on investments. PPDs generated valuable exchanges between stakeholders, where private sector representatives could voice concerns about financial viability and operational challenges, while government representatives could provide insights into the regulatory framework and policy support mechanisms. These dialogues identified areas where collaboration could yield mutual benefits, for example by means of public-private partnerships for infrastructure development.

The outcomes from these institutional discussions, HFEs and PPDs, helped shape the final action plan for the roadmap. Key areas of focus included the need for financial incentives for private investors, enhancing regulatory framework to support the transition to electric vehicles, and ensuring that local communities are not only consulted but actively involved in the decision-making process. The feedback collected from these forums and dialogues was essential in selecting policy priorities to ensure their practicality and inclusiveness.

The institutional arrangements set up for this consultation process will continue to be an integral part of the roadmap. Continued stakeholder participation in the HFE and PPDs will ensure that the roadmap remains aligned with expectations throughout its implementation.

The data collection process adopted a mixed-method approach, combining both quantitative and qualitative methods to ensure a comprehensive understanding of the tourism and transport sectors. This approach integrates emission calculations, fleet data analysis, statistical trends, and insights from stakeholder consultations and workshops. By combining these approaches, the roadmap provides evidence-based findings while reflecting stakeholder viewpoints and the specific context of the sector.

Quantitative data were sourced from official institutions, including the Ministry of Tourism and Antiquities (MoTA), the Ministry of Transport (MoT), and tourism operators. This data included tourist arrivals, information needed to calculate transport emissions, and economic contributions from tourism and transport to Jordan's GDP. On the qualitative side, data was gathered through interviews and public-private dialogues involving key stakeholders such as government agencies, tourism operators, and local community representatives. This qualitative data provides insight into the current conditions and practices in the sector, as well as the challenges and opportunities faced by stakeholders in the tourist transport sector.

## 2.3 Components of the Roadmap

The roadmap acts as a strategic plan for transforming Jordan's tourism sector into a model of sustainable transport. It is designed to address key green growth challenges such as reducing greenhouse gas (GHG) emissions, decreasing dependence on fossil fuels, and bridging gaps in infrastructure. More than just a policy document, the roadmap integrates environmental sustainability, social inclusiveness, and economic resilience into a unified plan of action. Its purpose is to define a clear objective, set actions and realistic timelines, then assign responsibilities to stakeholders, ensuring that the transition to sustainable transport solutions is both effective and measurable.

The roadmap's design structure applies the following globally proven good practices:

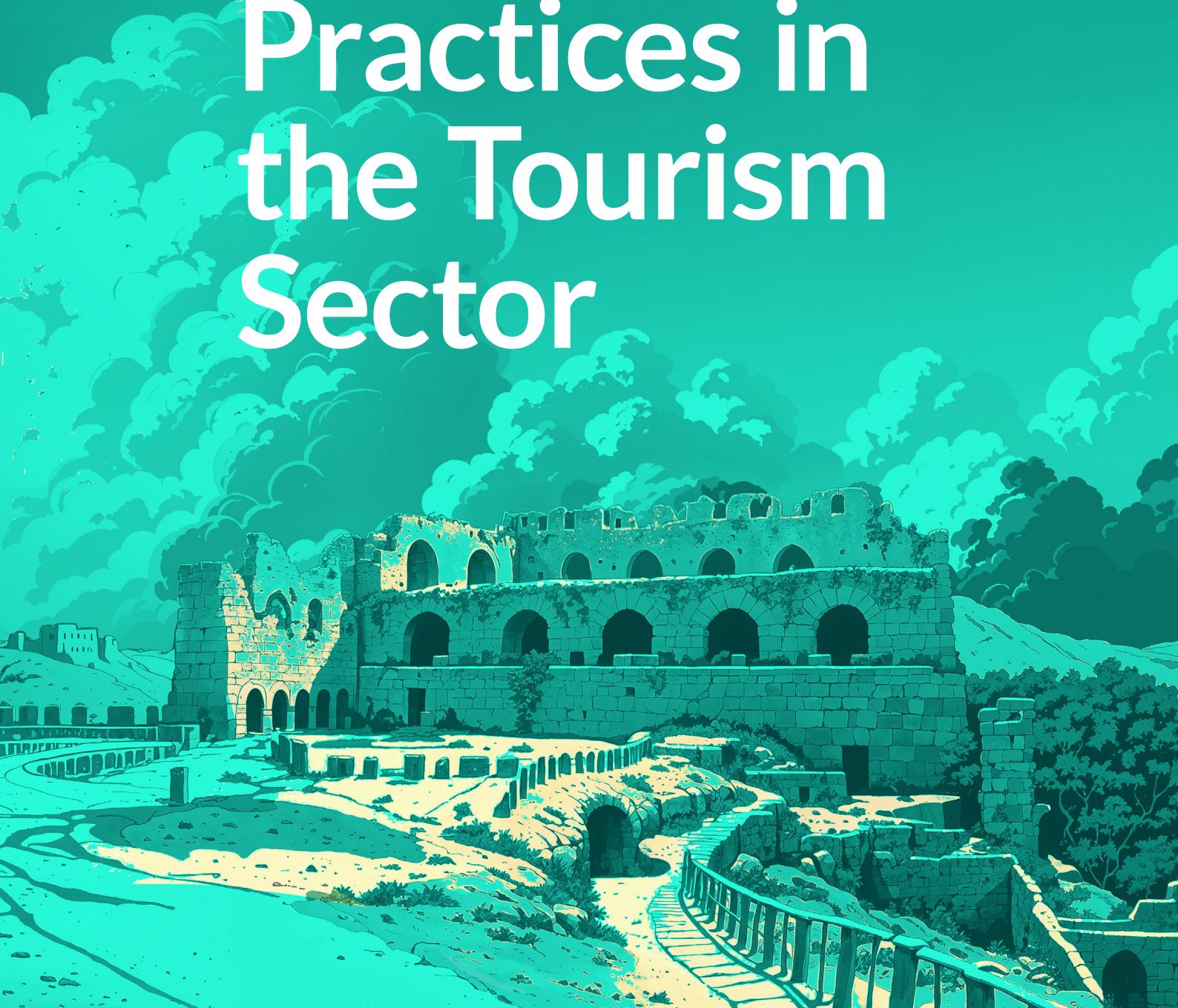
- **Identify a Strategic Objective:** To define a long-term, actionable goal aligned with Jordan's sustainable tourism priorities and national environmental targets.
- **Select Instruments:** Identify the different tools and mechanisms to be leveraged to achieve the objective, while ensuring a comprehensive approach in choosing actions.

- **Define Actions:** Outline specific, tangible activities under each of the selected instruments. Each action features quantitative target, as per the results-based principles.
- **Set Timelines and Milestones:** Establish measurable milestones to track progress. Each phase will be designed to ensure timely achievement of actions.
- **Monitoring, Reporting, and Verification (MRV):** Develop a robust system for tracking the implementation of the roadmap, including transparent reporting and verification mechanisms to stakeholders, regular evaluations to ensure that stakeholders remain engaged, and that adjustments are made when necessary to stay on track.

Guided by the principles of sustainability, inclusivity, and resilience, this roadmap ensures a balanced approach that considers the economic, social, and environmental aspects of sustainable tourism mobility in Jordan.

03

# Existing Transport Practices in the Tourism Sector



### 3.1 Tourism Trends and Economic Impact

The tourism sector has experienced various trends over recent years, influenced by global events, economic conditions, and shifts in traveler behavior, as shown in Figure 2. Between 2016 and 2019, tourist arrivals grew consistently, with annual increase ranging from 8% to 9%, reflecting a steady rise in global interest for Jordan's rich cultural and natural attractions. However, the tourism industry faced a severe downturn in 2020 due to the global impact of the COVID-19 pandemic. International tourist arrivals dropped by a staggering 77%, as travel restrictions and safety concerns halted international movement. As the world began recovering from the pandemic in 2021, Jordan saw a remarkable rebound with a 90% increase in tourist arrivals. This positive momentum continued into 2022, with a 114% increase in arrivals compared to the previous year.

The recovery trend persisted in 2023, with a further 26% increase in tourist arrivals, and a total number of 6.3 million tourists. This recovery highlights not only the sector's resilience but also the potential for sustained growth, positioning Jordan as a key tourism destination in the region. The continued growth of the sector further emphasizes the importance of integrating sustainable practices, including greener transportation options, to meet future demand and ensure the preservation of the country's cultural and environmental resources. The sector could lead by example to promoting sustainable tourism practices while maintaining its appeal to international visitors.

