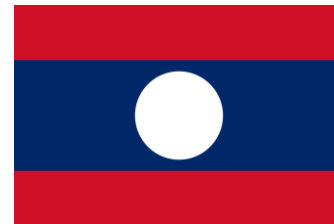
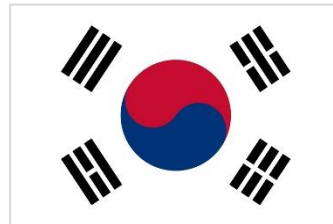


2023.08.23 Vientiane, Lao PDR

# Technical Assistance for the Lao PDR for Low-Carbon Transport (CTC-N) 2022/2023



# Contents



**I. Introduction**

**II. Review of JICA's VTPM**

**III. SmartTransport Scenarios**

**IV. Pre-Feasibility Study for DRT**

# I. Introduction

1. CTCN Request
2. KNUT & Youngin ITS
3. Transport in Vientiane
4. Scope of Work



## Our Scope of Work for the CTCN TA

1. **Review of the JICA Vientiane Transportation Master Plan (VMPT) – *Discussed Previously***
  - ❖ JICA is undertaking a Master Plan for transportation up to 2035.
  - ❖ We are providing a “peer review” of the proposed public transport changes, and providing a few recommendations and alternatives
  
2. **Smart Public Transport (or ITS) Scenarios for Vientiane**
  - ❖ Build a transportation model (Emme)
  - ❖ Evaluate options for Smart Transport for the public transport system in Vientiane, based on the Korea case
  - ❖ Recommend Smart Transport projects, features, and timelines
  - ❖ **Complement the ongoing JICA Transport Master Plan**
  
3. **Pre-Feasibility Study for Demand-Responsive Transit (DRT)**
  - ❖ Undertake a stated preference survey for ITS
  - ❖ Create a basic plan for demand-responsive transit (DRT) in Vientiane
  - ❖ **Complement the ongoing JICA Transport Master Plan**

## **II. SmartTransport Scenarios**

1. Introduction to ITS
2. ITS in Korea & Lao PDR
3. Evaluation
4. Recommendations

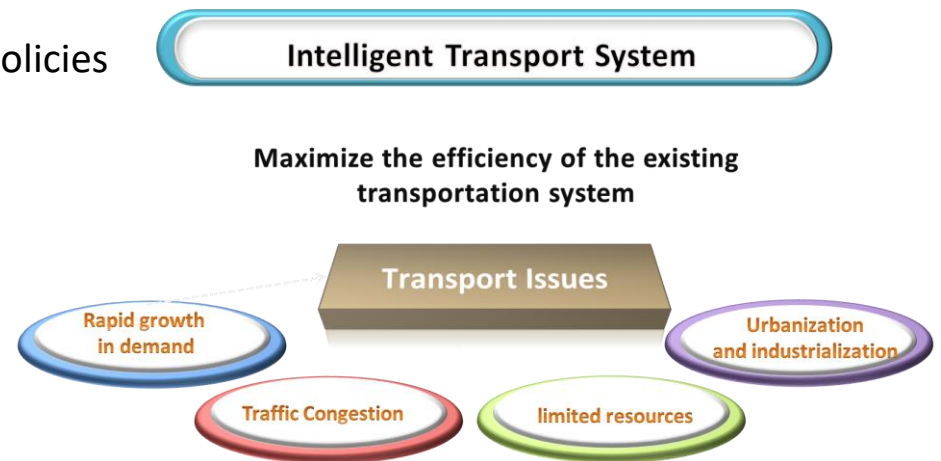


## Definitions

- ❖ **Intelligent Transport Systems (ITS)** refers to technologies and hardware that improve the efficiency of transport infrastructure.
- ❖ **Smart Transport** includes ITS, as well as other features like Demand-Responsive Transit (DRT).

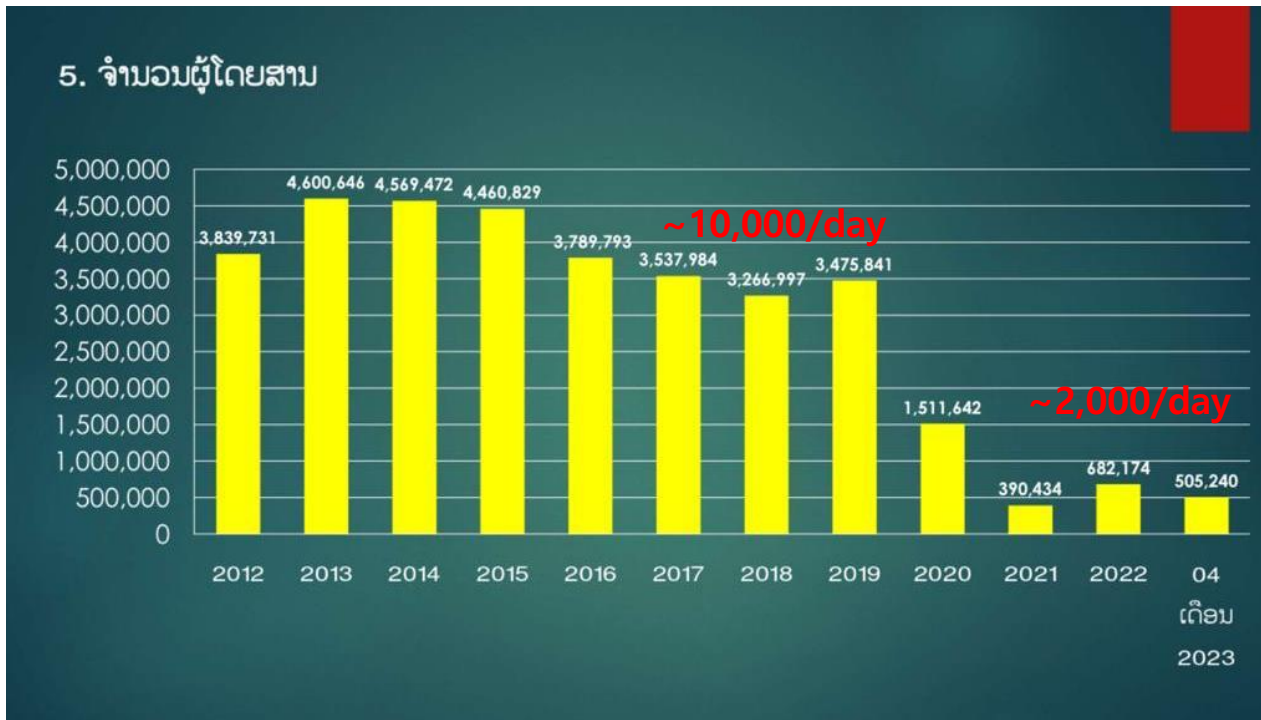
**ITS and Smart Transport can maximize efficiency in transport networks.**

- ❖ We identified and evaluated projects and some policies that would be appropriate for Vientiane.



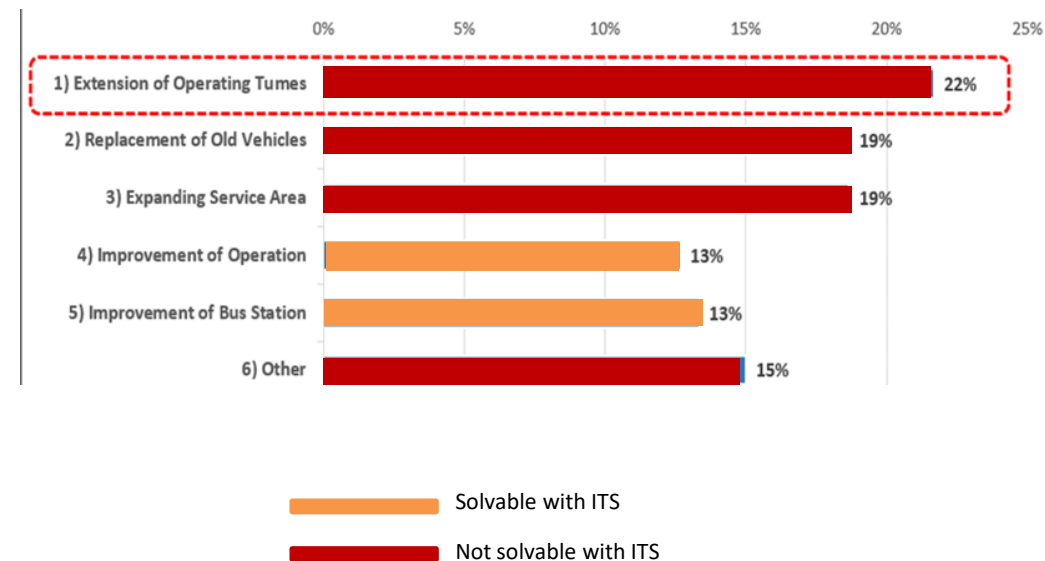
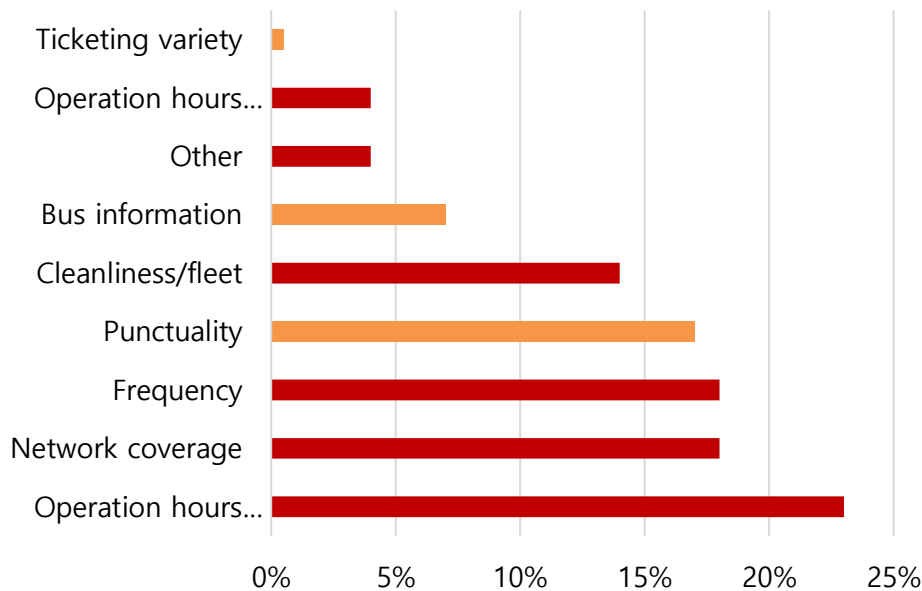
## The Existing Public Transport Network

- ❖ Small, and basic system.
  - ❖ Good things: Clean vehicles, pretty nice vehicles, relatively safe
  - ❖ Bad things: Very low frequency, small coverage
- ❖ Declining ridership is a problem!



