future transportation

MDPI

Article

Implementation Challenges of Low-Emission Public Transport Policies in Ulaanbaatar, Mongolia

Bayarmagnai Jambaldorj [1,*] and Kenichi Matsui [2]

[1] Doctoral Program in Sustainable Environmental Studies, University of Tsukuba, Tsukuba 305-8577, Japan
[2] Faculty of Life and Environmental Sciences, University of Tsukuba, Tsukuba 305-8577, Japan; matsui.kenichi.gt@u.tsukuba.ac.jp
* Correspondence: s2236028@u.tsukuba.ac.jp

Abstract

Past studies on low-carbon public transport implementation challenges primarily focused on a specific transport mode to find its viability within broader sustainable urban mobility frameworks. A notable gap still exists in analyzing implementation challenges of low-emission urban public transport policies in the Global South. In particular, research about cities in developing countries, including Mongolia, remains limited. Thus, this study attempts to fill this gap by identifying implementation challenges for low-emission public transport policies in Ulaanbaatar, Mongolia's capital. We collected and systematically examined the most relevant legal and policy documents from 2008 to 2023, including those from transport agencies and research institutions. The low-emission public transport policies were identified using the principles of the Avoid-Shift-Improve approach. The implementation challenges of identified policies were analyzed using the policy implementation analysis framework developed by Sabatier and Mazmanian. We found that low-emission public transport initiatives that were approved by international organizations and the national government were canceled or significantly delayed due to political instability, financial limitations, and poor inter-agency coordination. This paper also shows that, contrary to some past studies that mainly emphasized financial and administrative capacity limitations, Ulaanbaatar's low-emission public transport policy implementation met more varied challenges due partly to its unique political, social, and institutional factors as well as unpredictable incidents like the COVID-19 pandemic.

Keywords: low-emission; public transport policy; implementation challenges; Ulaanbaatar

check for updates

Academic Editor: Kum Fai Yuen

Received: 19 August 2025
Revised: 6 October 2025
Accepted: 6 October 2025
Published: 15 October 2025

Citation: Jambaldorj, B.; Matsui, K. Implementation Challenges of Low-Emission Public Transport Policies in Ulaanbaatar, Mongolia. *Future Transp.* **2025**, *5*, 144. https://doi.org/10.3390/futuretransp5040144

Copyright: © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

1. Introduction

The transport sector has been one of the main contributors to global greenhouse gas emissions and air pollution. According to the IPCC report [1], the transport sector was the 4th largest global greenhouse gas emission source, contributing 15% in 2019. The European Environment Agency [2] highlighted that road transport accounts for significant air pollutant emissions. In the European Union, road transport constituted about 18% of CO, 28% of NOx, and 5% of PM2.5 emissions in 2019 [2]. In the United States, it was responsible for 41% of NOx and 19% of VOC emissions between 2004 and 2015 [3]. While road transport emissions decreased in many cities of developed countries, they increased in developing regions, including China and India, over the past decades [3]. Similarly, road transport generates a significant amount of air pollution in Ulaanbaatar, one of the world's

most polluted capitals with PM2.5 concentration, which is 12 times higher than the WHO guideline [4,5].

Low-emission transport has been promoted to reduce global greenhouse gas emissions and air pollution [6]. Three types of measures were identified: (1) improving motor vehicle efficiency through technology and clean fuels, (2) shifting towards sustainable transport modes, and (3) reducing the need to travel by improving urban infrastructure technology efficiency [6–8]. Public transport improvement can also reduce traffic accidents, noise, congestion, and health problems [2,9].

However, low-emission public transport policies have faced significant implementation challenges. For example, even though 191 cities in the world adopted the BRT system, many Global South cities struggled for the effective and efficient operation [10]. Dar es Salaam and Nairobi took an extended period of time before making it operational, even though these cities adopted the highly acclaimed Bogotá TransMilenio model for sustainable transport [11] that was designed for overcoming challenges in the Global South. Some cities failed due to optimistic timelines and cost estimation in implementing BRT projects [12]. The BRT system expansion plan in Lima, Peru, was canceled due to a shortage of resources, institutional conflicts, and corruption [13].

Other low-emission public transport policies have faced various implementation barriers. The adoption of electric public utility vehicles in the Philippines met implementation delays due to economic and technological factors [14]. In England and Sweden, the introduction of electric buses faced the limitation of charging infrastructure, high costs, a knowledge gap, and complex stakeholder engagement [15]. Institutional barriers like limited concession periods and diesel-oriented scheduling presented a challenge to implementing zero-emission buses in the Netherlands [16].

Although past studies mainly looked at specific public transport modes, there is still limited understanding of why and how these cities, particularly in developing countries, have encountered implementation challenges for low-emission urban public transport policies. Some generalized factors like financial limitation and poor capacity are often cited, but the question remains as to how these factors were woven into a complex scenario of implementation processes in which not only a city government but also a national government and international organizations were intricately involved in different stages. Amid a growing number of public transport studies with a view of emission reduction, we still have limited knowledge about emerging economic hubs like Ulaanbaatar City in Mongolia, where air pollution and traffic congestion have become serious concerns for residents and policymakers. Therefore, this study attempts to trace low-emission public transport policy implementation challenges in Ulaanbaatar City to shed light on the question as to why Ulaanbaatar has not been able to successfully implement several relevant policies despite active involvement and commitment from developed countries.

In the following sections, the paper first explains the significance of the study area, data collection, and analysis. Then, in the following section, we will identify major low-emission public transport policies in Ulaanbaatar and show implementation challenges. We examine each project first and then elaborate on some common or influential factors that led to the failure of achieving goals for Ulaanbaatar City.

2. Materials and Methods

2.1. Study Area

Ulaanbaatar demonstrates several salient and unique characteristics that contribute to our discussion about low-emission public transport policy implementation challenges. Despite its relatively small population of 1.6 million, as the nation's economic hub and capital city, it embraces approximately 47% of the country's total population. According

to the WHO [5], in 2019, Ulaanbaatar had the 6th highest annual average concentration of PM2.5 among capital cities. This is only behind Kabul, Delhi, Dhaka, Dushanbe, and Kampala. Contrary to Dhaka and Kampala, which are high-population density cities with a warm climate, Ulaanbaatar emits a high volume of PM2.5 mainly during winter months when daily average temperatures range from −26 °C to −13 °C [17]. The national audit report [18] showed that the annual average concentration of fine particles (PM2.5) in Ulaanbaatar was 60 μg/m^3, coarse mode particle (PM10) was 124 μg/m^3, and nitrogen dioxide (NO_2) was 38 μg/m^3. These values are 3.8–12 times higher than WHO guideline values. Furthermore, the air quality statistics [4] data of the roadside air quality monitoring station showed that between 2020 and 2024, the highest NO_2 annual average values in Ulaanbaatar were 6–12 times higher than the WHO guideline value (Figure 1).