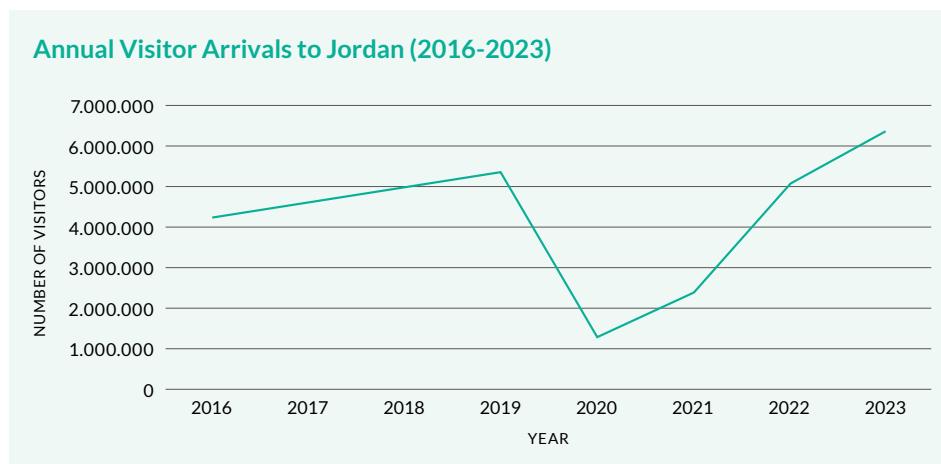


Figure 2: Visitor Arrivals in Jordan (2016-2023)

Source: Ministry of Tourism and Antiquities, Tourism Statistics. [2016-2023]

The industry faces significant seasonal challenges. The varying demand throughout the year poses issues such as underutilization of resources, impacting hotel occupancy rates, revenue streams, and employment opportunities. Notably, seasonal variations reveal peaks in tourist visits during the summer months. For example, from 2021-2023, visitor numbers peaked in August, accounting for 14% of total visitors due to favorable weather conditions, while February recorded the lowest turnout with 5% of visitors.

Jordan attracts a diverse range of visitors from around the world, with a significant number of international visitors coming from Europe, North America, and Arab countries. Arab countries account for the largest share, contributing 48% of the total visitors. Additionally, Jordanian expatriates represent a significant portion, making up to 25% of visitors. Meanwhile, non-Arab visitors comprise 27% of the total, demonstrating Jordan's increasing attraction to international tourists from outside the Arab region. Tourism in Jordan shows a diverse distribution of visitors across various touristic sites. The UNESCO World Heritage of Petra leads with 20.3% of visitors, followed by Mount Nebo (11.5%), Wadi Rum known for its stunning desert landscapes (9.2%), Jarash (8.7%). These percentages, as illustrated in Figure 3, reflect the varied appeal of Jordan's cultural and natural attractions to tourists.

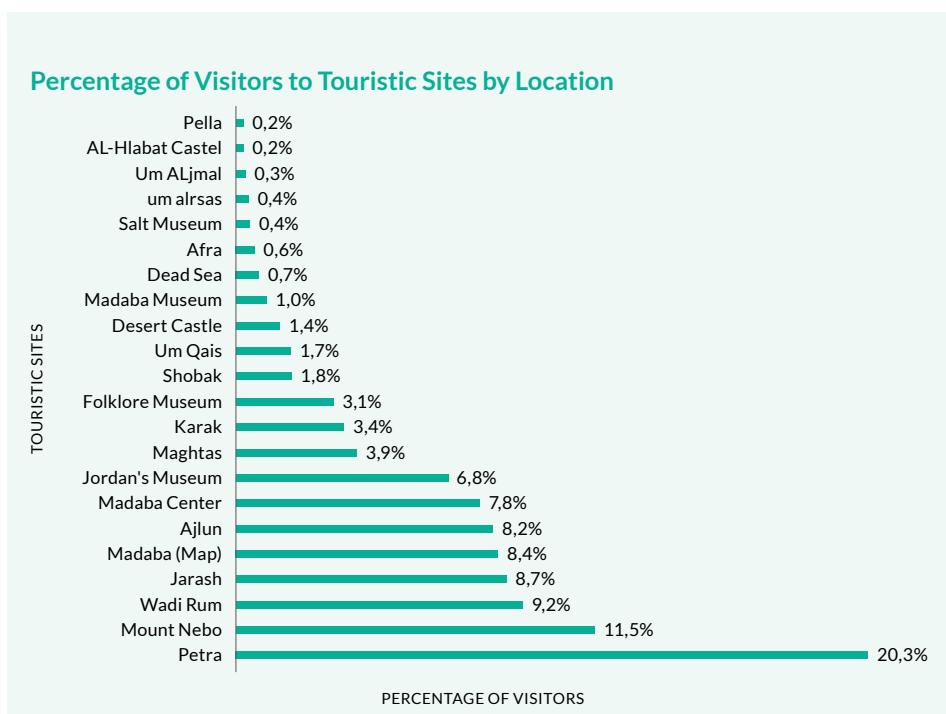


Figure 3: Distribution of Visitors Across Major Tourist Sites (2023)

Source: Ministry of Tourism and Antiquities, Tourism Statistics. [2023]

The data on Jordan's annual tourism income from 2016 to 2023 reveals significant growth trends in the sector's performance. From 2016 to 2019, there was steady growth, with income rising from JOD 2.87 billion to JOD 4.1 billion<sup>1</sup>, shown in Figure 4. However, the COVID-19 pandemic caused a severe decline in 2020, with income dropping to JOD 1 billion due to travel restrictions and lockdowns. Remarkably, by 2023, tourism income had rebounded to JOD 5.25 billion.

<sup>1</sup> Jordan Strategy Forum (JSF). Tourism Sector Jordan's Economic Vision Roadmap. Amman: Jordan <https://jsf.org/uploads/2022/12/tourism.pdf>

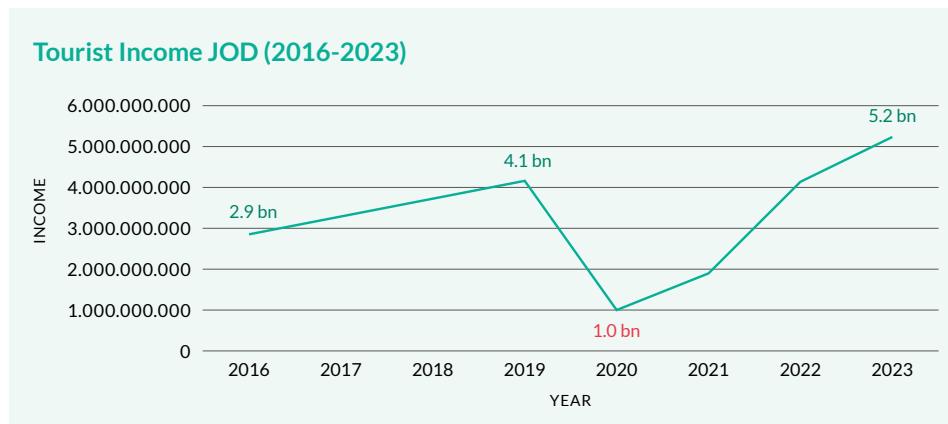


Figure 4: Jordan's Annual Tourism Income Trends (2016-2023)

Source: Ministry of Tourism and Antiquities, Tourism Statistics. [2016-2023]

Tourism's significant contribution to Jordan's economy extends beyond income figures. The sector is a cornerstone of the country's Gross Domestic Product (GDP), employment, and foreign exchange earnings. The sector directly supports around 54,856 jobs and indirectly sustains many more through related sectors such as hospitality, transportation, and retail<sup>2</sup>. The top three activities are hotels, tourism restaurants, and travel agencies, employing 40%, 38%, and 8% people respectively in 2023 while tourist transport employs around 5,000 people<sup>3</sup>.

## 3.2 Tourist Transport Stakeholders in Jordan

Tourist transport in Jordan relies on a diverse network of stakeholders, each contributing to policy development, infrastructure expansion, investment, and technological advancement. These stakeholders span government institutions, academia, private sector entities, and development and finance partners.

Government institutions such as the Ministry of Transport (MoT), the Ministry of Tourism and Antiquities (MoTA), and the Land Transport Regulatory Commission (LTRC), are responsible for setting policies, regulating transport operations, and ensuring alignment with national sustainability goals. Other key governmental bodies, including the Ministry of Environment (MoEnv) and the Ministry of Energy and Mineral Resources (MEMR), oversee environmental regulations and energy strategies that directly impact the electrification of transport systems. Additionally, authorities such as the Petra Development and Tourism Region Authority (PDTRA), and the Aqaba Special Economic Zone Authority (ASEZA) play key roles at major tourist destinations.

<sup>2</sup> Ministry of Tourism and Antiquities. Power BI Report

<sup>3</sup> Ministry of Tourism and Antiquities. Tourism Statistics.

Academic institutions focus on research, capacity building, and technological innovation. Universities such as the University of Jordan (JU), Jordan University of Science and Technology (JUST), and The German Jordanian University (GJU) provides expertise in engineering, energy systems, and transport solutions, and support the development of required human capital.

The private sector is instrumental to the operation of tourist transport, with entities such as the Specialized Tourist Transport Companies Association and private transport operators driving investments. Organizations like the Jordan Automotive Dealers Association, national electric power and distribution companies and charging infrastructure providers can facilitate electrification of the sector. Development partners and financial institutions provide essential funding, policy recommendation, and technical expertise to accelerate sustainable transport transition. Collaboration among stakeholders is crucial for overcoming financial, technical, and regulatory challenges. A coordinated effort can ensure that the Jordan's tourism transport sector aligns with global sustainability commitments while enhancing visitor experiences and fostering economic growth. Below is a non-exhaustive list of stakeholders.

**Government stakeholders:** Ministry of Transport, Ministry of Tourism and Antiquities, Ministry of Environment (MoEnv), Ministry of Energy and Mineral Resources (MEMR), Energy and Minerals Regulatory Commission (EMRC), Jordan Standards and Metrology Organization (JSMO), Ministry of Planning and International Cooperation (MoPIC), Ministry of Finance (MOF), Land Transport Regulatory Commission (LTRC), Ministry of Labor (MOL), Aqaba Special Economic Zone Authority (ASEZA), Petra Development and Tourism Region Authority (PDTRA), Jordan Tourism Board (JTB), Jordan Customs, Environmental Police and Rangers.