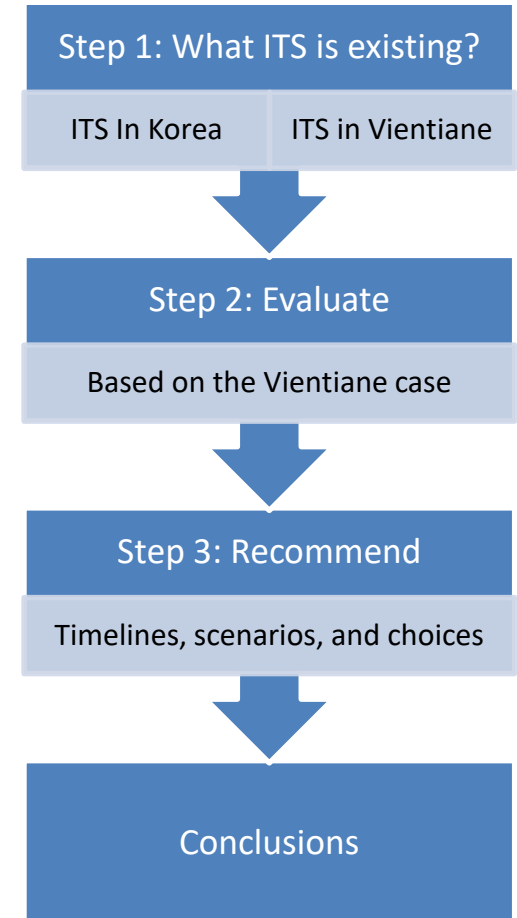
## The Role of SmartTransport & ITS

- ❖ There is a desire in Vientiane, to improve the public transport network
- ❖ **ITS can help make the system more convenient and attractive - but it is not the only way!**



## What Smart Transport is appropriate for Vientiane? Our Approach

1. Establish the kinds of Smart Transport that are currently available (based on the Korean case)
2. Establish what, if any, Smart Transport is already present in Vientiane
3. Determine evaluation criteria and calculate each of the criterium
4. Evaluate and recommend



## Smart Transport for Public Transport – What’s in Korea



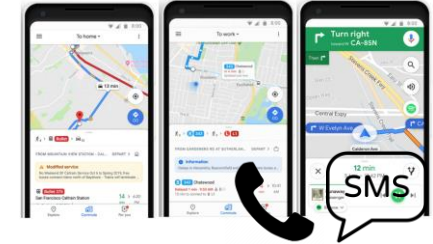
Electronic fare collection (EFC)



Bus management systems (BMS)



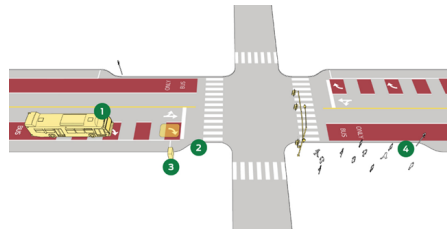
Bus information terminals (BIT)



Bus information system (BIS) & open data



On-board next-stop information



Transit service priority (TSP)



Demand-responsive transit (DRT)



Other amenities



Demand-responsive:

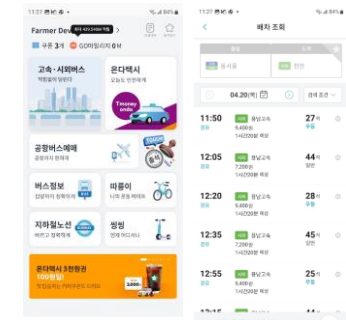
- Taxi-hailing
- Ridesharing
- Taxi-sharing (Uber Pool)



Autonomous vehicles



MaaS



Online ticketing system (for intercity transport)

## Electronic Payment Card

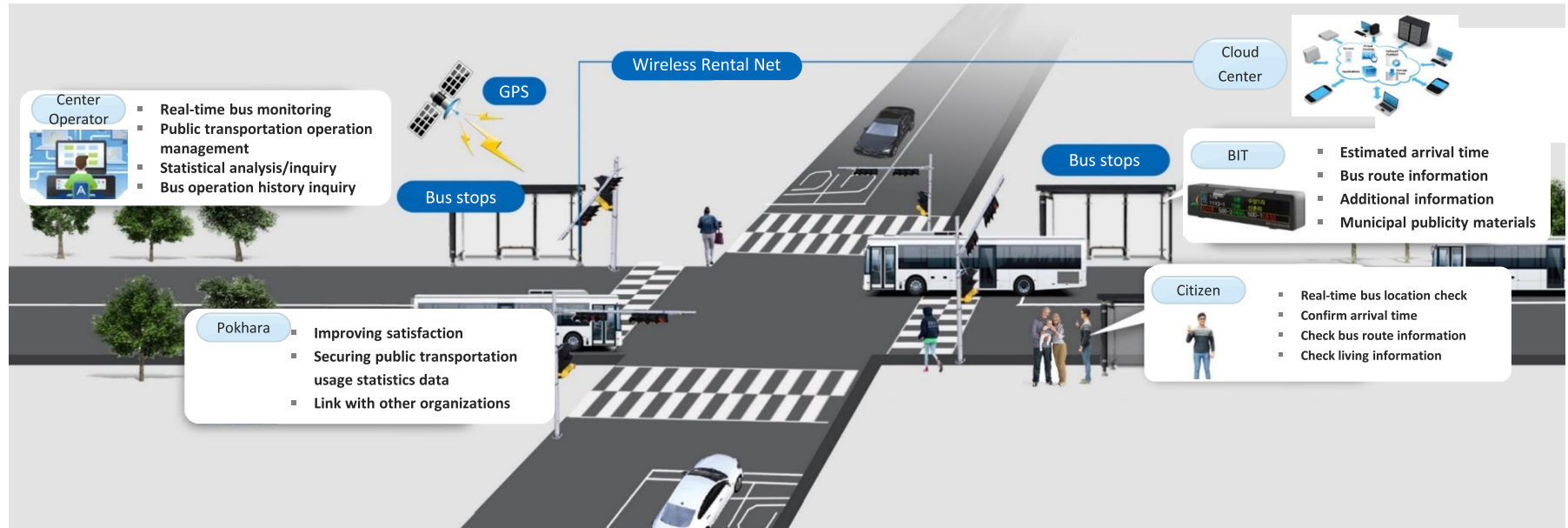
- ❖ Korea had one of the first transport payment cards in the world (1996) using RFID technology
- ❖ RFID chip be built into credit and debit cards
- ❖ You can purchase a card at any convenience store<sup>1</sup>: T-money is a semi-public transportation company launched in 2004 (owned by Seoul City, LG CNS, and Credit Card Union)
- ❖ Accepted all over Korea

**Implementor:  
Public Sector (Pseudo-Private Sector)**

**Tmoney**  
카드&페이



## Bus Information and Management Systems



### Construct a server center

Construct a Server-Based Center

- Cloud-based center operation for optimal solution development before bus information center construction/expansion
- Building the optimal bus information software utilizing the scalability of the cloud center

### Bus information operation software development

Establishment of integrated operating environment for BIS

Homepage construction for providing information

### Field equipment design and construction

BIT/OBE

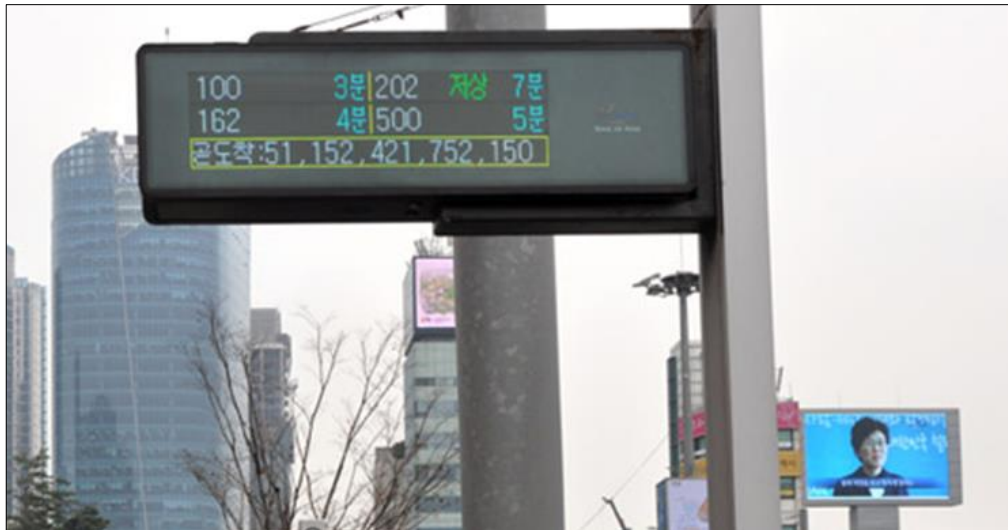
Design and Construct

- Construction of field equipment optimized for Pokhara City
- Securing system operation stability through trial operation before implementation