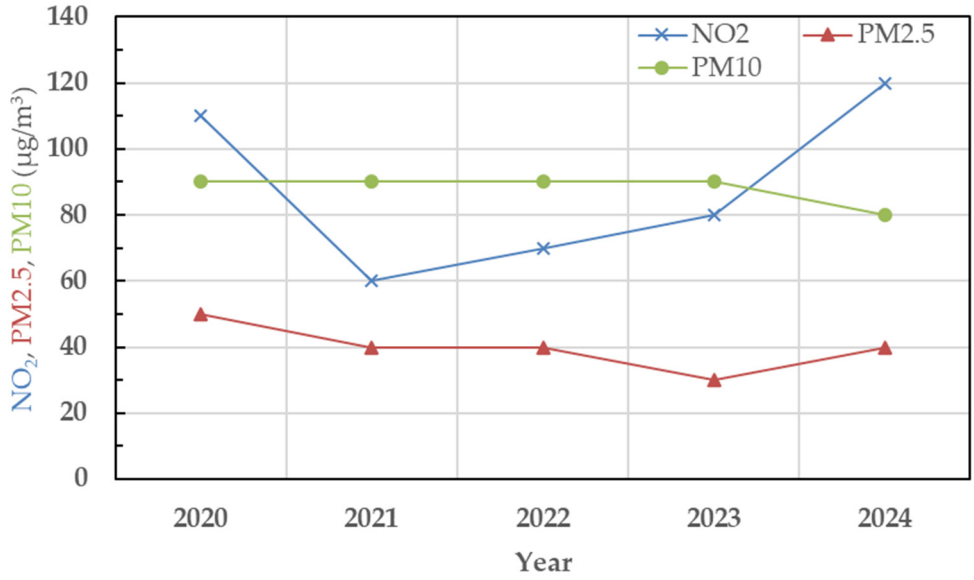


Figure 1. Annual average concentrations of NO_2, PM2.5, and PM10 at roadside monitoring station UB2 in Ulaanbaatar. [Air pollutant data retrieved from the National Statistics Office website].

Vehicles are one of the major air pollution sources in Ulaanbaatar [19]. An on-road emission measurement of diesel buses in the city's bus fleet showed that the actual daily PM emission from one bus is 166.2 g, and emission per kilometer is 0.687 g/km. Emission per kilometer is even higher than the EURO 1 standard emission [20]. According to an emission inventory report of Ulaanbaatar, vehicles contributed to about 10% of air pollution [21]. Nevertheless, buses are Ulaanbaatar's only existing mode of public transport, which carried 140.2 million passengers in 2023. The total bus fleet had 1263 buses in 2020, which are divided into four engine types: 1109 diesel-fueled buses, 95 compressed natural gas (CNG)-fueled buses, 47 trolleybuses (non-battery electric), and 12 electric buses [22].

2.2. Data Collection

Ulaanbaatar City's public transport policies and relevant documents were primarily collected from the Unified Legal Information System [23] and the official websites of the Ministry of Road and Transport Development of Mongolia, Ulaanbaatar City Municipality, and Public Transport Policy Department of Capital City. The policy document selection covered the period from 2008 to 2023. This specific timeframe was chosen because 2008 marked the initial promotion of electric mobility and natural gas usage policy for public transport. After this collection process, we selected one strongly relevant piece of legislation, nine policy documents, and eight action plans (Table 1).

Table 1. List of documents on public transport policy.

Document Type	Document Title	Year
Legislation	Law of Road Transport	1999
Policy	Ulaanbaatar 2020 Master Plan and Development Approach for 2030	2013
	National Green Development Policy 2030	2014
	Mongolia Sustainable Development Vision 2030	2016
	National Program for Reducing Air and Environmental Pollution	2017
	National Policy on Road Transport	2018
	Mongolia's Nationally Determined Contribution to the United Nations Framework Convention on Climate Change	2019
	Vision 2050 Long-term Development Policy of Mongolia	2020
	Five-Year Development Guidelines for 2021–2025 of Mongolia	2020
	General Development Plan of Ulaanbaatar City for 2040 (draft)	2021
Action program and plan	2008–2012 Action Program of the Government of Mongolia	2008
	2012–2016 Action Plan of the Government of Mongolia	2012
	2016–2020 Action Program of the Government of Mongolia	2016
	2020–2024 Action Program of the Government of Mongolia	2020
	2020–2024 Action Plan of the Government of Mongolia	2020
	2016–2020 Action Program of the Governor of the Capital City and Mayor of Ulaanbaatar	2016

In order to identify implementation challenges of these policies and actions, we collected documents from official websites of national and local governments, transport agencies, and research institutions. Additionally, reports from international organizations, such as the Asian Development Bank (ADB), World Bank (WB), and Japan International Cooperation Agency (JICA), were collected and examined. To clarify our findings and identify policy implementation challenges, we used Google searches, including both specific project or policy titles and broader keywords such as "policy name and implementation" or "implementation challenges." From these searches, a limited number of news articles and interviews with officials were extracted and subsequently added to our policy analysis.

2.3. Data Analysis

Three interlinked pathways were used to identify policies that are pertinent to low-emission public transport in Ulaanbaatar City: (1) a shift to low-emission public transport, (2) electrifying transport, and (3) a scale-up support for new generation low-emission fuels. The Global Climate Fund [6] suggested that these three interlinked pathways follow the "Avoid-Shift-Improve" approach that promotes emission needs reduction (avoidance), more sustainable transport modes (shift), and system efficiency (improvement) [7,8]. Policies were selected for a further analysis if they contained measures to shift and improve pathways for low-emission transport.

With this international urban transport framework in mind, we designed a method to analyze the above-identified policy documents. Regarding policy document analyses, past studies emphasized a straightforward, efficient, and cost-effective method in understanding policy processes and contents with a sufficient understanding about policy complexity and implementation challenges [24–26].

A few past studies identified seven common barriers that limit the successful implementation of transport policies as follows: (1) culture; (2) polity; (3) law; (4) organization; (5) knowledge; (6) technology; and (7) finance [27–29]. These barriers are highly relevant to the independent variables of the policy implementation analysis framework of Sabatier and Mazmanian [30]. Thus, we created measurable questions for each variable to make the analysis clearer and easier to assess, and we slightly modified the framework accordingly (Table 2). Our slight modification was based on the information we had acquired about

local transport conditions, given that no past studies examined implementation challenges of low-emission public transport policies in Ulaanbaatar City.

Table 2. Selected independent variables and related questions.

Group	Variables	Research Questions
Problem tractability	Technical difficulty	Is a technical solution available in practice?
	Diversity of the target group	Who are the target groups?
	Scope of policy/population	What is the target group size?
	Extent of behavioral change	Is behavioral change required to achieve the target?
Clear structure for implementation	Clear and consistent objective	Is the objective clear and consistent?
	Legal capacity	Is legal support sufficient to achieve the objective?
	Financial resource	Is a financial resource allocated?
	Hierarchical integration	Is there clear hierarchical integration among implementers?
	Implementing agency decision	Do the implementing agencies have clear decisions or rules about policy?
	Human resource	Is there recruitment of implementing officials?
	Stakeholder involvement	Is there stakeholder(s) involvement?
Other implementation support variables	Socioeconomic condition	What are the socioeconomic conditions of the problem?
	Public support	Does the public support the policy?
	Political support	Does the policy have political support?
	Governmental support	Does the policy have organizational support?
	Leadership in implementation	Do implementers have knowledge and leadership?