**Academia:** The University of Jordan (JU), AlHussein Technical University (HTU), Princess Sumaya University for Technology (PSUT), Jordan University of Science and Technology (JUST), German Jordanian University (GJU).

**Private sector:** Specialized Tourist Transport Companies Association, Jordan Automotive Dealers Association, Jordanian Engineers Association, Amman Vision, Private Transport Operators, National Electric Power and Distribution Companies

**Development partners:** Global Green Growth Institute (GGGI), United Nations Industrial Development Organization (UNIDO), United States Agency for International Development (USAID), Friedrich-Ebert-Stiftung (FES), Korea International Cooperation Agency (KOICA), NDC-Partnership, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ),

**Financiers:** World Bank, EBRD, Green Climate Fund (GCF), International Finance Corporation (IFC), Jordan Renewable Energy and Energy Efficiency Fund (JREEEF).

### 3.3 Mobility Modes for Tourists

Jordan offers a variety of transportation options to meet the needs of both international and domestic tourists. These modes range from air and sea travel for international visitors to extensive road networks for regional and local tourists. The mobility options within the country can be categorized as follows:

1. **Air Travel:** Queen Alia International Airport serves as Jordan's primary hub for international tourists, accounting for 41% of arrivals. Regional airports support some domestic and international travel, though they play a smaller role in overall tourist mobility.
2. **Road Transport:** Most tourists rely on road transport to explore Jordan's historical and natural sites. Public buses, private cars, and vans are the primary means of transportation between major tourist destinations like Petra, Wadi Rum, Jerash, and the Dead Sea. Car rentals and guided tours are popular choices for international tourists, offering flexibility in exploring various sites.
3. **On-Site Transport Options:** Within specific tourist attractions, localized transport services are available to enhance the visitor experience. These include golf carts and shuttles, particularly in expensive or rugged sites like Petra and the Dead Sea resorts. While these options are limited and site-specific, they provide essential mobility for elderly visitors or those with mobility challenges.

This roadmap focuses on road transport, as it represents the main mobility mode connecting tourists to Jordan's key touristic tourist sites. Whether arriving via air or land, many tourists depend on road networks to access the country's tourist attractions. Therefore, the strategies and initiatives outlined here are centered on improving and greening road transport solutions. This includes enhancing the sustainability of vehicles, while also addressing the infrastructure, policy, and regulatory challenges associated with transitioning to sustainable mobility within the tourism sector.

### 3.4 On Road Public Transport in Tourism

In 2023, a total of 939 public vehicles were registered for tourism services in Jordan and owned by registered tourist transport companies. The majority, 59% (556 vehicles), were medium and large vehicles, commonly used for group tours and travel agencies. Small vehicles, such as cars and minibuses, made up 28% (264 vehicles), offering flexibility for individual tourists and smaller groups. Mini vans and vans accounted for 13% (119 vehicles), serving family and small group tours. This diverse fleet facilitates tourist mobility across major sites like Petra, Wadi Rum, and the Dead Sea, supporting both local and international visitors.

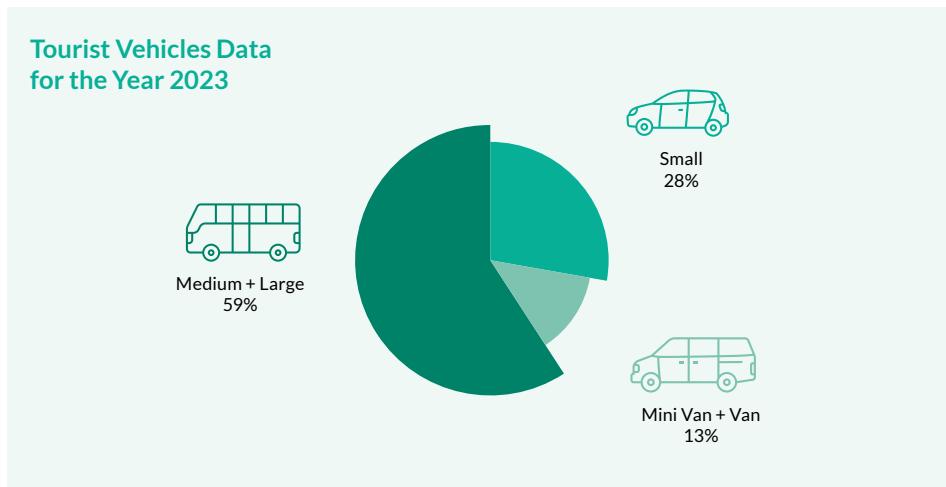


Figure 5: Type and Number of Vehicles Used for Tourism Services

Source: Private Operator

This roadmap focuses on public vehicles in the medium and large segments, due to the lack of data available regarding the usage of the small as well as minivan & van categories. For similar reasons individual car rentals for tourism use are excluded from the roadmap. Medium and large vehicles also bring multiple benefits compared to smaller segments such as cost savings, reduced traffic congestion, social equity, reduction in parking demand, etc.

### 3.5 Sustainability Challenges

Jordan's transport infrastructure presents notable barriers to tourism. Reliable, affordable, sustainable and safe transport services are essential to ensure a positive visitor experience. A 2024 assessment by the Ministry of Tourism and Antiquities identified transportation as one of the least attractive aspects of tourism in the country<sup>4</sup>. Common complaints from tourists include subpar service quality, high transport costs, uncomfortable experiences with taxis, and limited pedestrian-friendly zones in urban areas like Amman. Despite efforts to improve the infrastructure, public transport, especially outside of major cities, remains inadequate. This situation is particularly challenging for non-Arabic-speaking visitors, who often find it difficult to navigate the existing systems.

The lack of a well-functioning integrated public transportation system outside Amman adds to the challenges faced by tourists wishing to explore sites beyond the capital city. According to a 2022 report by the World Bank<sup>5</sup>, Jordan's public transport is marked by long wait times, unreliable schedules, and overcrowded buses. In tourist hotspots like Petra, Wadi Rum, and the Dead Sea, the absence of sufficient public transport options forces many visitors

4 World Economic Forum. Travel & Tourism Development Index 2024

5 Jordan Public Transport Diagnostic and Recommendations (English). Washington, D.C.: World Bank Group.

to rely on private vehicles or expensive taxis, further raising the cost of travel. Additionally, the increasing number of visitors exacerbates the need for transport services that are not only reliable and affordable, but also safe. An emphasis on improving road safety and public transport accessibility is critical to promoting sustainable tourism in Jordan.

In addition, the transport sector has been traditionally male dominated, often overlooking the needs of women and marginalized groups especially regarding personal security, commuting patterns, accessibility, and caregiving responsibilities. As the sector increasingly adopt E-mobility solutions, there is a unique opportunity to integrate gender equity including equal opportunities, flexibility, safety, and innovative solutions for women.

Furthermore, there are environmental concerns regarding Jordan's heavy reliance on fossil-fuel-powered vehicles, which conflicts with the country's ambitions toward green and sustainable tourism<sup>6</sup>. The primary issue identified is the GHG emissions generated by tourist buses, which contributes to global warming and climate change. Fossil fuel combustion also generates noise pollution and adversely affects air quality through the release of local pollutants such as carbon monoxide, sulfur dioxide, nitrogen dioxide, and lead. These pollutants can harm human health, harm the environment, and cause property damage.

Addressing these issues enhance Jordan's global tourism appeal, by not only improving tourist satisfaction but also boosting the country's competitiveness as a destination.

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<sup>6</sup> The Green Growth National Action Plan (GG-NAP), Transport Sector, 2021-2025. Jordan: GGGI. 2021

04

# Strategic Objective of the Roadmap



## 4.1 Definition of the Strategic Objective

A strategic objective provides the foundation for any effective plan, serving as a guiding purpose to achieve measurable, impactful outcomes. Resources and efforts will be aligned toward a specific, long-term goal, ensuring clarity and focus. The overarching goal of this Roadmap is to transition tourist mobility in Jordan to a sustainable development pathway. Based on findings from the previous section including the assessment of the environmental impacts of tourist transport systems, **the strategic objective of the roadmap is set as “the reduction of greenhouse gas emissions from on road tourist transport”**. The following subsections describe the definition of a quantitative target for the strategic objective. First, Jordan's existing commitments to sustainable development, green growth, and climate change mitigation are reviewed. Then, to define the quantitative indicator associated with the objective, GHG emissions from tourist transport are estimated, together with local pollutants emissions.

## 4.2 National GHG Emissions Reductions Commitment

On 4<sup>th</sup> November 2016, Jordan ratified the Paris Agreement, which is a legally binding international treaty on climate change. It was adopted by 196 Parties at the UN Climate Change Conference (COP21) in Paris, France, on 12 December 2015. Its overarching goal is to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels” and pursue efforts “to limit the temperature increase to 1.5°C above pre-industrial levels.”

The Paris Agreement works on a five-year cycle of increasingly ambitious climate action -- or, ratcheting up -- carried out by countries. Since 2020, countries have been submitting their national climate action plans, known as nationally determined contributions (NDCs). Each successive NDC is meant to reflect an increasingly higher degree of ambition compared to the previous version.

On 12<sup>th</sup> October 2021, Jordan submitted an updated 1st Nationally Determined Contributions (NDC) document which enhances its commitment to the international climate change governance system by raising its GHG emission reduction target from 14% in the 1st NDC to 31% in this current updated NDC, both compared to Business as Usual (BAU) scenario. The GHG emission reduction target was based on a combination of national policies, programmes and actions while set as conditional to international support and finance.