**Implementor: Public Sector**

## Bus Monitoring and Tracking - Physical

- 85% of bus stops Seoul have digital signage indicating which buses are arriving and when and include
- Signs indicate bus number, time to destination, and crowding



Example of a real-time display

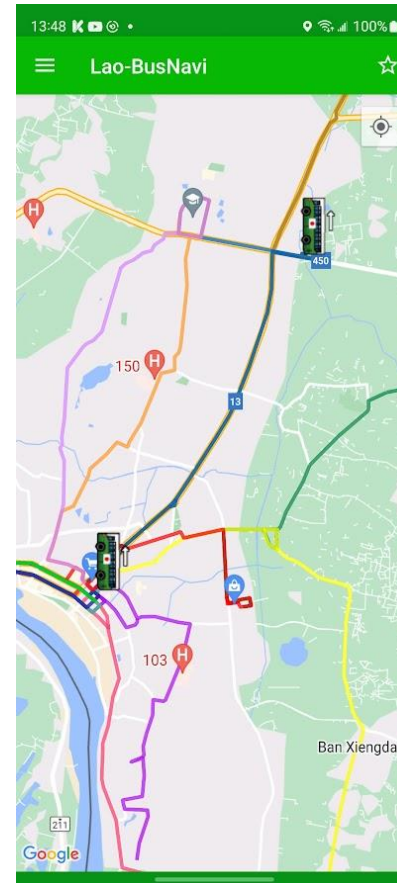


HQ monitoring centre (TOPIS)

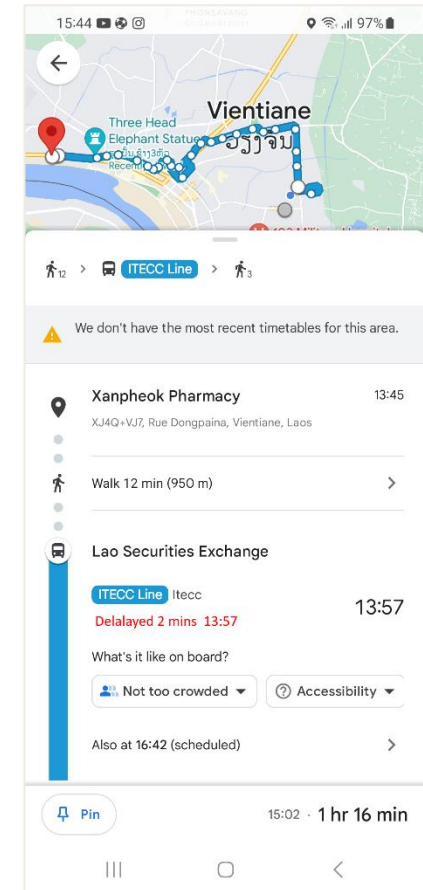
**Implementor:**  
**Public Sector (Pseudo-Private Sector)**

### Bus Monitoring and Tracking – Data Sharing

- ❖ The most advanced ITS function in Vientiane is the live tracking app and hardware.
- ❖ Current system, using cellphones as on-board units is clever and cost-effective method to achieve many of the advantages
- ❖ However, a true professional BIMS is much more robust and offers many more features than the existing mobile phone-based system
- ❖ **GTFS-RT standard** could be applied to the existing data and system, which would allow for third-party app developers to use the data, like Google Maps.



Lao-Developed



Google

## Ride Hailing Applications

- ❖ Ride-hailing (i.e. Uber/Lyft) is illegal in Korea
- ❖ Instead, regular taxis can be hailed just like you would with Uber or Lyft using apps
- ❖ KakaoT is by far the most used (90%+ market share)



[iOS](#) [Android](#)

UT – Partnered with Uber  
(the Uber app functions in the  
same way)



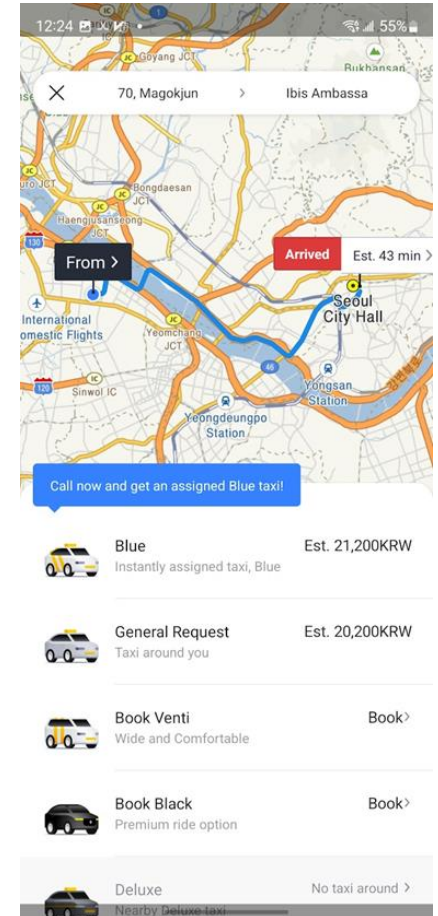
[iOS](#) [Android](#)

Tmoney Corporation  
Not supported for tourist  
s



[iOS](#) [Android](#)

Kakao Corporation

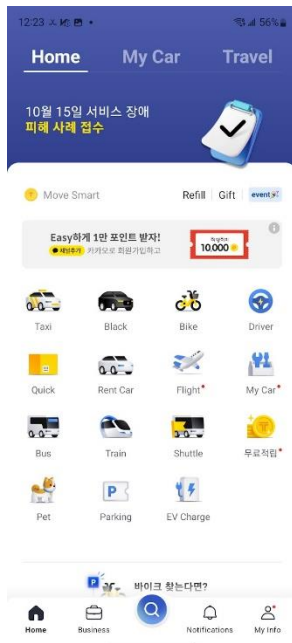


**Implementor:  
Private Sector (Heavily Regulated)**

## MaaS/Online Ticketing:

- ❖ Several transport “superapps” exist in Korea, and elsewhere
- ❖ Examples include KakaoT and Tmoney Go
- ❖ Grab, from SEA is also very advanced and popular

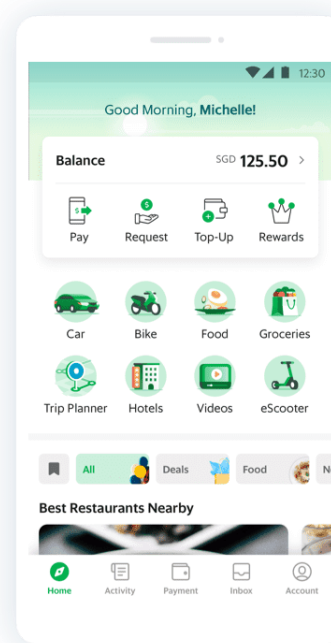
**Implementor:  
Private Sector**



**KakaoT**



**TMoney**



**Grab**

## On Board Announcements & Screen

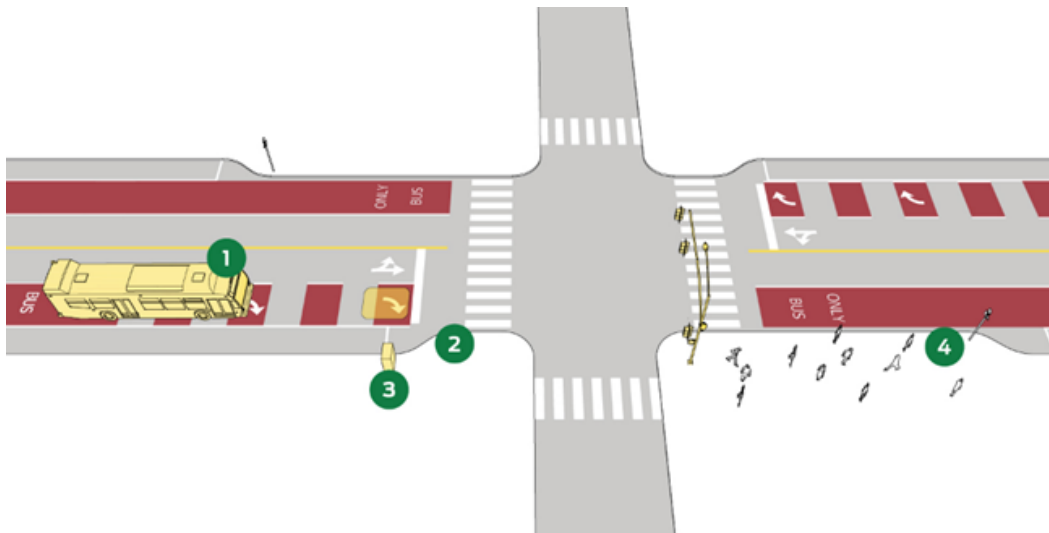
- ❖ On-board bus announcement technologies are systems designed to provide automated audio announcements on public transit vehicles, such as buses and trains.
- ❖ Use pre-recorded messages or text-to-speech software to announce upcoming stops, transfer points, and other important information to passengers.
- ❖ There are several types of on-board bus announcement technologies available, including:
  - ❖ GPS-based systems
  - ❖ Route-based
- ❖ On-board bus announcement technologies are becoming increasingly popular.