3. Results

After examining the above 17 documents, six policy documents were ultimately selected for an in-depth analysis. Three policy documents were excluded: the National Policy on Road Transport [31] was revoked by the Parliament in 2021. Mongolia Sustainable Development Vision 2030 [32] was revoked by the Parliament in 2020 because it was combined with the Vision 2050 Long-term Development Policy [33]. The Draft of the General Development Plan of Ulaanbaatar City for 2040 [34] had not yet been approved by the Parliament.

Of the six selected policy documents, five are national policies, and one is a local government one. All three analytical pathways for low-emission public transport were addressed in these policies with a strong emphasis on a modal shift and transport electrification. Two policies targeted at a wider use of new-generation low-emission fuels. In the following, we first identify low-emission public transport goals and then show our findings about implementation challenges.

3.1. Policies for Shifting Measures to Low-Emission Public Transport in Ulaanbaatar

We found that policies addressed the implementation of four public transport modes in Ulaanbaatar City: (1) the bus rapid transit (BRT) system, (2) cable car, (3) light rail transit (LRT) system, and (4) electromagnetic train.

The BRT system policy is included in three core policy documents: the Ulaanbaatar 2020 Master Plan and Development Approach for 2030 [35], National Green Development Policy [36], and Vision 2050 Long-term Development Policy of Mongolia [33]. Additionally, it is referenced in four action plans, including Government Action Plans for 2012–2016 and 2016–2020 [37,38], the National Green Development Policy Implementation Plan 2016–2030 [39], and the Action Program of the Governor of the Capital City and Mayor of Ulaanbaatar for 2016–2020 [40]. Clear and measurable objectives were mentioned only in three of these documents. The Ulaanbaatar 2020 Master Plan and Development Approach for 2030 [35] set a goal to build a 50-km BRT system with an estimated budget of 320 billion Mongolian tugrik. The BRT system comprises a vertical line between the Selbe

subcenter and Buyant-Ukhaa and a horizontal line between Shar Khad and the Bayangol new residential area. The Government Action Plan for 2012–2016 [37] aimed to complete the BRT system by 2016 with an estimated budget of USD 272 million. In contrast, the Action Plan for National Green Development Policy [39] aimed to construct a 64.5-km BRT system between 2017 and 2019 (Table 3).

Table 3. Low-emission public transport policy implementation status by transport modes as of 2024.

Document	Measurable Objectives and a Time Frame	Implementation Status by 2024
BRT-ADB Completion Report [41]	• Build three BRT corridors with a length of 49.9 km and 60 bus stops by 2019. • Estimated cost: USD 274.4 million. USD 215.9 million loan from ADB, USD 1.5 million grant from the GEF, and USD 57 million from the national government.	Not implemented. The project was closed by the ADB in 2019 due to a prolonged implementation delay.
LRT-GCCAP [42]	• Implementation 30% in 2022, 60% in 2023, 100% in 2024. • Estimated cost: 374.08 billion tugrik (USD 132.9 million). • "General Development Plan of Ulaanbaatar City for 2040" (draft) will build a 64.6 km 3-line system by 2030.	Not implemented. The Parliament did not approve the budget for the project due to the government debt ceiling.
Urban Cable Car=GCCAP [42]	• 2021: 2.5 km (Line 1) operational. • 2022: Additional 2.4 km (Line 1) operational (total Line 1: 4.9 km). • 2nd line feasibility study conducted. • 2023: 7.9 km (Line 1 = 4.9 km + Line 2 = 3 km) operational. • Estimated cost: 199.946 billion tugrik (EUR 60.7 million).	Implementation delay. The general investment agreement was approved and the project implementation contract was signed. The feasibility study was completed.
Electric buses in the public transport fleet-MGAP [43]	• Introduce single and double-decker electric buses to public transport. • Purchase 80 new buses in 2021, 70 new buses in 2022, 90 new buses in 2023, and 90 new buses in 2024. • Estimated cost: 198 billion tugrik (USD 70.4 million)	Partially implemented. 109 new electric buses were purchased between 2021 and 2024, and are now in use.
Increase the use of Euro 5 standard fuel-NPRAEP [44]	• Support the import and use of Euro 5 standard fuel. • Use Euro 5 standard fuel up to 50% in 2019, 80% in 2025.	In implementation, little progress. The imported Euro 5 fuel ratio was about 9.3% in 2019–2021.

Note: ADB: Asian Development Bank; BRT: Bus Rapid Transit; GEF: Global Environmental Facility; GCCAP: Governor of the Capital City Action Program; MGAP: Mongolian Government Action Plan; NPRAEP: National Program for Reducing Air and Environmental Pollution.

The policy for introducing the cable car system is mentioned in Vision 2050 Long-Term Development Policy and Five-Year Development Guidelines for 2021–2025 [33,45]. It is also referenced in two action plans: the Government Action Plan for 2020–2024 and the Action Plan of the Governor of the Capital City and Mayor of Ulaanbaatar for 2020–2024 [42,43]. The latter contains the measurable objective that was to build two cable car lines with a total length of 7.9 km by 2024. Regarding the implementation of this objective, we found that the two policy documents had a significantly different budget: the Government Action Plan mentions 159.908 billion tugrik, but the Governor's Action Plan allocated 199.946 billion tugrik.

In the 2020s, in addition to the urban cable car system, Ulaanbaatar planned to introduce Light Rail Transit (LRT), an electromagnetic train (Maglev), and high-capacity public transport. The Ulaanbaatar 2020 Master Plan and Development Approach for 2030 [35] established a task to conduct a feasibility study for the LRT system. The National Green Development Policy Implementation Plan for 2016–2030 [39] set a goal to implement the Ulaanbaatar Metro project, which was to be built from Amgalan to Tolgoit between 2017 and 2030. Vision 2050 [33] included a goal to introduce electromagnetic trains through high passenger demand corridors. The Government Action Plan for 2020–2024 [43] outlined its implementation with a feasibility study to be completed in 2022 and infrastructure construction to be completed in 2024. An estimated total budget was

764.601 billion tugrik. The Action Plan of the Governor of the Capital City and Mayor of Ulaanbaatar for 2020–2024 [42] included a plan to implement a high-capacity public transport project between 2022 and 2024 at a total cost of 374.08 billion tugrik. Overall, the total cost to construct all these proposed urban transport developments was estimated at approximately USD 747.75 million (using 2020 as the reference year for currency conversion), which is 5.6% of Mongolia's 2020 GDP.

3.2. Policies for Improve Measures for Low-Emission Public Transport in Ulaanbaatar

Public bus electrification is the main component of the low-emission public transport policy in Ulaanbaatar. In May 2008, the Parliament amended the Law on Road Transport [46] to include provisions for the adoption of natural gas-fueled and electric public transport in urban and suburban areas. However, no action was taken. When the Ulaanbaatar 2020 Master Plan and Development Approach 2030 [35] were amended in 2013, the adoption of a high-capacity bus fleet and trolleybuses was mentioned as the city's core public transport system in the future. It aimed to introduce six new public bus parks and to improve service capacity with a fleet of 1800 buses, comprising 50 duo electric buses and 100 trolleybuses (non-battery electric buses). Vision 2050 [33] included a goal of introducing eco-electric public transport to reduce GHG emissions. The Five-Year Development Guidelines for 2021–2025 [45] mentioned the importance of introducing environmentally friendly electric, CNG, and hybrid public transport projects. Government Action Plan for 2020–2024 [43] would introduce a total of 330 single- and double-deck electric buses into public transport service in Ulaanbaatar between 2021 and 2024 (Table 3).