## 4.3 Quantitative Target for the Strategic Objective

To achieve the high-level objective, the carbon footprint of tourism-related transportation must be quantified by means of calculating the greenhouse gas emissions generated by diesel medium and large buses used by tourists. Emissions of local pollutants can be derived from GHG emissions using COPERT<sup>7</sup> which is the EU standard vehicle emissions calculator. COPERT uses vehicle population, mileage, speed and other data such as ambient temperature and calculates emissions and energy consumption for a specific country or region.

### 4.3.1 Estimation of Tourist Bus Kilometers Travelled

Based on data collected from the government, in 2023, Jordan welcomed 6.35 million visitors, and approximately 1.59 million of them used medium and large buses for their mobility needs. The following table illustrates the tourist bus travelled distances calculations in Jordan.

Parameter	Value	Source
A Total number of visitors in 2023	6.35 Million	Ministry of Tourism and Antiquities
B Share of trips using buses	25.1 %	Department of Statistics
C Total number of tourists using buses	1.59 Million	Calculated (A*B)
D Average distance per tourist using buses	8.6 Km	Estimated based on data from MoTA and private tourist bus operators
E Total distance covered by tourist buses in 2023	13.707 Million Km	Calculated (C*D)

Table 1: The Tourist Bus Travelled Distance Calculations in Jordan for 2023

It is estimated that tourist buses covered a total of 13.707 million kilometers across Jordan's various tourist destinations.

<sup>7</sup> EMISIA. COPERT: The Emission Inventory Software: <https://copert.emisia.com/>

#### 4.3.2 Estimation of GHG Emissions from Tourist Buses

To effectively evaluate emissions from the diesel buses, three main types of emissions are considered: Tank-to-Wheel (TTW), Well-to-Tank (WTT), and Well-to-Wheel (WTW), in line with the UNFCCC methodological tool<sup>8</sup>. Each category represents a different stage in the fuel lifecycle, with distinct calculations.

- **Tank-to-Wheel (TTW) Emissions:** These represent direct emissions from fuel combustion during vehicle operation. TTW emissions include CO<sub>2</sub>, NOx, and particulate matter, which are released as the vehicle operates. These emissions account only for vehicle usage, without considering fuel production or distribution.
- **Black Carbon Contribution:** A subset of TTW emissions, black carbon is found in particulate matter (PM2.5) from diesel combustion. As a short-lived climate pollutant with global warming potential 900 times that of CO<sub>2</sub> over 100 years, black carbon significantly impacts climate change. Its contribution is quantified by assessing its proportion within PM2.5 emissions and applying its global warming potential to estimate its CO<sub>2</sub>-equivalent impact.
- **Well-to-Tank (WTT) Emissions:** These account for the indirect GHG emissions from the production, extraction, refining, and transportation of fuel before it reaches the vehicle. WTT emissions capture the full environmental impact of fuel production.
- **Well-to-Wheel (WTW) Emissions:** WTW emissions combine TTW and WTT emissions, along with the CO<sub>2</sub> -equivalent impact of black carbon. This analysis gives a comprehensive view of a vehicle's total environmental footprint, considering both direct emissions from fuel combustion and indirect emissions from fuel production.

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<sup>8</sup> UNFCCC. Tool for the estimation of upstream leakage emissions associated with fossil fuel use (AM Tool 15 v2.0). United Nations Framework Convention on Climate Change, 2019.

Table 2 below presents the GHG emissions for diesel buses for tourism sector buses in 2023.

Parameter	Value	Source
A Annual distance	13.707 Million Km	Previous table
B TTW CO <sub>2</sub> emissions	16,956 Tons/y	$B = A * \text{Diesel consumption} * \text{Diesel density} * \text{Net Calorific Value (NCV) for diesel} * \text{CO}_2 \text{ emission factor}$ <ul style="list-style-type: none"> <li>– Diesel consumption (0.46l/km) research<sup>9</sup></li> <li>– Diesel density (0.844 kg/l), IEA 2005<sup>10</sup></li> <li>– NCV diesel (43 MJ/kg), (IPCC 2006)<sup>11</sup></li> <li>– CO<sub>2</sub> emission factor of diesel (74.1 gCO<sub>2</sub>/MJ), (IPCC 2006)</li> </ul>
C Well-to-Tank (WTT) emissions	3,900 Tons/y	$C = B * \text{WTT markup factor for diesel (23% UNFCCC 2014)}^{12}$
D CO <sub>2</sub> equivalent of black carbon	592 Tons/y	$D = A * 75\% (\text{fraction of black carbon in PM}_{2.5} \text{ emission})^{13} * 900 (\text{global warming potential of black carbon in 100 years})^{14}$
E WTW including black carbon CO <sub>2</sub> e	21,448 Tons/y	$E = B + C + D$

Table 2: GHG Emissions from Tourist Buses

GHG emissions from tourist buses are calculated at 21,448 tCO<sub>2</sub>e in 2023.

Table 3 below outlines the projected GHG emissions for the years 2026 to 2030, based exclusively on the continued use of diesel buses, i.e. the Business-as-Usual (BAU) Scenario. We used a projected global tourist growth rate of 5.3%<sup>15</sup>. Based on this growth rate, the number of tourists and associated travel distances for each year are forecasted. The emissions for

9 Imam, Rana, Seong-Cheol Kang, and Diana Quezada. „Exploring low-carbon bus options for urban BRT systems: The case of Amman.“ Journal of Public Transportation 22, no. 1 (2020): 57-75.

10 IEA (International Energy Agency). 2005. Energy Statistics Manual

11 IPCC (International Panel on Climate Change). 2006. IPCC Guidelines for National Greenhouse Gas Inventories. Edited by S. Eggleston, L. Buendia, K. Miwa, T. Ngara, and K. Tanabe. Institute for Global Environmental Strategies.

12 UNFCCC (United Nations Framework Convention on Climate Change). 2014. Methodological Tool: Upstream Leakage Emissions Associated with Fossil Fuel Use, Version 02.0.

13 Ntziachristos, L., and Z. Samaras. 2018. “Passenger Cars, Light Commercial Trucks, Heavy-Duty Vehicles including Buses and Motorcycles.” EMEP/EEA Air Pollutant Emission Inventory Guidebook 2016 – Update July 2018. European Environment Agency.

14 Bond, T. C., S. J. Doherty, D. W. Fahey, P. M. Forster, et al. 2013. “Bounding the Role of Black Carbon in the Climate System: A Scientific Assessment.” Journal of Geophysical Research: Atmospheres 118 (11): 5380– 5552. <https://doi.org/10.1002/jgrd.50171>

15 Research Nester. (n.d.). Tourism Industry Market – Global Market Size, Forecast, and Growth Opportunities.

these years are then calculated by applying the same emission factors and methodologies used for 2023, adjusting the values in accordance with the expected increase in tourist numbers and corresponding travel distances. Under this scenario, without the introduction of electric buses, all emissions would be attributed to diesel-powered transport. This scenario provides a reference for a comparison of potential emissions reductions achievable through a transition to electric buses.

<b>Business as Usual</b> <b>Baseline: Existing Diesel Bus Fleet</b>		
<b>Years</b>	<b>Total Distance (million km)</b>	<b>Total GHG Emissions (tons CO<sub>2</sub>)</b>
2026	15.89	24,859
2027	16.73	26,176
2028	17.62	27,564
2029	18.55	29,025
2030	19.53	30,563

Table 3: Total GHG Emissions for Business as Usual 2026-2030

#### 4.3.3 Estimation of Emission Reductions Target

The commitment from Jordan in its NDC to reduce GHG emissions at national level by 31% by 2030 compared to business-as-usual scenario was determined through extensive consultation of stakeholders in GHG intensive sectors of the economy. The 31% reduction target was further divided into a 5% unconditional target and a 26% conditional target, subject to the mobilization of financing from international sources. This roadmap aligns the level of emission reductions ambition with the 2021 Jordan NDC.

By 2030, if diesel buses remained the sole mode of transport, GHG emissions from tourism buses would be expected to reach 30,563 tons of CO<sub>2</sub>. To meet Jordan's NDCs and achieve a 31% reduction in emissions, emissions must be reduced to 21,090 tons of CO<sub>2</sub> by 2030, representing a reduction of 9,591 tons. To achieve this target, 55% of the tourism bus fleet must be transitioned to electric vehicles by 2030, with the remaining 45% would continue to operate using diesel.

This transition to electric buses can be accomplished through a linear fleet conversion approach: starting with 11% of the tourism bus fleet being electric in 2026, with the electric share increasing by 11% each year until reaching 55% by 2030, as shown in Figure below. This approach facilitates periodic monitoring of the progress to ensure that the target is met within the five-year timeframe.

The table below also indicates emission reduction ambition through the 5% NDC unconditional target. Under such scenario, emissions must be reduced to 29,013 tons of CO<sub>2</sub> by 2030, or by 1,550 tons of CO<sub>2</sub>. To achieve this target, 9% of the tourism buses fleet should be transitioned to electric buses by 2030.