## Implementor: Public Sector

## Transit Service Priority (TSP)

- ❖ Transit service priority (TSP) at traffic lights is a system designed to improve the speed and reliability of public transportation by giving buses and other transit vehicles priority at intersections.
- ❖ Traffic lights are equipped with sensors that detect approaching buses and give them priority when they approach an intersection.
- ❖ This can include extending the green light time for buses, shortening the red-light time, or even changing the light to green as the bus approaches. This helps to reduce delays and improve the reliability of bus service.



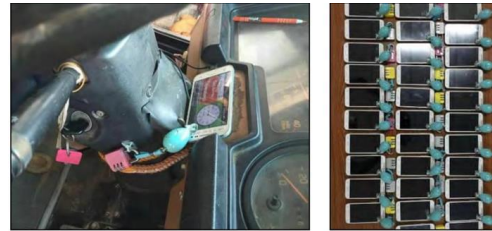
**Implementor:  
Public Sector**

## Vientiane's Existing ITS for Public Transport



**Electronic fare collection (EFC) by QR-Code on buses**

QR payment is accepted, but research has shown that QR codes slow down passenger boarding, not speed it up



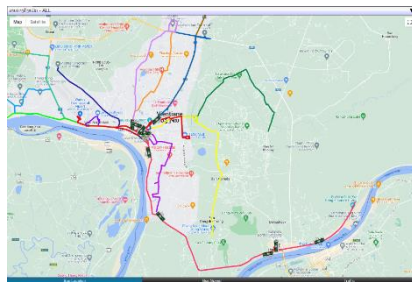
**Bus management system (BMS) including on-board units (OBUs)**

BMS was introduced by JICA in 2016 using a very basic system that uses SmartPhones as OBUs and Wi-Fi packet sensors for speed and congestion measuring, no other sensors are used



**Bus information terminal (BIT) at CBS**

JICA helped fund these monitors at CBS which show the same information as the app.



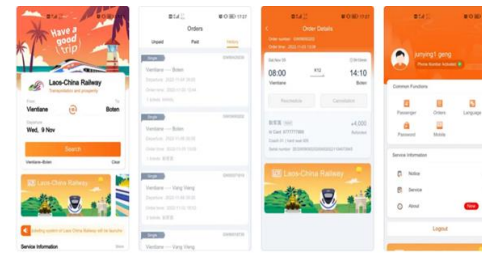
**Bus information system (BIS) & open data**

A Lao-developed website and app is available for tracking buses, but it is just a basic design



**Ride-hailing service (RHS)**

Ride Sharing Service (RHS) exists in the Lao PDR. LOCA has dominated the ride-hailing market in Vientiane but does not currently offer TukTuk hailing.



**Online ticketing**

Since 2023, online ticketing has been available for the Lao-China railway. Bus systems are generally booked only by visiting the bus station up to a few days prior to departure.



**On-board announcements**

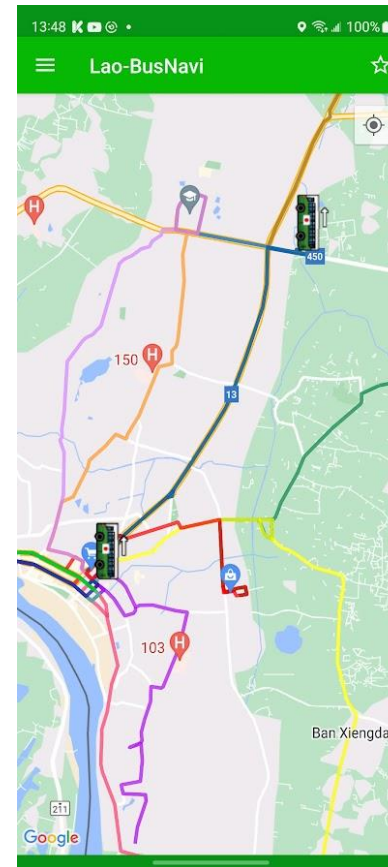
The upgrades routes that JICA established in 2018 (ITECC and Airport Shuttles) are equipped with numerous extra amenities including next-stop announcements

# SmartTransport Scenarios

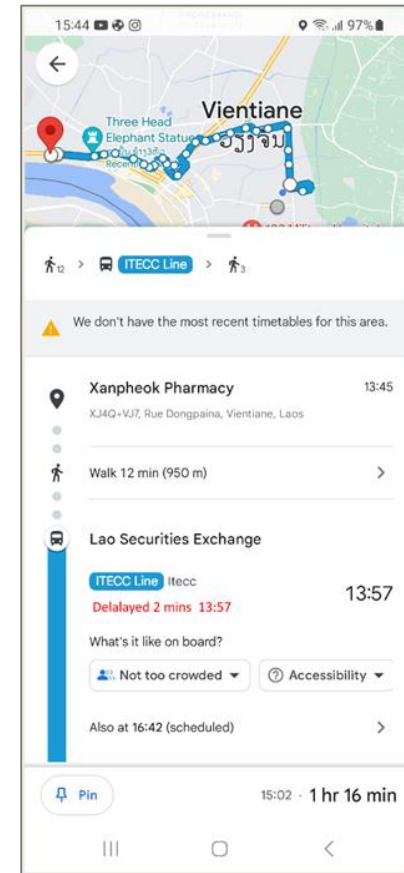
	Project	Short	Mid	Long	
1	Upgrades to Existing Bus Information Systems (BIS)	✓			Upgrade the existing BIS, and switch to an open data standard (G TFS-RT).
2	Development of policies to legalize ridesharing	✓			Develop policies to finally legalize ridesharing and taxi-hailing in Lao PDR based on Lao-government developed standards.
3	Development of policies to support foreign and local investment in E-Ticketing, micro mobility, & Mobility as a Service (Maas)	✓			Develop policies support and encourage private industry to develop standard ticketing systems for online ticketing of bus and train systems.
4	CCTV on buses	✓			CCTV on buses
5a/5b	Upgrades to the CBS	✓			Major project to focus on the CBS, the busiest bus stop/terminal in Vientiane with improved passenger amenities and information
	Free WiFi	✓			
	CCTV	✓			
	Upgraded screens	✓			
	Bus Information Terminals (BITs)		✓		
6a/6b/6c	a. Full replacement of the Bus Management System (BMS)		✓	✓	Replace the existing JICA-developed system with a completely new and “proper” BIMS system.
	b. Next-stop signs and announcements on buses	✓			Invest in equipment and software to announce stops on buses including visually and with sound.
	c. Bus Information Terminals (BITs)			30%	When BMS system is replaced, BITs can be pursued, eventually target 30% of stops.
7	Electronic fare collection (EFC) by IC-card			✓	IC card will significantly reduce the time to board buses. Target 100% of VCSBE fleet and BRT.
8	Transit service priority (TSP)			✓	Traffic congestion does not yet warrant TSP, perhaps, but by 2035 it might.
9	Wi-Fi on buses			✓	Free WiFi aboard VCSBE Buses
10	<i>Demand-Responsive Transit (DRT) - Project to Enhance Songthaew Capability</i>		✓	✓	<i>See next section.</i>

## Project 1 : Upgrade the Existing Bus Information System (BIS)

- ❖ Upgrade the existing BIS (JICA-developed system) & switch to an open data standard (GTFS-RT) and GTFS static.
- ❖ **Details:**
  - ❖ Target: 2024-2025
  - ❖ Replace faulty mobile phones OBUs
  - ❖ Require operators to always use the system
  - ❖ Develop open data standards based on GTFS static and GTFS real-time
- ❖ **Cost:** ~\$150,000 (\$30,000 development fee)
- ❖ **Who is responsible:** Contracted Private Entity & VCSBE
- ❖ **Funding/Next Steps:** Internal Lao PDR or KSP Program (Korea)



Current App



Google Maps

## Project 2 : Development of Policies to Legalize Ridesharing

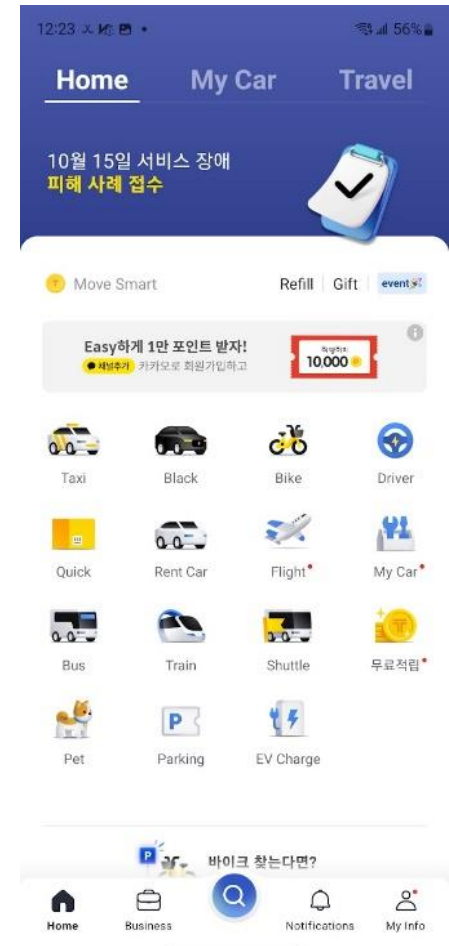
- ❖ **Ridesharing is a private sector transport system**
- ❖ Develop balanced and appropriate policies to allow ridesharing services (like Loca or Kakao) to operate legally
  
- ❖ **Details:**
  - ❖ Target: 2024-2025
  - ❖ Develop policies to enable rideshare taxis to operate
  - ❖ Set minimum EV fleet standards
  - ❖ Set appropriate boundaries for fare pricing
  - ❖ Develop policies that will apply to TukTuks, shared transport (Songthaews), and vehicles
  - ❖ Tourist/local pricing schemes
  
- ❖ **Cost:** \$200,000 – \$300,000 USD \*
  
- ❖ **Who is responsible:** MPWT DOT
  
- ❖ **Funding/Next Steps:** Develop policy through internal Lao PDR & **KSP Program** (Korea)



Note: Korea is not in a necessarily a good place to aid with knowledge transfer for ridesharing., Thailand is a good option for policy learning.