These policies additionally aimed to increase the use of Euro 5 standard fuel and compressed natural gas (CNG). Four policy documents commonly mention CNG use: the Ulaanbaatar 2020 Master Plan and Development Approach 2030 [35], National Green Development Policy 2030 [36], National Program for Reducing Air and Environmental Pollution [44], and Five-Year Development Guidelines [45]. The CNG adoption meant to comply with the Law on Road Transport [46], in which public transport includes both bus and taxi services. The Government Action Program for 2008–2012 [47] set a goal to support the acquisition of more than 2000 gas-powered taxis. However, the Government Action Plan for 2012–2016 [37] changed the goal to having 800 CNG buses by 2014. Then the National Program for Reducing Air and Environmental Pollution [44] changed the target to acquire 3,000 CNG taxis by 2025. The National Program for Reducing Air and Environmental Pollution [44] aimed to increase the use of Euro 5 fuel to 50% of the total fuel use by 2019 and 80% by 2025. Mongolia's Nationally Determined Contribution to the UNFCCC [48] aimed to reduce the transport sector's total GHG emissions by 0.457 Mt CO_2 eq (approximately a 35% reduction) through supporting Euro 5 fuel use by 2030 (Table 3).

3.3. Policy Implementation Challenges

3.3.1. Implementation Challenges of the Bus Rapid Transport BRT Project

Despite hopeful visions for low-emission transport transformation for Ulaanbaatar mentioned above, what happened afterward was largely disappointing. We attempted to understand why these visions did not materialize as planned. As briefly mentioned above, the ADB canceled the BRT project in August 2019 due to several reasons [41]. First, after the project announcement, the Mongolian government delayed its approval to appropriate a budget for the project. The 40% public debt ceiling that had been put in place since the 2014 Fiscal Stability Law delayed the project approval process. Second, the loan and project agreements for tranche 1 were signed on 5 May 2015, but the public transportation committee was not prepared to handle the coordination work that was essential to implement this project. Third, during project implementation from

March 2012 to September 2019, the Prime Minister of Mongolia changed four times, and two parliamentary elections were held in 2012 and 2016, changing many officials who were in charge of this project implementation.

In addition to these national-level challenges, Ulaanbaatar City faced other problems. The city requested to change the plan because the planned BRT corridor on Enkhtaivan Avenue overlapped with the Light Rail Transit (LRT) plan outlined in the Ulaanbaatar 2020 Master Plan and Development Vision for 2030. The executing agency proposed to minimize these overlaps. When the revised terms of reference were presented in January 2019, the consulting service recruitment process was halted due to insufficient remaining time before the end of the tranche 1 schedule. ADB's Multitranche Financing Facility (MFF) for the Urban Transport Development Investment Program for Mongolia was to be undertaken in three tranches. Tranche 1 had a budget of USD 78.4 million, with its loan/grant closing date set for February 2018. However, due to a delayed launch, the Ministry of Finance requested an extension, and the ADB approved a two-year extension [41].

The ADB report [41] also explained that the program lacked effective and continued support from key bodies. The project steering committee was established but could not provide necessary services to the management team. Its decisions were mostly overruled by the Citizens' Representative Council. The committee was not sufficiently empowered to coordinate among stakeholders, as it had a lower legal status than the Municipality of Ulaanbaatar.

A JICA report [49] highlighted that the BRT project was a complex and first-generation BRT project that needed a long-term investment plan. The prolonged decision-making processes shortened the already limited implementation period. Considering that the project was overly ambitious with many big promises, the project implementation unit (PIU) needed more time and training for sufficient skills and knowledge to manage the scheduling of this complex infrastructure project.

In short, the BRT project failed primarily due to its overly optimistic implementation structure, including overlapping plans, a lack of legal capacity, financial decision-making delays, and weak coordination among various agencies. Additionally, political instability and a lack of consistent governmental support and leadership further contributed to the project's cancelation.

3.3.2. Light Rail Transit and Urban Cable Car Project Implementation Challenges

After the failure of the BRT project, Light Rail Transit (LRT) and Urban Cable Car projects (2020–2024) were introduced. There is limited openly available information about these projects due to a lack of progress and audit reports. To supplement, we examined news articles and interviews of implementers. The idea of introducing LRT was originally mentioned in the Ulaanbaatar 2020 Master Plan and Development Approach for 2030. However, a clear objective was only mentioned in the Concept of General Development Plan of Ulaanbaatar City for 2040 [34], which was a draft policy. In this draft, LRT was to establish a 64.6 km three-line system by 2030. At the time, the JICA [49] suggested that this project would face another implementation challenge, as the city had not overcome issues of limited financial resources, administrative capacity, and technical readiness. A local government's financial resource limitations are directly connected to its fiscal dependency on a state or central government, a situation often caused by legal limitations on its ability to generate independent revenue for high-cost development projects. In addition, land acquisition would require a long-term commitment to a series of negotiations with landowners and business interests.

Even though the JICA recommended a longer implementation period for undertaking any mass transit projects, the Government Action Plan for 2020–2024 [43] and the Action

Plan of the Governor of the Capital City and Mayor of Ulaanbaatar for 2020–2024 [42] gave only a 3- to 4-year implementation period. The mayor of Ulaanbaatar announced that the feasibility study for the LRT project would be ready in March 2022. The study was conducted in 2022 by a joint venture between the China Railway Engineering Corporation (CREC) and UDC Group LLC, Mongolia [50].

However, Mongolia's parliament did not approve the loan for LRT due to concerns over the government debt ceiling and economic security. According to news articles [51–54], a state budget amendment draft in April 2022 included the government's guarantee of USD 510 million, which meant 50% of the first phase of the LRT project. However, during the parliamentary session, some members mentioned that the project's total cost was to be USD 2.8 billion, which is approximately 16% of the country's 2022 GDP. This revelation caused a strong debate over the government debt ceiling, which is capped at 60% of GDP, leaving a headroom of only USD 1.6 billion. Unlike the BRT project, the LRT plan was still in its planning stage with no final decisions being made. However, the plan suffered from a lack of a clear, consistent objective without a realistic implementation timeline.

In May 2020, the Mongolian government and the Government of the French Republic entered into a loan agreement for the Ulaanbaatar cable car project. It was to be fully financed through a loan from the French Government at the cost of EUR 60.7 million. The project was to be implemented by the Municipality of Ulaanbaatar City and the French company POMA for the 2020–2024 period [55]. Although the project was initiated, there was no progress reported in terms of physical outcome. In the early stages of the project, the COVID-19 pandemic made it impossible for French experts to visit Mongolia. In addition, land disputes along the proposed cable car route emerged. The municipality was asked to reconsider the planned route, halting the project implementation in the meantime [55–57]. According to Suvdmaa [57], the first planned routes for the cable car system were from Bayankhoshuu to Gemtel Hospital and from Doloon Buudal to Sansar. These routes would pass through densely populated ger areas (Figure 2). Later, the revised route was established from Yarmag to Kharkhorin, passing through the industrial area and the Tuul River watershed, which has lower population density. This new plan went ahead, and the Public Transport Policy Department [58] reported that pylon construction began in 2024 for the 4.2 km line.