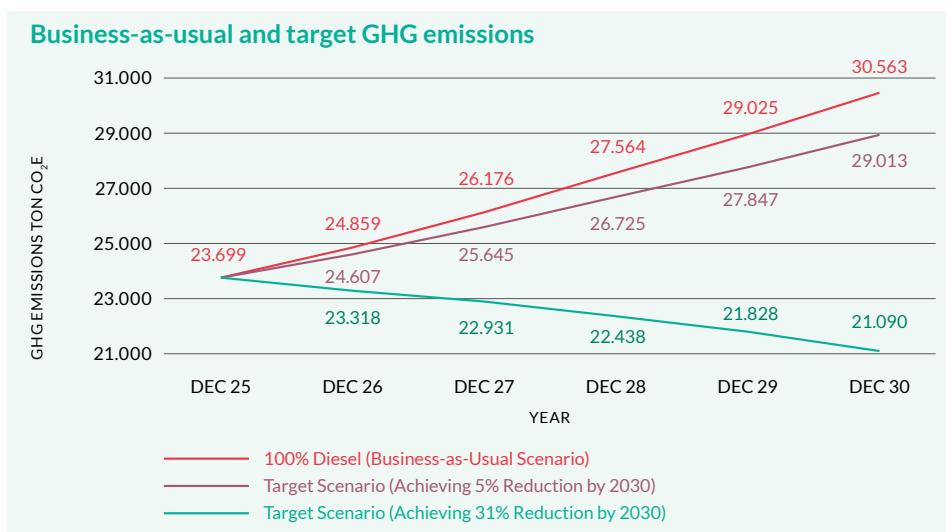


Figure 6: Business-as-usual and target GHG emissions

While electric buses are often labelled zero-emission vehicles, their actual footprint depends on the source of the electricity used for charging. For this analysis, emissions from the electricity grid have been considered, this is conservative. However, if solar-powered electric buses were utilized, their emissions would be reduced to zero.

In conclusion the high-level strategic objective of this roadmap is the reduction of greenhouse gas emissions from tourist buses, and the associated conditional quantitative target is a reduction of 9,591 tons of CO<sub>2</sub>e compared to business-as-usual scenario in 2030, while the unconditional quantitative target is a reduction of 1,550 tons of CO<sub>2</sub>e.

#### 4.3.4 Local Air Pollutants Reductions

Transitioning from conventional diesel buses to electric alternatives will also contribute to improve urban air quality and public health. Diesel buses are a significant source of fine particulate matter (PM<sub>2.5</sub>) and nitrogen oxides (NOx), which contribute to respiratory diseases and environmental degradation. Reducing these pollutants can support efforts to enhance urban livability and mitigate the negative impacts of air pollution on communities.

Under a business-as-usual (BAU) scenario, the existing bus fleet will continue operating with diesel engines, leading to sustained emissions growth in proportion to annual mileage. The estimated local pollutants emissions from the current diesel bus fleet are outlined in the table below:

Business as Usual			
Years	Distance (million km)	BAU Emissions - PM <sub>2.5</sub> (tons)	BAU Emissions - NOx (tons)
2026	15.89	1.02	127.89
2027	16.73	1.07	134.66
2028	17.62	1.13	141.80
2029	18.55	1.19	149.32
2030	19.53	1.25	157.23

Table 4: BAU PM<sub>2.5</sub> & NOx Emissions Projections (2026-2030)

Emissions factors used in calculations from COPERT, 2016, Table 3-24, Tier 3:

PM<sub>2.5</sub>: 0.064 g/km, NOx: 8.05 g/km

The introduction of electric buses will significantly reduce pollutant emissions by replacing diesel vehicle kilometers with zero-emission electric alternatives. The table below presents the estimated reductions in PM<sub>2.5</sub> and NOx emissions, considering a progressive fleet electrification scenario:

Business as Usual				
Years	Reduction in PM <sub>2.5</sub> Emissions Under Conditional Target (tons)	Reduction in PM <sub>2.5</sub> Emissions Under Unconditional Target (tons)	Reduction in NOx Emissions Under Conditional Target (tons)	Reduction in NOx Emissions Under Conditional Target (tons)
2026	0.1	0.02	14.1	2.3
2027	0.2	0.04	29.6	4.8
2028	0.4	0.06	46.8	7.7
2029	0.5	0.09	65.7	10.8
2030	0.7	0.11	86.5	14.2

Table 5: Projected PM<sub>2.5</sub> & NOx Reductions with Bus Fleet Electrification (2026-2030)

The planned electrification of the bus fleet is projected to achieve significant reductions in harmful air pollutants. By 2030, both PM<sub>2.5</sub> and NOx emissions are expected to decrease by approximately 55% and 9% respectively compared to the business-as-usual scenario under the conditional and unconditional NDC scenarios. These improvements will play a crucial role in enhancing air quality, supporting Jordan's environmental and public health objectives.

05

# Instruments and Actions



The roadmap leverages four interdependent instruments to achieve its strategic objective, namely 1) technology and infrastructure, 2) policy framework, 3) financing and 4) knowledge sharing. This approach holistically tackles the challenges and gaps associated with achieving the strategic objective. In practice, the introduction of new technologies and infrastructure will not be possible without access to financing. Similarly, the engagement of all stakeholders will not be obtained without raising their awareness and capacity, nor without a robust and adequate regulatory framework, especially considering that e-mobility investments are expected to be private sector driven.

Under each instrument, a limited number of critical actions are then introduced. The rationale is provided, as well as some preliminary recommendations. As part of the roadmap implementation plan in the next section, a quantitative indicator is associated with each action to monitor the progress, report to stakeholders, and where needed flag the need for additional technical assistance.

Figure 7 illustrates the four instruments and associated actions.

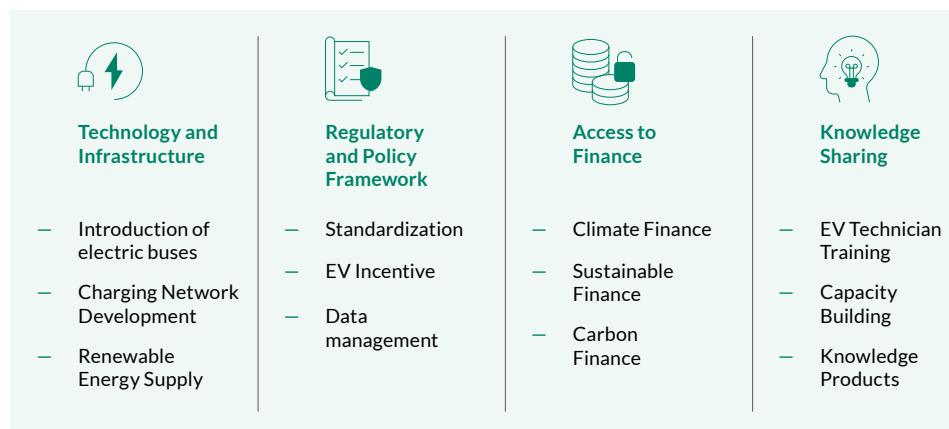


Figure 7: Instruments and Actions

## 5.1 Technology and Infrastructure

The introduction of new technologies and infrastructure is the primary instrument utilized in this roadmap. Four actions are selected to achieve the strategic objective. Technology includes the procurement of electric buses and establishing a data hub, while infrastructure actions focus on developing a network of charging stations and integrating sustainable energy sources. The following sections provide a description of each action.

### 5.1.1 Introduction of Electric Buses

The introduction of electric buses technology in Jordan's tourism sector is the cornerstone of this roadmap. E-buses are a transformative innovation capable of reducing carbon emissions, noise pollution and local pollutants, thereby contributing to preserving even the most environmentally sensitive tourist areas such as UNESCO World Heritage sites of Petra and Wadi Rum.

This action builds upon the electric bus pilot project in Petra and expands to other high-traffic tourist routes, incorporating insights and lesson learned. Transport operators responsible for tourist buses are from the private sector. As such, successful implementation of this action relies on private entities, including technology suppliers and importers. However, the government and development partners should provide strategic guidance, technical assistance and coordination, including the identification of priority routes and locations, supporting technical studies, accessibility to charging infrastructure and enhancing the financial attractiveness of investments.

As per section 4.3.3, it is estimated that 55% of the fleet of tourist buses will have to be converted to electricity by 2030 to achieve the 31% emission reduction target of the roadmap, and 9% of the fleet to achieve the unconditional target.

### 5.1.2 Charging Network Development

For the successful adoption of EVs at the national level and more specifically in the tourism sector, it is essential to develop a comprehensive network of charging stations covering high-traffic routes, major tourist destinations, and underserved tourist sites in rural areas to provide consistent and reliable access to standardized charging facilities. This will address the anxieties related to the operational range of the tourist electric buses and the strengthen the efficiency of bus operations. Both slow chargers (typically used for overnight or long-term parking) and fast charging (suitable for quick top-ups) need to be included in the network to meet different usage patterns.

This action requires strong commitment from both the public and the private sector. The former should identify and evaluate potential locations, create a phased implementation plan, develop standards and regulations for charging stations to ensure compatibility and safety, facilitate access to renewable energy, and set adequate tariffs and incentives to attract private investors and operators into investments in different types of charging technology (slow, fast, ultra-fast) based on needs. Incentives comprise the authorization to develop a full business ecosystem around the stations, such as cafes, restaurants and convenience stores.

The Ministry of Tourism and Antiquities (MoTA) will first conduct comprehensive site assessments, evaluate grid capacity, and develop a strategic implementation plan to identify

suitable locations for charging stations. Once these steps are completed, the tourism sector will confirm and facilitate private sector investment in the selected sites, ensuring alignment with investor agreements and infrastructure needs.

It is estimated that approximately 15 site assessments will be completed by 2030, based on the number of major tourist areas identified across Jordan, while 10 new charging facilities suitable for electric buses will be necessary to achieve the objective of the roadmap.