## Project 3 : Development of Policies to Support Foreign and Local investment in E-Ticketing, micro-mobility, & Mobility as a Service (Maas)

- ❖ **Government does not need to provide MaaS service.** The private sector has proven willing and able to provide a high-quality MaaS product if the market is there but need a policy framework.
- ❖ **Details:**
  - ❖ Target: 2024-2025 (2-3 years to develop)
  - ❖ Develop policies to micro-mobility and the use of common public space (like sidewalks)
  - ❖ Develop policies to require online ticketing for bus transport in a fair and transparent way
  - ❖ Parking policies for car / motorcycle sharing
  - ❖ Public subsidies if required
  - ❖ Requirements to service disabled/underserved areas
  - ❖ Develop policies for data standardization and sharing
- ❖ **Cost:** \$200,000 – \$300,000 USD \*
- ❖ **Who is responsible:** DOT MPWT
- ❖ **Next Steps:** Develop policy through internal Lao PDR & **KSP Program** (Korea)



## Project 4: CCTV on Buses

- ❖ Invest in CCTV cameras for all public buses in Vientiane operated by the VCSBE. CCTV cameras increase perceived and actual safety on buses. In the near future, AI cameras could also be used.

- ❖ **Details:**

- ❖ Target: 2025-2026

- ❖ **Costs:**

- ❖ In the future, \$600,000 - \$700,000 USD
  - ❖ Current fleet (~100): \$250,000 USD

- ❖ **Benefit/cost ratio:** High \* (assuming ridership recovery)

- ❖ **Who is responsible:** VCSBE

- ❖ **Next Steps:** Business Case as part of KOTRA EPIP 2024/2025 Program - **Applied in 2023**



## Project 5a: ITS Upgrades to the Central Bus Station

- ❖ Invest in basic ITS equipment to enhance safety and convenience at the most used bus stations in Vientiane, the Central Bus Station.
- ❖ **Details:**
  - ❖ Target: 2025-2026
  - ❖ CCTV cameras
  - ❖ Digital kiosks
  - ❖ New monitors,
  - ❖ Free WiFi
- ❖ **Cost:** \$400,000 - \$500,000 USD
- ❖ **Benefit/cost ratio (BCR):** High
- ❖ **Who is responsible:** Vientiane City & MPWT DOT
- ❖ **Next Steps:** Business Case
- ❖ **Next Steps:** Business Case as part of KOTRA EPIP 2024/2025 Program - **Applied in 2023**



## Project 5b: Major ITS Upgrades to the Central Bus Station \*

- ❖ Invest in major equipment and software to enhance safety and convenience at the most used bus stop in Vientiane, the Central Bus Station.
- ❖ **Details:**
  - ❖ Target: 2025-2027
  - ❖ Items:
    - CCTV cameras
    - WiFi
    - Digital ticketing
    - Digital departures
    - Online reservations system
    - Terminal voice broadcasting
    - Operation management systems
- ❖ **Major renovation cost:** \$3 – \$4 million USD
- ❖ **Benefit/cost ratio (BCR):** High
- ❖ **Who is responsible:** Vientiane City & MPWT DOT
- ❖ **Next Steps:** Business Case as part of KOTRA EPIP 2024/2025 Program - **Applied in 2023**



## Project 6a: Replacement of Bus Management System (BMS)

❖ Invest in new Bus Management System (BMS) using proper On-Board Units with advanced capabilities.

❖ **Details:**

- ❖ Target: 2028
- ❖ Replace OBUs on fleet
- ❖ Develop management center
- ❖ Set-up BMS

❖ **Cost:** \$7 – \$10 million USD +

❖ **Benefit/cost ratio:** 1.2\* (assuming ridership growth)

❖ **Who is responsible:** VCSBE & MPWT DOT

❖ **Next Steps:** Business Case as part of KOTRA EPIP 2024/2025 Program - **Applied in 2023**



## Project 6b: Next-Stop Announcements on Buses

- ❖ Invest in equipment and software to announce stops on buses including visually and with sound.
- ❖ **Details:**
  - ❖ Target: 2028
  - ❖ Procure and install system to announce the next stops using visual (LED) and sound (loudspeaker)
- ❖ **Cost:** \$750,000 - \$1 million USD
- ❖ **Benefit/cost ratio (BCR):** High \* (assuming ridership recovery)
- ❖ **Who is responsible:** VCSBE
- ❖ **Next Steps:** Business Case as part of KOTRA EPIP 2024/2025 Program - **Applied in 2023**



## Project 6c: Bus Information Terminals (BITs) at 10-30% of Bus Stops

- ❖ **With BMS system in place**, target installation of BITs (digital signs) at selected bus stops, targeting Around top 10 - 20% busiest of all bus stops.
- ❖ **Details:**
  - ❖ Target: 2029-2030
  - ❖ Procure and install BITs
- ❖ **Cost:** \$3 - \$4 million USD
- ❖ **Benefit/cost ratio:** 1.39
- ❖ **Who is responsible:** VCSBE, Vientiane City & MPWT DOT
- ❖ **Next Steps:** Business Case as part of KOTRA EPIP 2024/2025 Program - **Applied in 2023**



## Project 7: Electronic Fare Collection with RFID Card

- ❖ Invest in an IC-card based electronic fare collection system. The IC-card based system would be far superior to the existing QR-code system as it would significantly increase the speed at which customers can board buses. **This is also a finance project involving money, good project for the central budget.**
- ❖ **Details:**
  - ❖ Target: **2030+ (Long Term)**
  - ❖ Card readers for buses and BRT
  - ❖ Cards for purchase
- ❖ **Cost:** \$8 – \$10 million USD
- ❖ **Benefit/cost ratio:** **<1.0** at current est. demand levels
- ❖ **Who is responsible:** VCSBE & MPWT DOT
- ❖ **Next Steps:** Business Case as part of KOTRA EPIP 2024/2025 Program - **Applied in 2023**



## Project 8: Transit Service Priority

- ❖ In the future, speeds on roads could reduce significantly. To speed up buses, can invest in traffic light signal systems at major intersections.
- ❖ **Details:**
  - ❖ Target: **2030+ (Long Term)**
- ❖ **Cost:** \$1 - \$2 million USD
- ❖ **Benefit/cost ratio:** **< 1.0** at current est. demand levels
- ❖ **Who is responsible:** Vientiane City, MPWT DOT
- ❖ **Next Steps:** Business Case as part of KOTRA EPIP 2024/2025 Program - **Applied in 2023**



## Project 9: WiFi on Buses

- ❖ Invest in free WiFi for all VCSBE buses, by dedicated routers.
- ❖ **Details:**
  - ❖ Target: **2030+ (long term)**
- ❖ **Cost:** \$50,000 - \$75,000 USD + **data costs**
- ❖ **Benefit/cost ratio:** 1.98 \* (assuming ridership recovery)
- ❖ **Who is responsible:** VCSBE
- ❖ **Next Steps:** Business Case as part of KOTRA EPIP 2024/2025 Program - **Applied in 2023**



## Next Steps

- ❖ **Applied for the EPIP 2024/2025** program in 2023
  - ❖ Complete ITS/Smart Mobility business case/feasibility studies in 2024 and 2025
  - ❖ Pilot /first project in 2025 – full roll-out after that
- ❖ **Apply for the KSP** program in 2024

	2024	2025	2026	2027	2028	2029	2030	>2030
Preparation (EPIP)	Business Case / Feasibility	Business Case / Feasibility	Pilot Project (Project 2)*					
Policy Development & KSP	Application/Learning Process	New Policies						
			4. CCTV on Buses					
			5. Upgrades to the CBS					
					6a. Replace the BIMS			
					6b. Next Stops			
						6c. BITs		
								7. EFC
								8. TSP
								9. WiFi
								10. WiFi

\* If EPIP provides funding for a pilot project, it should be ITS upgrades to the Central Bus Station (CBS)

## **III. Demand-Responsive Transit (DRT)**

1. Introduction to DRT
2. Proposed method
3. Results





## Songthaew (Paratransit) System in Vientiane

### ❖ JICA solutions

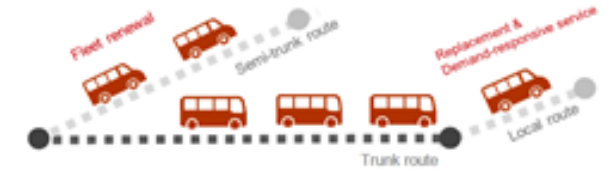
- ❖ Integrate songthaew into public transit system
- ❖ Use songthaew for local/feeder routes & VCSBE for trunk routes

### ❖ Our Proposed Solution

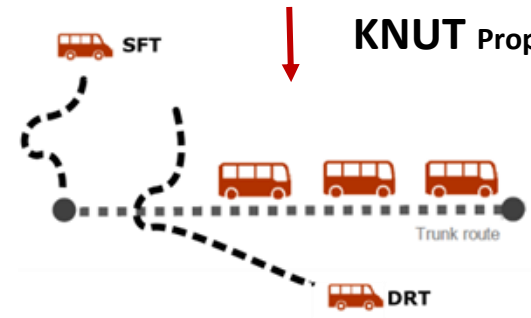
- ❖ Songthaew as DRT
- ❖ Parallel or feeders to BRT network