In a nutshell, unlike the previous project implementation challenges, the urban cable car project exposed external factors like the COVID-19 pandemic along with socioeconomic challenges. The latter included land ownership problems, especially in densely populated areas. The land acquisition for the initial route met challenges when the municipality could not obtain wider public support and legal services for land transaction due partly to the hasty implementation process. As a result, the route moved to less populated area with some concerns over a short-term financial return with a heavy infrastructure investment.

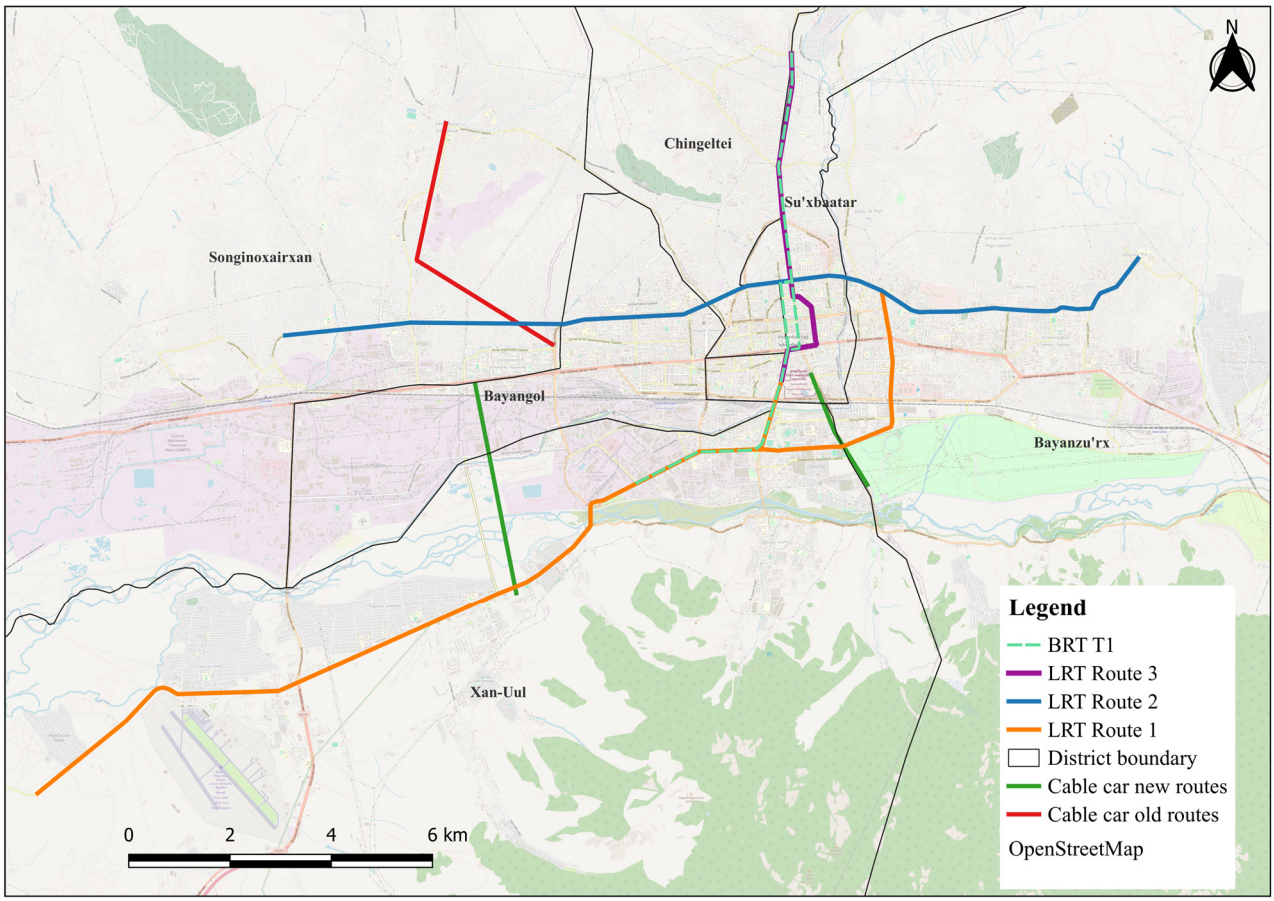


Figure 2. Map of planned transit routes for public transport of Ulaanbaatar. [Visualization based on OpenStreetMap, July 2025].

3.3.3. Implementation Challenges of Electrifying Public Transport and the Use of Clean Fuel

Coinciding with the cable car project, the Mongolian Government issued its 2020–2024 Action Program in 2020. This included an annually determined numerical goal of introducing electric buses to the public transport fleet in Ulaanbaatar City. In 2021, the national government would purchase and introduce 80 new electric buses. This would be followed by 70 new electric buses in 2022, 90 in 2023, and another 90 in 2024. However, only 109 new electric buses were introduced to the public transport fleet from 2020 to 2024. According to a press interview with the governor of Ulaanbaatar, the procurement of buses was delayed due to financial difficulties and the COVID-19 pandemic [59].

Unlike other policies, Ulaanbaatar faced an immediate, mandatory technical requirement to replace its aged bus fleet, which is Ulaanbaatar's only existing public transport. This urgent need prompted the municipality to purchase new Euro 5 diesel engine and electric buses between 2021 and 2024 [58]. However, the question arose as to the extent to which the existing bus fleet can contribute to emission reduction, given remaining concerns over the durability of electric buses. The 2022 JICA report [49] warned that cold weather conditions in Ulaanbaatar would pose a technical challenge for buses powered by rechargeable batteries. Senol et al. [60] similarly argued that low temperatures can reduce the lifespan of Li-ion batteries in electric vehicles, decrease their driving range, and increase charging time.

In addition to increasing the number of electric public buses, the national government planned to increase the usage of Euro 5 standard fuel in urban areas up to 50% of total fuel use by 2019 and 80% by 2025 [44]. The national standard for diesel fuel Euro technical

requirements was introduced in 2018, and a fuel quality testing laboratory capacity was established. It also planned to reduce 35% of transport sector GHG emissions by 2030 [48].

However, the national audit report [18] indicated that Euro 5 standard fuel constituted only about 9.3% of the total fuel imported in 2021. The actual import of Euro 5 standard fuel was insufficient to reach the objective of 50% of total fuel use in 2021. A press interview with a governmental representative highlighted only the need to improve public awareness and implement supportive policies through legal measures rather than a lack of institutional preparedness to execute these fuel use goals. The interview added that the market was not willing to import more Euro 5 standard fuels, as these are more expensive, and most users currently opt for cheaper Euro 3 standard fuels [61].