### 5.1.3 Renewable Energy Supply

The electricity used for charging e-vehicles should come from sustainable sources to maximize the climate change mitigation benefits. This involves further integrating renewable energy sources like solar and wind into the grid, which is the responsibility of the National Electric Power Company (NEPCO) with the support of private investors and development partners. Considering the intermittent nature of solar and wind power generation, upgrading the infrastructure and management systems with battery storage technology will also be required. The action will support the climate goal under this roadmap but is also largely beyond the scope of this roadmap. However, the installation of off-grid solar power capacity at EV charging points dedicated to tourist buses is simplified approach achievable under this roadmap.

In this context, the government should continue facilitating licensing and permits for off-grid clean power generation at EV charging points. This will allow private charging operators to generate higher profits by getting access to low-cost renewable energy. According to the World Bank, Jordan is ideally located in one of the regions benefiting from high long-term average of global horizontal irradiation.

The addition of approximately 1.59 MW installed renewable energy capacity will be necessary to fully power the proposed number of charging points under the conditional target, and around 0.26 MW under the unconditional target. This estimate is based on the projected annual distance to be covered by electric buses in 2030, and typical electric bus energy consumption of around 1.3 kWh per km<sup>16</sup>.

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<sup>16</sup> Würtz, Samuel, Klaus Bogenberger, Ulrich Göhner, and Andreas Rupp. 2024. "Towards Efficient Battery Electric Bus Operations: A Novel Energy Forecasting Framework" World Electric Vehicle Journal 15, no. 1: 27.

## 5.2 Regulatory and Policy Framework

The regulatory and policy framework is a critical component in facilitating the transition to electric mobility within Jordan's tourism sector. Establishing a comprehensive set of regulations is essential for ensuring the successful integration of electric vehicles (EVs) and the necessary charging infrastructure. This section outlines key regulatory priorities, including standardization, prioritization of electric buses in national tourism programs, and incentives for private sector investment in charging infrastructure.

### 5.2.1 Standardization

To facilitate the transition to electric mobility within the tourism sector, a clear and comprehensive regulatory framework for EVs and charging infrastructure must be established. Standardizing technical specifications for electric buses, charging stations, and grid integration will provide investors and operators with the necessary regulatory certainty while ensuring compatibility, safety, and efficiency. Aligning these standards with the best international practices and regional regulations will further streamline implementation and attract investment in high-quality, future-proof solutions.

The Jordan Standards and Metrology Organization (JSMO) will play a central role in defining and enforcing these standards, ensuring that all EVs and charging stations comply with technical and safety requirements. This framework will establish performance criteria for electric buses, interoperability requirements for charging infrastructure, and grid readiness guidelines to support widespread deployment. By ensuring that regulatory and technical barriers are minimized, this policy will accelerate the adoption of electric buses, optimize infrastructure investment, and reinforce Jordan's commitment to sustainable tourism transport.

### 5.2.2 EV Incentive in National Tourism Program

“Urdona Janah” is a national initiative aimed at promoting domestic tourism through sponsored organized trips to cultural, historical and natural attractions across Jordan. The program is managed by the Ministry of Tourism and consists in providing financial incentives to private sector partners for the organization of tourist trips for Jordan nationals at discounted rates, thereby offering residents with affordable travel experiences, as well as stimulating the national tourism economy.

This action involves revising the regulatory framework for the “Urdona Janah” initiative to give tour operators using electric vehicles preferential access to government contracts.

Incorporating electric buses into national tourism programs will foster collaboration between the government, tourism operators, and the private sector, and encourage

investments in the necessary clean technology and infrastructure. This approach aligns with Jordan's broader environmental and sustainable tourism objectives, contributing to long-term sustainability and to the reduction of emissions across the sector.

### 5.2.3 Tourist Mobility Data management

As part of the Ministry of Digital Economy and Entrepreneurship's (MODEE) strategy, a centralized data hub will be established to support cross sectoral data management, including tourism. This action consists of integrating tourist mobility data, especially related to electric buses and charging infrastructure for tourism services, in the centralized data hub, thereby enabling the government to collect, analyze, and store key data and make informed decisions related to the transition of the tourism sector to electric buses.

A key component of this initiative will be the development of a policy mandating the collection of specific electric mobility data within the tourism sector. This policy will require private sector operators to share relevant data with the government, such as real-time metrics of electric bus performance, charging station usage, energy consumption, and maintenance performance.

In developing this policy, the government must address concerns around data privacy and security. Private sector operators must be reassured that their shared data will be protected, and the government will need to implement robust safeguards to ensure data integrity. Clear guidelines should be outlined specifying what data must be shared, under what conditions, and with necessary protections in place to ensure security and transparency.

This action will also contribute to the broader development of policies aligned with national sustainability goals, enhancing the efficiency of electric vehicle systems within the tourism sector. Ultimately, this approach will foster a transparent, data-driven ecosystem that facilitates the successful transition to electric mobility within tourism and across the country's transportation systems.

## 5.3 Access to Finance

While the transition to electric vehicles in the tourism sector offers significant environmental and operational benefits, it comes with a range of economic and financial challenges. These extend beyond the upfront costs of vehicles and infrastructure to include issues such as limited access to affordable financing, unpredictability in the regulatory framework, such as for example import tax rebates, as well as uncertainty about long-term returns. This roadmap selects four priority actions focusing on enhancing access to innovative financing schemes and to additional revenue streams tied to climate benefits and positive impacts on the environment, namely climate finance, sustainable finance, carbon finance and the creation of the national transport fund.

### 5.3.1 Climate Finance Mobilization

The absence of financial incentives or subsidies can deter investors from adopting electric vehicles and associated infrastructure (such as charging station and depot upgrades) in the tourism sector due to the high upfront costs compared to conventional internal combustion engine equivalent. Operators and financiers first need to consider the Total Cost of Ownership (TCO) of electric buses as part of their investment decision. In Jordan, owing to lower fuel costs resulting in long-term operating expenses savings, the TCO of e-buses is lower than the one of ICE buses.

In addition, the GHG emission reductions generated by e-buses mean that such technology is eligible for climate finance, which refers to financial instruments, mainly concessional loans and guarantees, whose proceeds are used for sustainable development projects and initiatives, environmental products and policies under the single goal of promoting a green economic transformation toward low-carbon, sustainable and resilient pathways. This action consists in supporting investors in developing funding proposals to financial institutions providing climate finance, such as the Green Climate Fund, the Mitigation Action Facility, the Global Environmental Fund, etc. The Government authorizes proposals by preparing a no objection letter, while development partners can coordinate to take the lead in funding proposal development.

### 5.3.2 Sustainable Finance Mobilization

In the context of e-mobility transition, sustainable finance mainly includes developing thematic bonds including green, social, sustainable and sustainability-linked bonds. In a collaborative effort, Jordan's Ministry of Environment, the Jordan Securities Commission, the Central Bank of Jordan, the Ministry of Finance, and the Ministry of Planning & International Cooperation developed green bond guidelines in 2021. Several financial institutions in Jordan are in the process or have already issued thematic bonds to transition towards a green financial infrastructure and diversify their financial instruments. Considering the environmental benefits of e-mobility transition in the tourism sector, dialogue should be strengthened between private tourist bus operators, local financing institutions, government and development partners to facilitate the allocation of the proceeds from these bonds raised from capital markets towards e-vehicles financing.

This action aims to facilitate the exchange of knowledge and lessons learned from thematic green bond experts and previous transactions in Jordan and globally, by means of capacity building workshops. In addition, interested financial public and private entities in Jordan should be provided with technical assistance for thematic bond issuance, offering support throughout the pre-issuance, issuance, and post-issuance stages.

### 5.3.3 Carbon Finance Mobilization

Carbon finance can enhance the financial viability of transitioning to electric vehicles by monetizing associated GHG emission reductions at an agreed price per ton of CO<sub>2</sub>e abated by a specific project. This type of scheme is results-based, rewarding entities for achieving specific targets, linking funding to results for accountability.

Through Article 6 of the Paris Agreement, Jordan can access carbon markets to support sustainable mobility in the tourism sector. This mechanism allows the generation and trade of carbon credits, providing financial incentives for emission reduction projects. By participating in both voluntary and compliance markets, Jordan can contribute to global climate targets while securing funding for sustainable transport solutions.

As part of this action, the first step is to build capacity of stakeholders to engage in Article 6 cooperative approaches and strengthen the current governance frameworks and institutional capabilities. The latter includes, among others, updating the Draft Article 6 Framework, clarifying institutional arrangements, formalizing the institutional setup of the Technical Committee and the Designated National Authority, developing an Article 6 Operations Manual including authorization criteria, defining positive and negative list of eligible projects, as well as Pricing Decision-making Guideline, fee structures, share of proceeds and flow of funds.

The next step will be to originate mitigation activities in the tourist transport sector, develop pre-feasibility analyses for the selected activities, then provide transaction advisory services between Jordan and buying countries. Development partners are invited to play a key role in supporting the Jordan government throughout the process.

## 5.4 Knowledge Sharing

Knowledge sharing is a pivotal component in enabling sustainable transition within the tourist transport sector. Through building skills, raising awareness, promoting collaboration among stakeholders and disseminating best practices, the sector can overcome technical, financial, operational and gender challenges more effectively. Knowledge sharing allows stakeholders to learn from successful case studies, master emerging technologies, and develop localized solutions that address the specific needs of the sector. Furthermore, fostering a culture of shared learning ensures the equitable distribution of information and opportunities, which can accelerate the transition to sustainable mobility systems and achieving national long-term goals.