↓ JICA

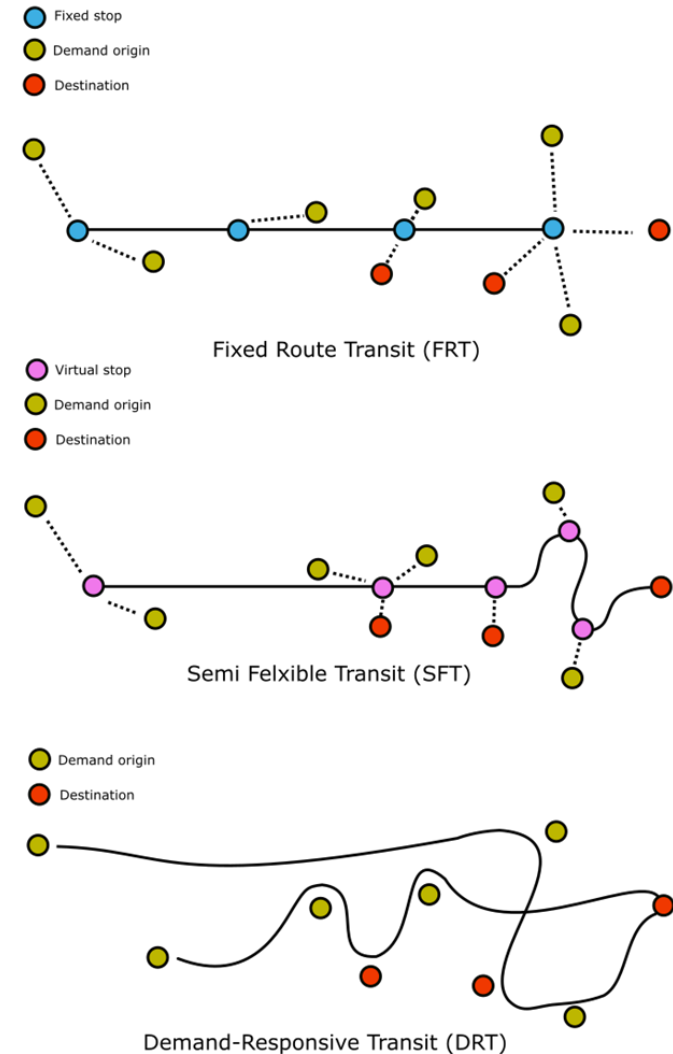


↓ KNUT Proposed



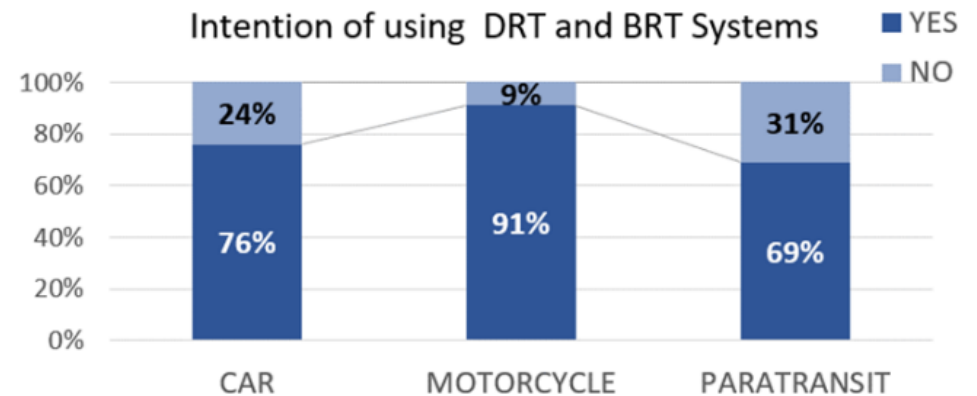
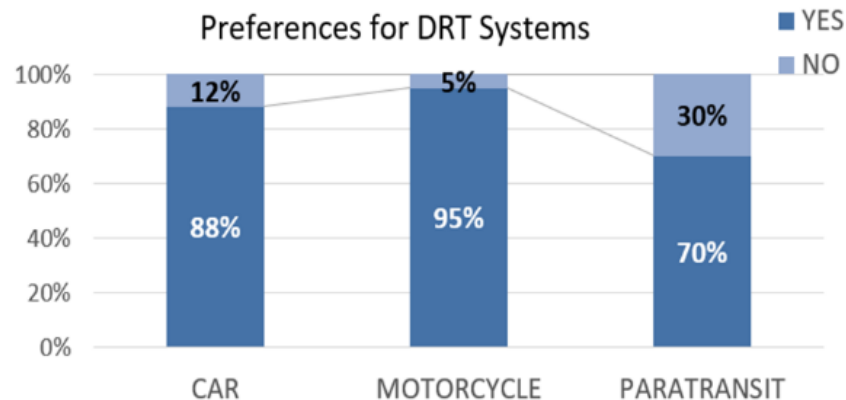
## What is Demand-Responsive Transit (DRT)?

- ❖ Demand-Responsive Transit (DRT) is a transportation service that operates on a flexible schedule and route based on real-time demand from passengers
- ❖ Examples of DRT are Uber, Grab, LOCA, but these generally use small vehicles. DRT is a similar concept but using shared vehicles (i.e. songthaew, buses, or vans).
- ❖ DRT is becoming popular around the world, as the technology evolves and more people have access to a SmartPhone.



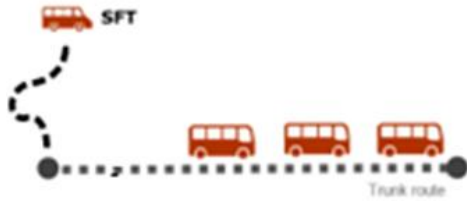
## Survey Results

- ❖ In February and March 2023, a Stated Preference (SP) survey was given to 300 residents in the Vientiane region.
- ❖ Would Vientiane residents accept such a solution?
  - ❖ Answer: **Yes!** Overall, 84% of respondents expressed an **intention to use DRT** in Vientiane.

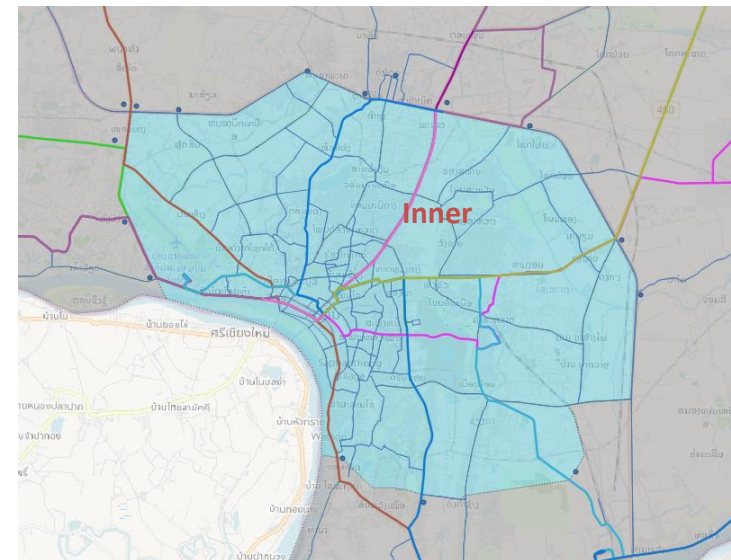
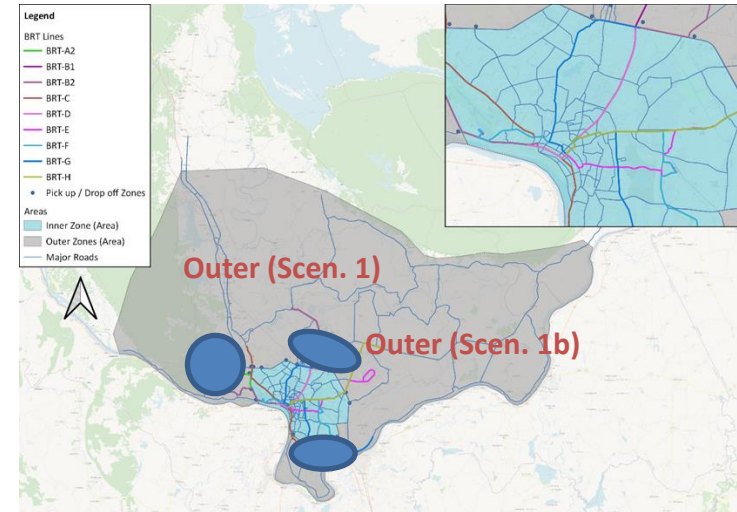


## Scenarios we Looked At

- ❖ **DRT + BRT: Scenario 1/1b : Outer**
- ❖ DRT vehicles allow for first mile/last-mile trips that must begin or end at a **BRT Stations**.
- ❖ 1b includes a sig. reduced area compared to 1



- ❖ **DRT + BRT: Scenario 2: Inner**
- ❖ DRT vehicles allow for any type of origin-to-destination trip within the inner city