For the public transport sector, Ulaanbaatar has heavily invested in public buses with Euro 5 engines. According to the Public Transport Policy Department of the Capital City, the local government purchased 965 Euro 5 engine buses between 2022 and 2024 [62]. However, a formal policy on the use of Euro 5 diesel fuel in these buses was not found. According to Khulantakhi [63], it was the unilateral decision by the Minister of Environment and Climate Change in 2024.

4. Discussion

The findings we discussed above reveal a pattern of implementation challenges due partly to overly ambitious or optimistic plans. We also discussed political instability, the debt ceiling, institutional capacity weakness, and logistic and management inefficiency. During the planned BRT project period, for example, four prime ministers and two parliamentary elections came into power in Mongolia, making it difficult to sustain original intentions and commitment to set aside or maintain project budgets. This political fluidity reflects administrative and institutional weakness, as noted by Sabatier and Mazmanian [30]. Sabatier's advocacy coalitions framework argues that a lack of "advocacy coalitions" can lead to fragmentation of power among stakeholders or administrative subsystems that represent different economic interests and are constrained by conflicting legal mandates [64]. Sabatier also suggested that a greater fragmentation among subsystems occurs among more recently formed ones.

A similar situation was found in a transport project in the Netherlands [65], where conflicting rules and a power imbalance among government agencies posed a major challenge to effective implementation. A hierarchy between national and regional governments often prevented them from working together effectively. We saw a similar situation in our discussion about the disempowered steering committee for the BRT implementation process.

We also demonstrated that advocacy coalitions for low-emission transport projects were not internally formed, partly because of frequently changing administrative subsystems. This led to a weak connection between the needs of residents and the carbon emission mitigation needs of donor agencies. Ulaanbaatar stakeholders were more concerned about economic growth, public transport needs, and social stability. Institutional weaknesses are often attributed to implementation failures, but without deeper consideration of internally grown needs and drivers, potential avenues for strengthening collaboration across agencies may be overlooked [66,67].

The Parliament delayed or rejected loans for public transport projects in Ulaanbaatar due to concerns about the debt ceiling. This highlights municipal government's limited ability to independently finance major transport undertakings. This is consistent with findings from the international context, where rigid budgeting rules with sectoral priorities restricted integrated land-use and transport planning efforts [65,68]. This also connects with the high upfront investment cost of adopting new-generation public transport

technologies [14]. According to a JICA study [49], major legal changes had already improved Ulaanbaatar's financial resources, allowing it to issue bonds, monetize the local development fund, establish public–private partnership rights, and co-fund projects. This suggests that financial difficulties alone cannot explain the failure of low-emission transport projects in Ulaanbaatar City.

Another factor we identified relates to policy plans that failed to incorporate realistic timelines. The JICA study [49] explicitly mentioned that complex, first-generation projects like BRT and LRT would require much longer implementation periods than the plans Mongolia allocated. In Ulaanbaatar, BRT, LRT, and cable car project plans set aside only 3–4 years for completion without clearly defined, time-bound, logistical goals and monitoring systems in place. For example, in Bangladesh, the Dhaka Metro Rail project took over a decade to become operational [69]. The project began its planning in 2009–2010. The national government approved the project in 2012, and the loan agreement was signed with the JICA in the following year. The implementation plan was laid out for 12 years, and the first phase was completed and became operational in December 2022.

A literature review on BRT implementation in the Global South confirms that the involvement of multiple institutions and the need for new legislation and enforcement are challenges that can delay the implementation process [10]. Furthermore, as implementation theory suggests, when a new, first-generation project is assigned to an existing agency without a clear priority, it will face delays and be given low priority, especially with a change in political leadership [30]. This dynamic, coupled with unforeseen challenges like the COVID-19 pandemic and land acquisition issues, affected implementation progress.

5. Conclusions

Considering challenges the Global South has faced in reducing carbon emissions from the transport sector, this paper examined implementation challenges of low-emission public transport policies in Ulaanbaatar City. After a thorough search for policy documents and international organization reports from 2008 to 2023, we selected and analyzed the most relevant national and municipal policies. These policies were related to the adoption of BRT, LRT, cable cars, electric buses, and Euro 5 standard fuel.

Our results showed varying degrees of implementation challenges, ranging from cancelation to substantial delay. Failures in implementing BRT and LRT systems were mainly due to political instability, hasty planning, debt ceiling constraints, poor administrative coordination, and a lack of advocacy coalitions. Progress delays for implementing the cable car project and electric buses were largely attributable to financial shortages, the COVID-19 pandemic, and land acquisition challenges. In terms of Euro 5 standard fuel adoption, the promotion of higher standard fuel among private users was found essential to increase the import of Euro 5 fuel. The national government did not appear to have sufficiently incentivized the use of Euro 5 fuel. We conclude that the challenges of implementing low-emission public transport policies in Ulaanbaatar are case-by-case in nature, even though a development need gap between international donors and aid recipients as well as domestic financial and administrative capacity limitations somewhat affected each case.

Finally, we discuss the study's limitations. Our findings rely mostly on government documents, project reports, and news articles, which do not always provide detailed information about the entire implementation process. For some policies, such as Euro 5 fuel adoption, LRT, and the cable car project, we could not obtain final project reports and audit findings as we used only openly available information. To help us understand implementation challenges more, future research can be performed in the area of low-emission public transit needs in different areas of the city, city government's organizational

culture, and economic feasibility or long-term profit projections for low-emission public transport projects.