Jobs that contribute to climate change mitigation, that minimize the negative environmental impact of businesses and encourage sustainable practices are classified as green jobs. High unemployment rates, especially among vulnerable groups, can be addressed by generating new green employment opportunities to support sustainable transport transition in the tourism sector, thereby promoting social equality and ensuring gender balance.

#### **5.4.1 Electric Vehicle Technician Training**

The transition to electric vehicles will lead to job displacement in the traditional tourist transport workforce. Moreover, new technical skills are required to maintain and repair EVs. This action consists in developing and implementing training programs to equip trainees with the necessary technical skills to diagnose, repair, and maintain hybrid and electric vehicles. To ensure that trainees are job-ready, programs should provide comprehensive training in hybrid and EV technologies as well as include job placement support and partnerships with potential employers to facilitate employment opportunities for trainees. By bridging the gap between training and employment, the program can enhance the overall job prospects of participants. The training program should be accredited by well-recognized certification body relevant to EV technologies, ensuring equal representation of women and that trainees receive a recognized and appropriate certification upon successful completion. The certification received by graduates should significantly enhance their credibility and employability in the job market, while providing tourist transport operators with a skilled workforce in sustainable transport technologies.

#### **5.4.2 Stakeholders' Capacity Building**

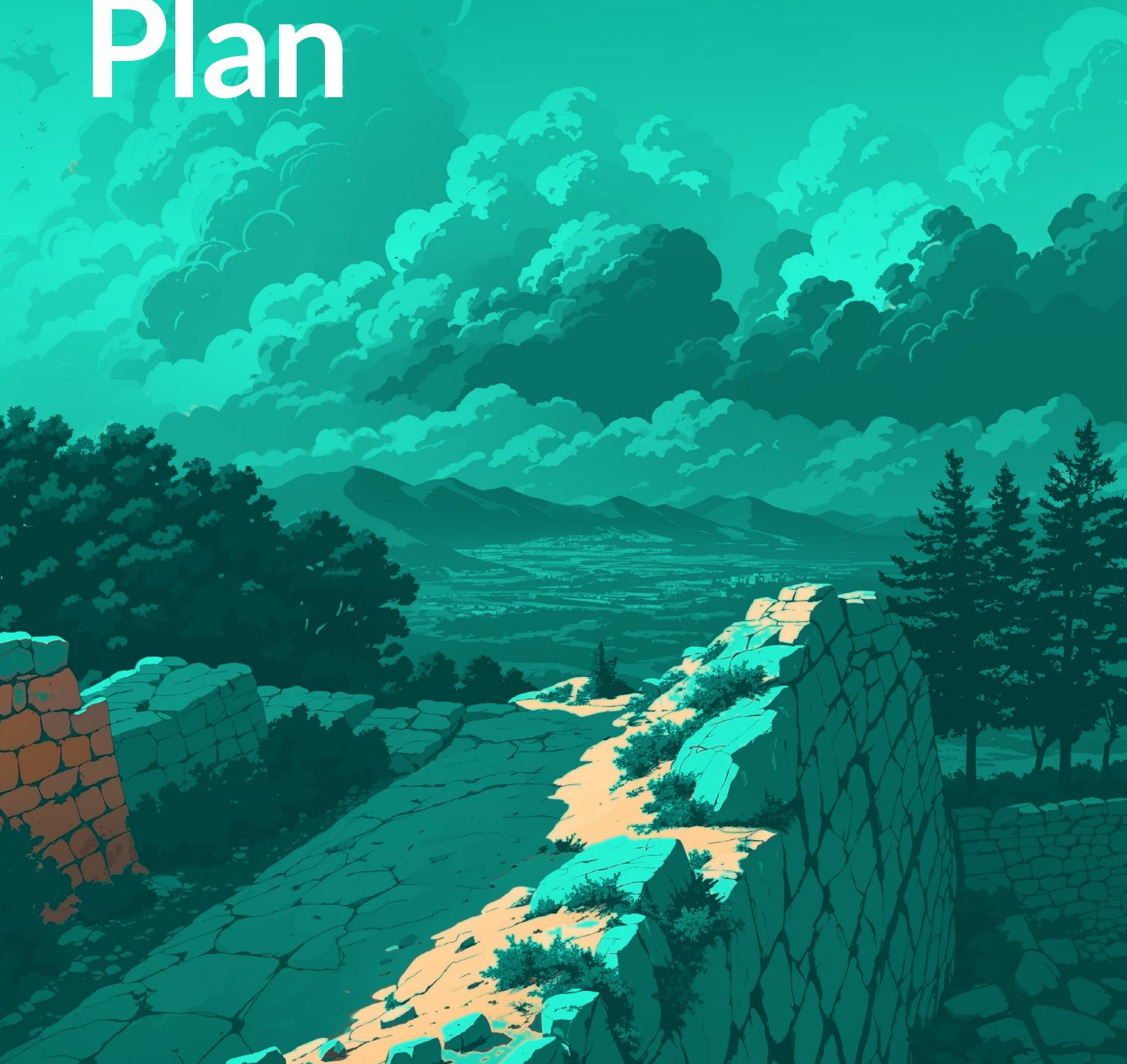
Building the capacity of stakeholders will accelerate the successful transition to electric vehicles (EVs) in the tourism sector. This action is targeted both for public and private entities. The former need the knowledge and tools to support the transition, including understanding technical, financial, regulatory and gender aspects to improve their ability to design policies, regulations, and incentives that promote the widespread, fair adoption of EVs in the tourism sector. Private entities need tailored initiatives to enhance their ability to make sound, long-term investment decisions. What's more, the action should maintain platforms for public-private dialogue where stakeholders can exchange ideas, challenges, and solutions. PPD can help identify and address regulatory hurdles, infrastructure gaps, financial and social barriers in a collaborative manner. Finally, capacity building activities can take the form of webinars to share global best practices and foster collaboration with international experts and organizations.

### 5.4.3 Knowledge Products Development

Knowledge products include reports (i.e. research and technical reports, whitepapers, policy briefs, insights briefs); publications (i.e. books, journals, academic papers and articles); training materials (i.e. curriculum, e-learning modules, and databases and knowledge repositories (i.e. online databases, libraries, and knowledge management systems), software and tools, best practice guidelines, and case studies. This action consists of developing ad hoc products to raise awareness of stakeholders and disseminate knowledge to a broader audience. Responsibilities for this action will rest on Academia, think-tanks, scientific societies and development partners in coordination with the public and private sectors.

06

# Implementation Plan



## 6.1 Key components of the Plan

The objective of the implementation plan is to ensure that the roadmap is carried out effectively, efficiently, and in alignment with its intended objective. By establishing a timeline, the implementation plan helps keep the roadmap on track and ensure that key outcomes are met on time. Assigning specific tasks to different entities allows everyone to know their responsibilities and to complete their part of the roadmap. In addition, the plan will be used to monitor progress and adjust as needed, so that the roadmap can stay on course. Annual reporting frequency is adopted for each indicator and action, then a target value is set every year. Monitoring and Reporting of the implementation of the roadmap is the responsibility of the Secretariat of the Jordan High-Level Forum on E-mobility (HFE) as per its Terms of Reference, approved by the Ministries of Environment, Transport and Energy & Mineral Resources. Reporting to stakeholders will take part during the annual meeting of the High-Level Forum on E-mobility.

## 6.2 Resources Allocation for Monitoring & Reporting

The entity in charge of the Secretariat of the HFE will allocate its own resources and personnel for monitoring and reporting activities under this roadmap. For 2026 and 2027, secretariat is provided by The Global Green Growth Institute (GGGI), as the executing agency of the GEF-7 'Integrated adoption of electric mobility in Jordan' for Jordan. For subsequent years, decision will be made by the HFE.

## 6.3 Risks and Mitigation Measures

### 6.3.1 Financing constraints

Successful implementation of the roadmap relies heavily on private sector investment in electric buses. Donors' coordination meetings will be organized on an annual basis under the umbrella of the Jordan High-Level Forum on E-mobility to identify needs and liaise tourist transport operators with financiers, including by enhancing access to concessional climate, sustainable and carbon finance.

### 6.3.2 Lack of stakeholders' engagement and coordination

Achieving the objective of the roadmap is a collective effort at national level. Lack of engagement, dialogue and coordination among stakeholders will hinder the implementation considering that the selected actions require input and efforts from multiple sources in the public and private sector. Coordination and engagement will be led by the Jordan High-Level Forum on E-mobility. Dialogue between the public and private sector will take place under the “Integrated adoption of electric mobility in Jordan” project, approved by the Global Environment Facility (GEF) as part of the GEF ‘Global Programme to Support Countries with the Shift to Electric Mobility’.

## 6.4 Implementation tables

The implementation plan of the roadmap for sustainable transport in the Jordan tourism sector is presented below in a table format, consisting of a specific table for the strategic objective, as well as one table for each of the four instruments.