## Modelling Process

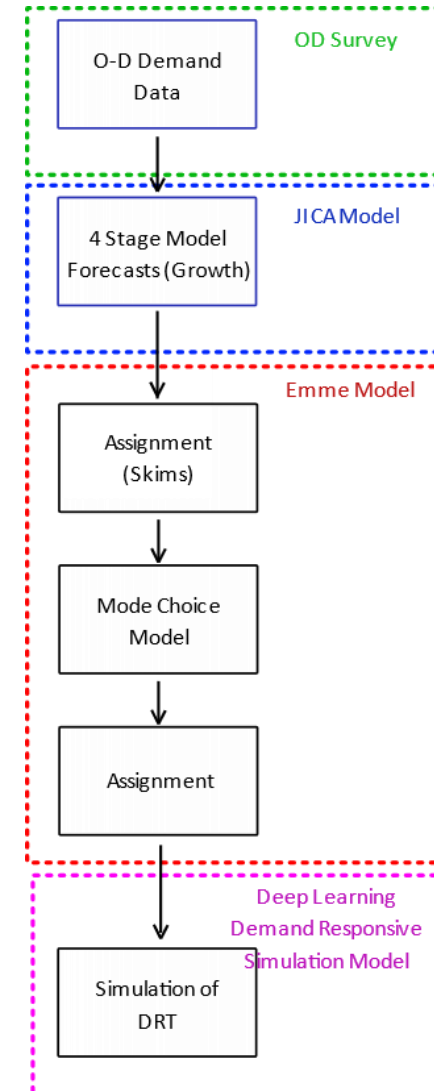
❖ Evaluation system involves other models including

1. O-D demand data (O-D Survey)
2. Outputs from the JICA 4-stage model
3. KNUT-developed transport model (Emme)
4. DRT simulation using a Genetic Algorithm

❖ Algorithms for DRT use advanced AI to optimize pickup/drop-off and travel times – overall aim is to reduce average waiting and travel time

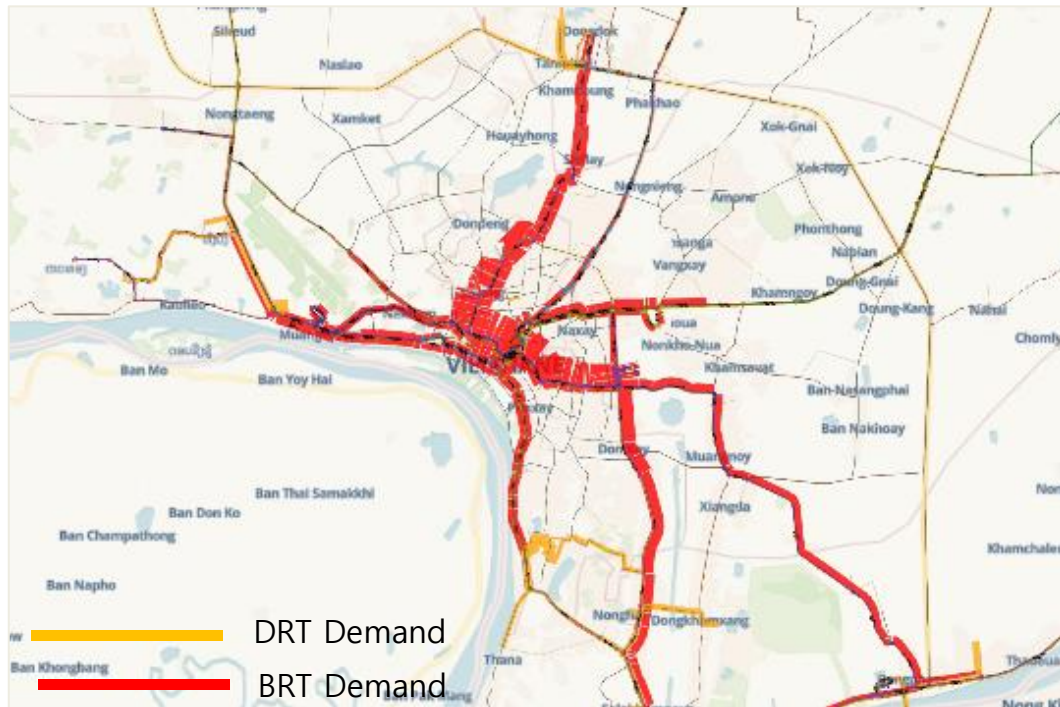
❖ Outputs

- **Forecasted ridership**
- **Cost to operate**
- **Potential profits from customers**



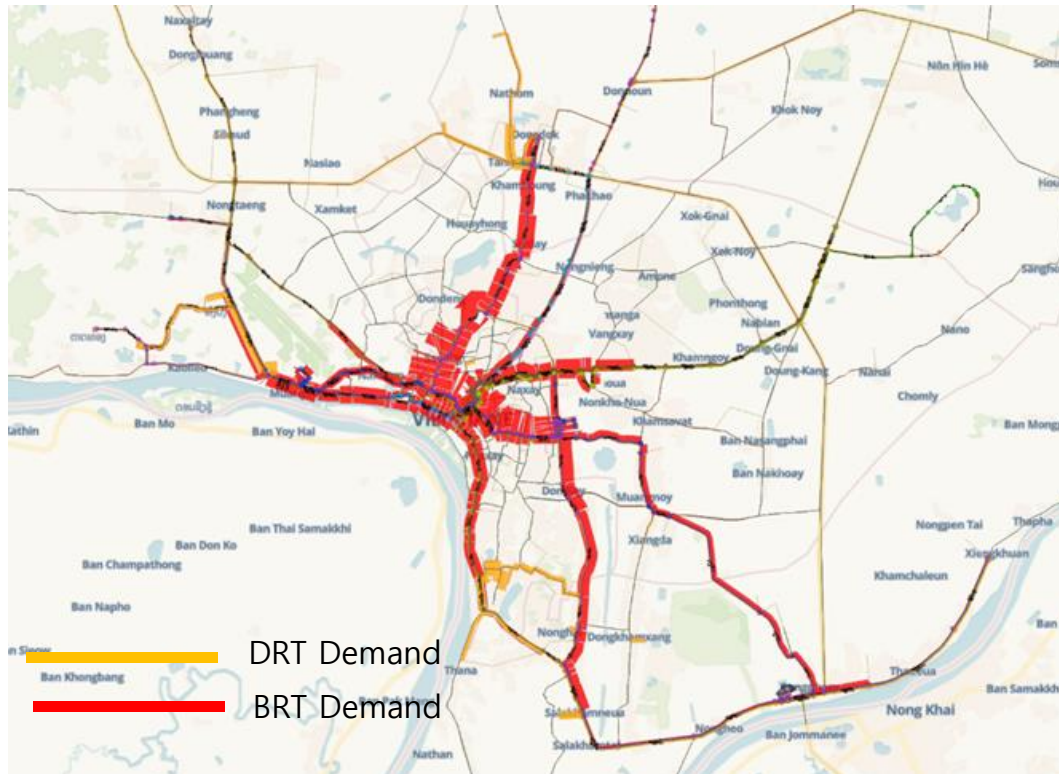
## Results: Scenario 1

- ❖ DRT is used as a feeder into BRT stations
- ❖ DRT Ridership = 11,400 per day
- ❖ 266 vehicles required



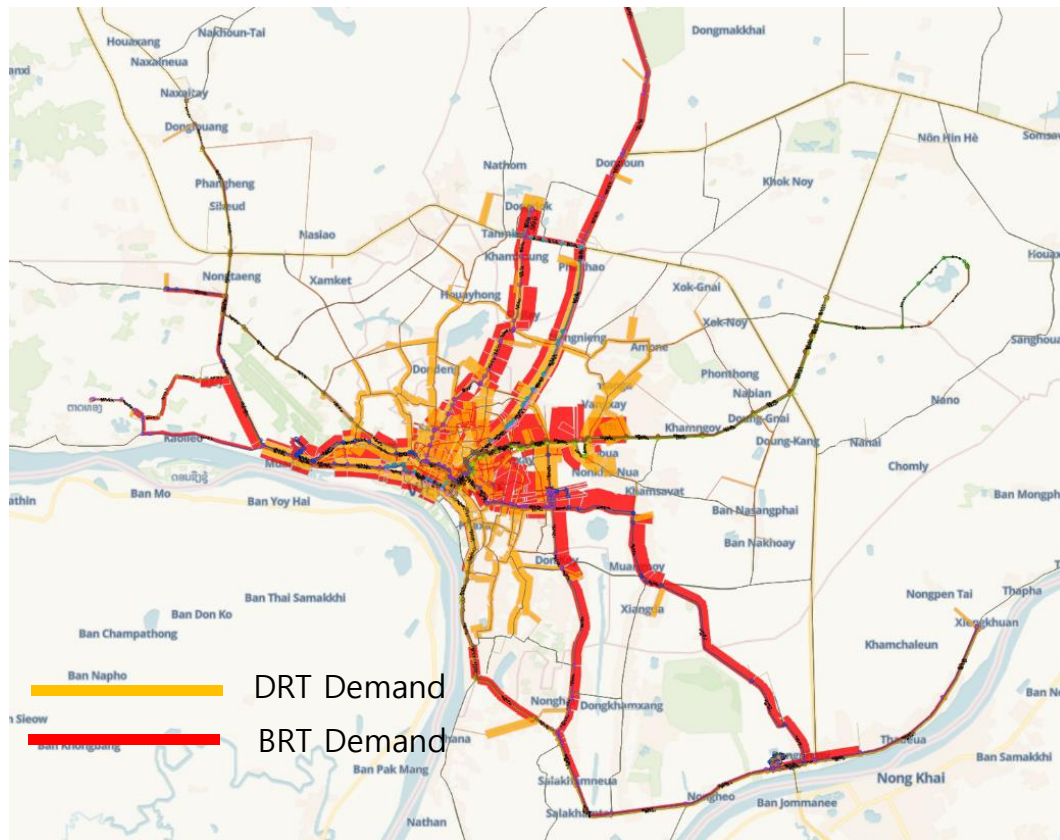
## Results: Scenario 1b

- ❖ DRT is used as a feeder into BRT stations
- ❖ The area covered is smaller compared to scenario 1
- ❖ DRT Ridership = 10,000 per day
- ❖ 191 vehicles required