Author Contributions: Conceptualization, B.J. and K.M.; methodology, B.J. and K.M.; formal analysis, B.J.; investigation, B.J.; data curation, B.J.; writing—original draft preparation, B.J.; writing—review and editing, K.M.; supervision, K.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: All the data used for the article is within the article.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. IPCC. *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*; Cambridge University Press: Cambridge, UK, 2022. [CrossRef]
2. European Environment Agency. Emissions of Air Pollutants from Transport. 2021. Available online: https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-air-pollutants-8/transport-emissions-of-air-pollutants-8 (accessed on 30 June 2023).
3. Sicard, P.; Agathokleous, E.; Anenberg, S.C.; De Marco, A.; Paoletti, E.; Calatayud, V. Trends in urban air pollution over the last two decades: A global perspective. *Sci. Total Environ.* **2022**, *858*, 160064. [CrossRef] [PubMed]
4. National Statistics Office of Mongolia. Mongolian Statistical Information Service. Available online: https://www.1212.mn (accessed on 1 July 2025).
5. WHO. Air Quality Database 2022. 2023. Available online: https://www.who.int/data/gho/data/themes/air-pollution/who-air-quality-database (accessed on 30 June 2023).
6. Global Climate Fund. Low Emission Transport Sectoral Guide. Sectoral Guide Series. Yeonsu: Green Climate Fund. 2022. Available online: https://www.ctis.re.kr/en/downloadBbsFile.do?atchmnflNo=8833 (accessed on 30 June 2023).
7. Banister, D. The sustainable mobility paradigm. *Transp. Policy* **2008**, *15*, 73–80. [CrossRef]
8. Nakamura, K.; Hayashi, Y. Strategies and instruments for low-carbon urban transport: An international review on trends and effects. *Transp. Policy* **2013**, *29*, 264–274. [CrossRef]
9. Kwan, S.C.; Hashim, J.H. A review on co-benefits of mass public transportation in climate change mitigation. *Sustain. Cities Soc.* **2016**, *22*, 11–18. [CrossRef]
10. Asimeng, E.T.; Jauregui-Fung, F. Tailoring bus rapid transit to the complex realities of African Cities: Critical issues and public policy planning approaches. *Transp. Res. Interdiscip. Perspect.* **2025**, *30*, 101351. [CrossRef]
11. Tsivanidis, J.N. The Aggregate and Distributional Effects of Urban Transit Infrastructure: Evidence from Bogotá's Transmilenio. 2018. Available online: https://knowledge.uchicago.edu/record/347/files/Tsivanidis_uchicago_0330D_14356.pdf (accessed on 1 July 2025).
12. Lindau, L.A.; Hidalgo, D.; De Almeida Lobo, A. Barriers to planning and implementing Bus Rapid Transit systems. *Res. Transp. Econ.* **2014**, *48*, 9–15. [CrossRef]
13. Mallqui, Y.Y.C.; Pojani, D. Barriers to successful Bus Rapid Transit expansion: Developed cities versus developing megacities. *Case Stud. Transp. Policy* **2017**, *5*, 254–266. [CrossRef]
14. Guno, C.S.; Collera, A.A.; Agaton, C.B. Barriers and drivers of transition to sustainable public transport in the Philippines. *World Electr. Veh. J.* **2021**, *12*, 46. [CrossRef]
15. Aldenius, M.; Mullen, C.; Pettersson-Löfstedt, F. Electric buses in England and Sweden—Overcoming barriers to introduction. *Transp. Res. Part D Transp. Environ.* **2022**, *104*, 103204. [CrossRef]
16. Bakker, S.; Konings, R. The transition to zero-emission buses in public transport—The need for institutional innovation. *Transp. Res. Part D Transp. Environ.* **2017**, *64*, 204–215. [CrossRef]
17. WMO. World Weather Information Service. 2025. Available online: https://worldweather.wmo.int (accessed on 1 July 2025).

18. Mongolian National Audit Office. Audit Report on Government Use Effects on Money Expended for Air Environmental Pollution Reduction Activities in 2017–2020, GAG/2020/13-GA. 2021. Available online: https://web.archive.org/web/20230816020820/https://audit.mn/wp-content/uploads/2021/11/%D0%9D%D1%8D%D0%B3%D0%B4%D1%81%D1%8D%D0%BD-%D1%82%D0%B0%D0%B9%D0%BB%D0%B0%D0%BD-%D0%90%D0%B3%D0%B0%D0%B0%D1%80%D1%8B%D0%BD-%D0%B1%D0%BE%D1%85%D0%B8%D1%80%D0%B4%D0%BE%D0%BB-20211022-%D1%85%D1%8D%D0%B2%D0%BB%D1%8D%D1%85-3.pdf (accessed on 16 August 2023).
19. Amarsaikhan, D.; Battsengel, V.; Nergui, B.; Ganzorig, M.; Bolor, G. A Study on Air Pollution in Ulaanbaatar City, Mongolia. *J. Geosci. Environ. Prot.* **2014**, *2*, 123–128. [CrossRef]
20. Agvaantseren, T.; Badarch, B.; Tseveg, A. The Impact of Diesel Bus Emissions on Air Pollution in Ulaanbaatar and Attempt to Reduce It. *World Sci.* **2022**, *4*, 24–32. [CrossRef]
21. Air Pollution Reducing Department of Capital City. Emission Inventory Report for Year 2016. 2017. Available online: https://aprd.ub.gov.mn/uploads/files/2022-05/1651466207_yalgarlyn-taylan-2017_compressed.pdf (accessed on 30 August 2023).
22. Public Transport Agency of the Capital City. Activity Report on the Year 2020. 2020. Available online: https://web.archive.org/web/20240713101726/https://transport.ub.gov.mn/en/wp-content/uploads/2021/03/2020.12.31-1.1526-4-havsralt_compressed.pdf (accessed on 30 June 2023).
23. National Legal Institution of Mongolia NLI Unified Legal Information System. Available online: https://legalinfo.mn/mn (accessed on 19 June 2023).
24. Cardno, C. Policy document analysis: A practical educational leadership tool and a qualitative research method. *Educ. Adm. Theory Pract. J.* **2018**, *24*, 623–640. [CrossRef]
25. Dalglish, S.L.; Khalid, H.; McMahon, S.A. Document analysis in health policy research: The READ approach. *Health Policy Plan.* **2020**, *35*, 1424–1431. [CrossRef]
26. Bowen, G.A. Document analysis as a qualitative research method. *Qual. Res. J.* **2009**, *9*, 27–40. [CrossRef]
27. Banister, D. Overcoming barriers to the implementation of sustainable transport. In *Barriers to Sustainable Transport*; Rietveld, P., Stough, R.R., Eds.; Routledge eBooks: London, UK, 2005. [CrossRef]
28. Richardson, B.C. Sustainable transport: Analysis frameworks. *J. Transp. Geogr.* **2005**, *13*, 29–39. [CrossRef]
29. Hull, A. Policy integration: What will it take to achieve more sustainable transport solutions in cities? *Transp. Policy* **2008**, *15*, 94–103. [CrossRef]
30. Sabatier, P.; Mazmanian, D. The implementation of public policy: A framework of analysis. *Policy Stud. J.* **1980**, *8*, 538–560. [CrossRef]
31. Government of Mongolia. Resolution on National Policy on Road Transport (321). 2018. Available online: https://legalinfo.mn/mn/detail?lawId=208735&showType=1 (accessed on 19 June 2023).
32. Parliament of Mongolia. Resolution on Mongolia Sustainable Development Vision 2030 (19). 2016. Available online: https://legalinfo.mn/mn/detail/11725/2/207105 (accessed on 19 June 2023).
33. Parliament of Mongolia. Resolution on Vision 2050 Long-Term Development Policy of Mongolia (52). 2020. Available online: https://legalinfo.mn/mn/detail?lawId=15406 (accessed on 19 June 2023).
34. Draft of Conception of General Development Plan of Ulaanbaatar City for 2040. 2021. Available online: https://ulaanbaatar2040.mn/p/159/xogzliin-eronxii-tolovlogoo (accessed on 19 June 2023).
35. Parliament of Mongolia. Resolution on Ulaanbaatar 2020 General Development Plan Approaches for 2030 (23). 2013. Available online: https://ulaanbaatar2040.mn/p/38/ulaanbaatar-xotyg-2020-on-xurtel-xogzuulex-eronxii-tolovlogoo-nii-todotgol-2030-ony-xogzliin-cig-xandlaga (accessed on 19 June 2023).
36. Parliament of Mongolia. Resolution on National Green Development Policy (43). 2014. Available online: https://legalinfo.mn/mn/detail?lawId=10482 (accessed on 19 June 2023).
37. Government of Mongolia. Resolution on Action Plan of the Government of Mongolia for 2012–2016 (120). 2012. Available online: https://legalinfo.mn/mn/detail?lawId=205732 (accessed on 19 June 2023).
38. Parliament of Mongolia. Resolution on Action Program of the Government of Mongolia for 2016–2020 (45). 2016. Available online: https://legalinfo.mn/mn/detail?lawId=12120 (accessed on 19 June 2023).
39. Government of Mongolia. Resolution on Action Plan for National Green Development Policy for 2016–2030 (23). 2016. Available online: https://legalinfo.mn/mn/detail/11886 (accessed on 19 June 2023).
40. Citizens' Representative Khural of the Capital City of Mongolia. *Resolution on Program of Action of Governor of the Capital City and Mayor of Ulaanbaatar for 2016–2020 (No. 03/08)*; Citizens' Representative Khural of the Capital City of Mongolia: Ulaanbaatar, Mongolia, 2016.
41. Asian Development Bank. Urban Transport Development Investment Program (Multitranche Financing Facility and Tranche 1): Completion Report. 2023. Available online: https://www.adb.org/projects/documents/mon-39256-023-39256-024-pcr (accessed on 30 June 2023).