HIGH LEVEL OBJECTIVE											
Indicator	Scenario	2026	2027	2028	2029	2030	Reporting frequency	Responsible Party	Data source	Methodology	
GHG emissions reduction (tCO <sub>2</sub> e/y)	Conditional	1,637	3,346	5,232	7,309	9,591	Annual	MoEnv; GGGI	MOTA; tourist operators; UNFCCC	Roadmap section 4	
	Unconditional	252	531	839	1,178	1,550					
PM <sub>2.5</sub> emissions reduction (tons/y)	Conditional	0.1	0.2	0.4	0.5	0.7	Annual	MoEnv; GGGI	MOTA; tourist operators; COPERT	Roadmap section 4	
	Unconditional	0.02	0.04	0.06	0.09	0.11					
NOx emissions reduction (tons/y)	Conditional	14.1	29.6	46.8	65.7	86.5	Annual	MoEnv; GGGI	MOTA; tourist operators; COPERT	Roadmap section 4	
	Unconditional	2.3	4.8	7.7	10.8	14.2					

Table 6: High-Level Objective Implementation Plan

INSTRUMENT: TECHNOLOGY AND INFRASTRUCTURE										
Action	Indicator	Scenario	2026	2027	2028	2029	2030	Reporting frequency	Responsible Party	Data source
Introduction of electric buses in the tourism sector	Number of e-buses in operation	Conditional	61	122	183	244	305	Annual	Tourist operators	LTRC
		Unconditional	10	20	30	40	50			
Development of charging network for the tourism sector	Number of charging station available	Both	2	4	6	8	10	Annual	Private sector	MOTA; MEMR
Site assessment at tourism locations for charging station planning	Number of completed assessments	Both	3	6	9	12	15	Annual	MOTA; MEMR	MOTA; MEMR
Renewable energy supply	Installed capacity at charging stations (MW)	Conditional	0.26	0.55	0.86	1.21	1.59	Annual	MEMR; Private sector	MEMR
		Unconditional	0.04	0.09	0.14	0.20	0.26			

Table 7: Technology and Infrastructure Implementation Plan

INSTRUMENT: REGULATORY AND POLICY FRAMEWORK										
Action	Indicator	2026	2027	2028	2029	2030	Reporting frequency	Responsible Party	Data source	
Standardization	Number of EV standards published	-	1	-	-	-	Annual	JSMO	JSMO	
EV Prioritization in national tourism program	Updated regulation	-	-	1	-	-	Annual	MOTA	MOTA	
Data management	Tourist transport data is collected	-	-	1	-	-	Annual	MODEE; MOT; MOTA	MOTA; MOT; tourist operators	

Table 8: Regulatory and Policy Framework Implementation Plan

INSTRUMENT: ACCESS TO FINANCE										
Action	Indicator	2026	2027	2028	2029	2030	Reporting frequency	Responsible Party	Data source	
Climate Finance Mobilization	USD mobilized (million)	8.5	8.5	8.5	8.5	8.5	Annual	Development partners, Green Finance Funds, Commercial Banks	Development partners	
Sustainable Finance Mobilization	USD mobilized (million)	8.5	8.5	8.5	8.5	8.5	Annual	Development partners, Green Finance Funds, Commercial Banks	Development partners	
Carbon Finance Mobilization	USD mobilized	8.5	8.5	8.5	8.5	8.5	Annual	Development partners, Green Finance Funds, Commercial Banks	Development partners	

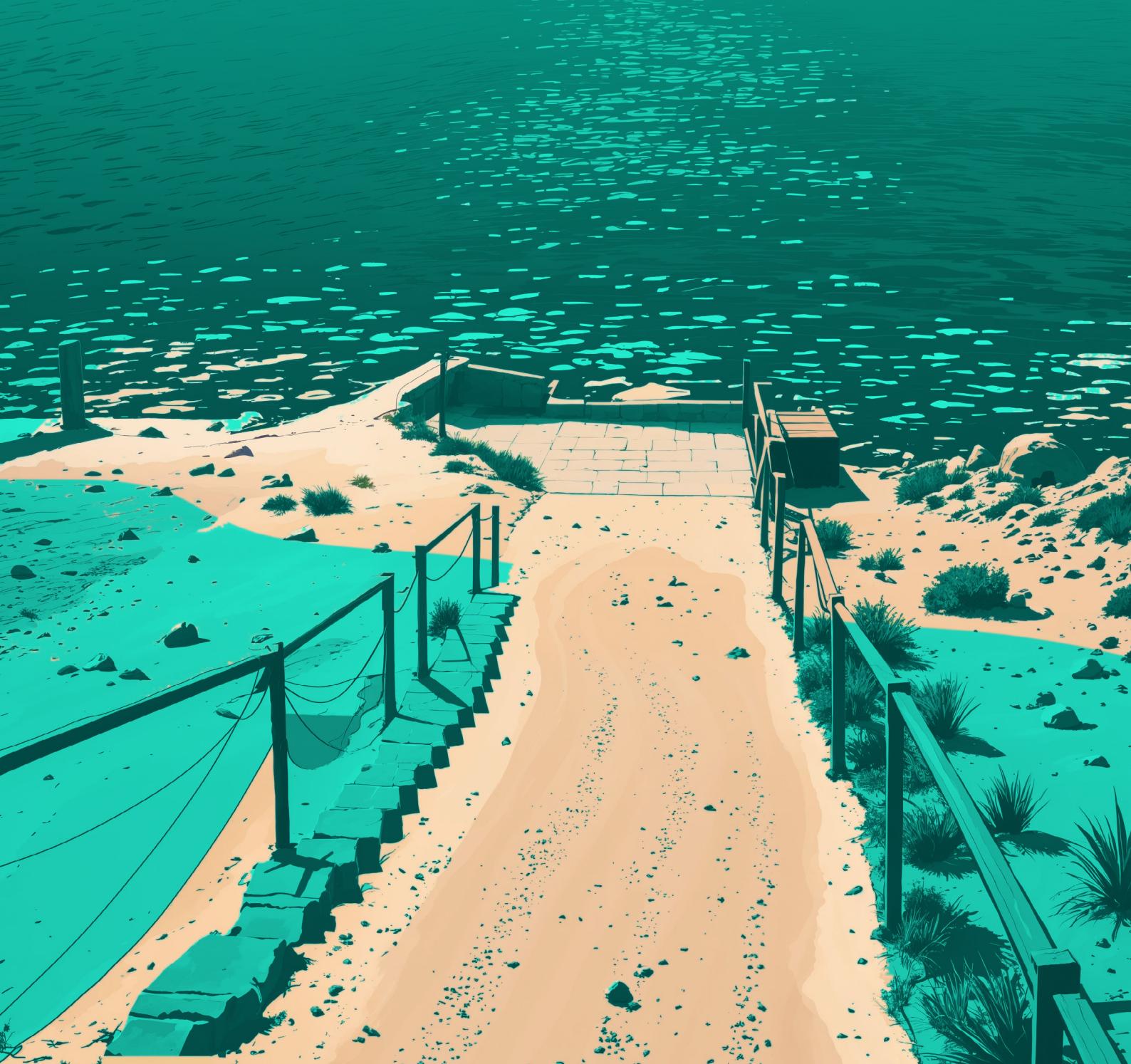
Table 9: Access to Finance Implementation Plan

INSTRUMENT: KNOWLEDGE SHARING										
Action	Indicator	2026	2027	2028	2029	2030	Reporting frequency	Responsible Party	Data source	
EV Technician Training	Number of participants trained	80	100	120	140	160	Annual	Development partners, training institutions	TVSDC	
Capacity Building	Number of participants in capacity building activities	100	100	100	100	100	Annual	Development partners	HFE	
Knowledge Products	Number of knowledge products published	-	1	1	1	1	Annual	Government and development partners	HFE	

Table 10: Knowledge Sharing Implementation Plan

07

# Conclusion



The quantitative target which will be critical to achieve the strategic objective this roadmap is the reduction of 9,591 tons of CO<sub>2</sub>e by 2030, -31% emissions compared to the business-as-usual scenario, subject to the mobilization of international climate finance. The transport sector in Jordan reports around 9.4 million tons of emissions per annum, while total GHG emission at national level are around 32 million tons/y. Therefore, such a target is deemed achievable and aligned not only with the principles of results-based management involving setting up realistic expected results, but more importantly in accordance with Jordan's commitments as part of its Nationally Determined Contribution to the Paris Agreement.

Nevertheless, this level of reduction corresponds to shifting about 55% of the current tourist bus fleet from diesel to electric, assuming that the e-buses would be powered from the grid, which does not only comprise renewable energy. Therefore, successful implementation of the roadmap will require the engagement of all stakeholders. To this end, the roadmap leverages several instruments, namely 1) technology and infrastructure, 2) policy and regulatory framework, 3) access to finance, and 4) knowledge sharing, and three actions are selected under every instrument, For the first instrument, the focus will be on introducing e-buses, developing a network of charging stations, and supplying them with renewable energy. Actions related to the second instrument encompass standardization, EV prioritization in the national tourist program called Urdona Janah, and data management. Instrument #3 consists of mobilizing concessional financing, including climate finance, sustainable finance and carbon finance. Lastly, the fourth instrument will act on EV technician training, private and public sector capacity building, as well developing knowledge products around sustainable transport.

Tourist operators in Jordan are largely from the private sector. Even if the upfront costs of electric vehicles can be significantly higher than diesel equivalent, lower operating costs will generate cost savings and bring in the long run the total cost of ownership of e-buses lower than fossil fuel vehicles. Besides, tourist operators that shift to clean transport modes will gain a competitive advantage in the light of the growing global demand for green tourism. The latter is even more relevant for Jordan which hosts sensitive, historic and natural destinations such as Petra, Wadi Rum, Jerash, etc.

The role of the public sector and development partners under this roadmap will essentially be to create an enabling environment and derisking private capital investment. The Government can support through standardization and policy incentives. Development partners should help mobilize concessional financing considering the climate benefits of sustainable transition. With the participation of all stakeholders, the successful implementation of the roadmap will generate measurable economic, environmental and social positive impacts and increase Jordan's attractiveness for global tourism demand, which is expected to continue growing at a rate of 5.3% per year.



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