42. Citizens' Representative Khural of the Capital City of Mongolia. Resolution on Program of Action of Governor of the Capital City and Mayor of Ulaanbaatar for 2020–2024 (No. 02/10). 2020. Available online: https://road.ub.gov.mn/?p=7411 (accessed on 30 June 2023).
43. Government of Mongolia. Resolution on Action Plan of the Government of Mongolia for 2020–2024 (24). 2020. Available online: https://legalinfo.mn/mn/detail?lawId=16389856694211&showType=1 (accessed on 30 June 2023).
44. Government of Mongolia. Resolution on National Program for Reducing Air and Environmental Pollution (98). 2017. Available online: https://legalinfo.mn/mn/detail?lawId=207779&showType=1 (accessed on 19 June 2023).
45. Parliament of Mongolia. Resolution on Five-Year Development Guidelines for 2021–2025 (24). 2020. Available online: https://legalinfo.mn/mn/detail?lawId=211219&showType=1 (accessed on 30 June 2023).
46. Law of Road Transport of Mongolia. 1999. Available online: https://legalinfo.mn/mn/detail?lawId=29. (accessed on 18 December 2022).
47. Parliament of Mongolia. Resolution on Action Program of the Government of Mongolia for 2008–2012 (35). 2008. Available online: https://legalinfo.mn/mn/detail/6187/2/203295 (accessed on 19 June 2023).
48. Government of Mongolia. Resolution on Mongolia's Nationally Determined Contribution to the United Nations Framework Convention on Climate Change (407). 2019. Available online: https://legalinfo.mn/mn/detail?lawId=210340&showType=1 (accessed on 30 June 2023).
49. Japan International Cooperation Agency. Data Collection Study on Transportation Infrastructure Development in Ulaanbaatar, Mongolia Final Report. 2022. Available online: https://openjicareport.jica.go.jp/pdf/12367587.pdf (accessed on 8 January 2024).
50. Ireedui, B.S. Feasibility Study of New Transport in Ulaanbaatar City Will Be Ready on 30th of March. 2022. Available online: https://gogo.mn/r/291778?i= (accessed on 1 July 2025).
51. Munkhtsetseg, E. About the LRT Project. 2022. Available online: https://itoim.mn/article/dyO5Z/32867 (accessed on 19 June 2023).
52. Undarmaa, S. LRT Project: Necessary vs Unnecessary. 2022. Available online: https://news.mn/r/2590209 (accessed on 19 June 2023).
53. Khishigjargal, R. Dorjkhand: The LRT System Would Require a $50 Million Annual Operating Cost Subsidy If the Project Is Implemented. Daily News. 2022. Available online: https://dorgio.mn/p/137684 (accessed on 19 June 2023).
54. Budget Watch. Light Rail Transit (LRT) Pillar Bridge Construction Project. 2022. Available online: https://budgetwatch.mn/00000-2/lrt-1/ (accessed on 1 July 2025).
55. Bold, B.; The Urban Cable Car Project Team Will Provide Preparation. The Montsame Agency. 2020. Available online: https://montsame.mn/mn/read/228111 (accessed on 19 June 2023).
56. Saruuldul, N. A Proposal Was Made to the Route of the Cable Car Project. 2022. Available online: https://itoim.mn/article/JDozg/31730 (accessed on 19 June 2023).
57. Suvdmaa, J. A Tale About Urban Cable Car Transport. 2023. Available online: https://www.unuudur.mn/a/255989 (accessed on 19 June 2023).
58. Public Transport Policy Department of the Capital City. Activity Report on the Year 2024. 2024. Available online: https://www.transport.ub.gov.mn/p/35 (accessed on 1 May 2025).
59. Zuuni Medee Sonin. The Renewal of Public Transport Will Take Two Phases Until 2022. 2024. Available online: https://www.zms.mn/a/89599 (accessed on 30 June 2023).
60. Senol, M.; Bayram, I.S.; Naderi, Y.; Galloway, S. Electric Vehicles Under Low Temperatures: A review on battery performance, charging needs, and power grid impacts. *IEEE Access* **2023**, *11*, 39879–39912. [CrossRef]
61. Odonchimeg, L.; Chuluunbat, C. Fuel Importers Will Pay More Taxes if Euro 5 Is Not Introduced. 2018. Available online: https://itoim.mn/article/zD7Lr/14298 (accessed on 19 June 2023).
62. Public Transport Policy Department of the Capital City. Reports on Implementation of Capital City Development Plan in 2024. 2024. Available online: https://www.transport.ub.gov.mn/p/43 (accessed on 1 May 2025).
63. Khulantakhi, T. About Minister of Environment and Climate Change S. Odontuya's Decision on Usage of EURO 5 Standard Fuel in Public Transport of Ulaanbaatar. 2024. Available online: https://isee.mn/n/69835 (accessed on 30 June 2025).
64. Sabatier, P.A. An advocacy coalition framework of policy change and the role of policy-oriented learning therein. *Policy Sci.* **1988**, *21*, 129–168. [CrossRef]
65. Van Geet, M.T.; Lenferink, S.; Arts, J.; Leendertse, W. Understanding the ongoing struggle for land use and transport integration: Institutional incongruence in the Dutch national planning process. *Transp. Policy* **2019**, *73*, 84–100. [CrossRef]
66. Canıtez, F.; Alpkökin, P.; Kiremitçi, S.T. Sustainable urban mobility in Istanbul: Challenges and prospects. *Case Stud. Transp. Policy* **2020**, *8*, 1148–1157. [CrossRef]
67. Pettersson, F.; Stjernborg, V.; Curtis, C. Critical challenges in implementing sustainable transport policy in Stockholm and Gothenburg. *Cities* **2021**, *113*, 103153. [CrossRef]

68. Bardal, K.G.; Gjertsen, A.; Reinar, M.B. Sustainable mobility: Policy design and implementation in three Norwegian cities. *Transp. Res. Part D Transp. Environ.* **2020**, *82*, 102330. [CrossRef]
69. Yamada, E.; Yi, J. JICA Ogata Research Institute Discussion Paper: The Impact of Dhaka Mass Rapid Transit on Road Congestion. 2025. Available online: https://www.jica.go.jp/english/jica_ri/publication/discussion/__icsFiles/afieldfile/2025/02/21/Discussion_Paper_No35.pdf (accessed on 1 July 2025).

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.