## Results: Scenario 2

- ❖ DRT is used as a feeder into BRT stations
- ❖ DRT Ridership = 74,500 per day
- ❖ 511 vehicles required



## Preliminary Results

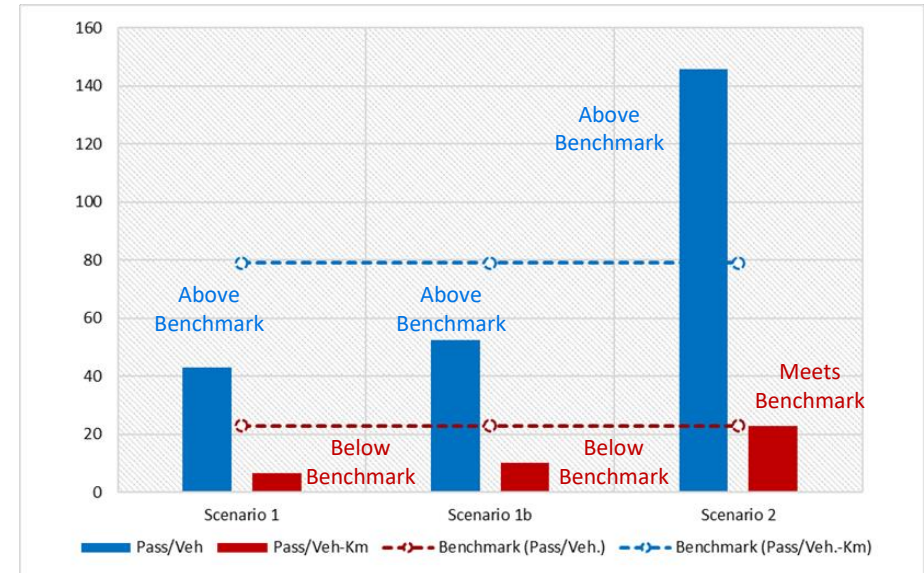
Scenario	Customers (Daily)	Number of Vehicles	Daily Pass. /Vehicle	Daily Pass/100 Veh. Km	Fare	OpEx (Daily)	Profit (Daily)
Existing Songthaew (Benchmark)	7,674	136	56	23.0	25,000	\$9,400	+5%-10%
<b>Converted Songthaews/TukTuks - Gasoline</b>							
Scenario 1	11,400	266	43	6.5	25,000	\$45,000	-\$30,000
Scenario 1b	10,000	191	52	10.1	25,000	\$90,500	-\$14,000
Scenario 2	74,400	511	146	23.0	25,000	\$28,515	+\$13,700
<b>EV Vans or Trucks - Electric</b>							
Scenario 1	11,400	266	43	6.5	25,000	\$13,400	+338
Scenario 1b	10,000	191	52	10.1	25,000	\$9,300	+\$3,000
Scenario 2	74,400	511	146	23.0	25,000	\$29,500	+\$70,600

Average Fare = 25,000 kip

- ❖ **Scenario 1 (Outer)**
  - ❖ Highest potential for GHG reductions, but relatively low demand, high operation costs
- ❖ **Scenario 1b (Outer, reduced coverage)**
  - ❖ 85% of the demand as Scenario 1, with far reduced operation costs
- ❖ **Scenario 2 (Inner)**
  - ❖ Highest demand, but will require many vehicles

## Operational Efficiency

- ❖ According to our analysis, existing songthaew operators are profitable, averaging around 5% - 10% profit margins after the driver salary is paid out. Each truck may profit up to ~\$200 USD/month.
- ❖ Adding DRT capability to a songthaew is possible with minimal equipment and would add a cost of around **\$20 USD/day**. Therefore, to remain profitable, the **DRT should add at least 15-20 passengers/vehicle/day versus today to remain profitable.**



## Costs & Subsidises

- ❖ According to our analysis, existing songthaew operators are profitable, averaging around 5% - 10% profit margins after the driver salary is paid out. Each truck may profit up to ~\$200 USD/month.
- ❖ Adding DRT capability to a songthaew is possible with minimal equipment and would add a cost of around **\$20 USD/day**. Therefore, to remain profitable, the **DRT should add at least 15-20 passengers/vehicle/day versus today to remain profitable.**

## Next Steps

- ❖ **Option 1:** Prepare a feasibility study under the EPIP program
- ❖ **Option 2:** Prepare a feasibility study under a UNESCAP funding mechanism
- ❖ **Option 3:** KSP Program

Potential Timeline:

	2024	2025	2026	2027	2028	2029	2030
Preparation	Feasibility Study	Feasibility Study		Business Case			
Pilot Project		Pilot Project					
Full Project (Songthaew Integration)							

Thank You  
감사합니다  
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 Research Center for  
Convergence of roads, vehicles,  
people and advanced ICT



KOREA NATIONAL  
UNIVERSITY OF TRANSPORTATION



YOUNG IN ITS  
INTELLIGENT TRANSPORT SYSTEM

## I. Next Steps



## Project Timelines

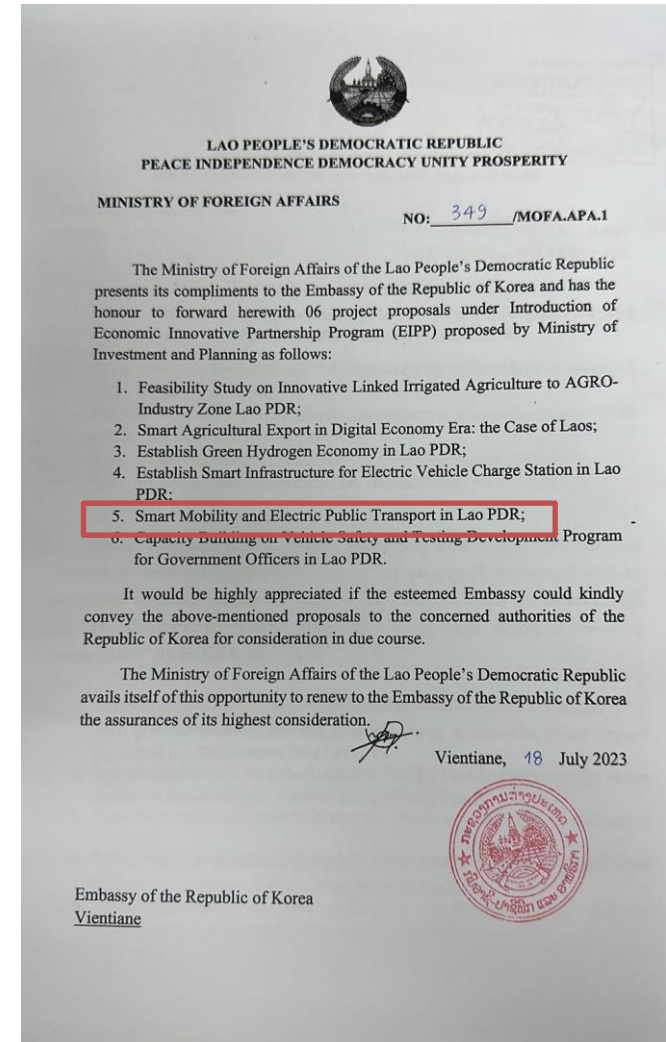
- ❖ Deadline was extended until December 31, 2023, to account for the JICA TMP Project finishing (**~November 2023**)
- ❖ We have time to receive feedback and incorporate any feedback before our due date
- ❖ Please get us any feedback by the end of **September 2023**

## Next Steps for these Projects

- ❖ EIPP program will be used to develop the next phase of study for our identified projects
- ❖ Funding for projects may come through the EPIP, but other sources (like EDCF or KSP) should also be considered

## EIPP Program (2024/2025)

- ❖ Good news is that the studies will continue with the EIPP program.
- ❖ However, its unclear how much funding for **implementation** will be available from EIPP.
- ❖ Other sources (like EDCF or KSP) and GCF or WorldBank, should also be considered.









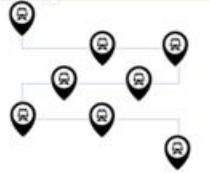



## EIPP Program (2024/2025)

### Fleet/Vehicle Electrification

As-Is	To-Be
 TukTuk/Jumbo (3-wheeled)	 e-TukTuk
 Songthaew	 e-Songthaew (van)
 Bus	 EV Bus
 Motorbike taxi	 e-Motorbike or e-Rickshaw

### Smart Transport

As-Is	To-Be
 Discrete payment system(s) for public transport modes	 Improvements to integrated payment systems for public transport modes
 Basic access to public transport information online	 Improved access to information of bus locations online
 No access to real-time information at stops	 Improved access to information of bus locations at stops
 Little to no management of public transport buses centrally	 Better management of bus systems
 Lack of good service outside of main corridors	 Demand-responsive transit (DRT) for hard-to-serve areas

## Requirements for Success

- ❖ In Korea, **DRT is operated with large subsidies** (up to 90% of costs are subsidized by governments)
  - ❖ Compared to Korea, wages are low in Lao PDR - so the biggest driver is cost of fuel (unlike in Korea, where it is labour)
  - ❖ Compared to Korea, Lao songthaew fares are generally quite high compared to average wages (the fare for the DRT in Korea was 1,250 W compared to a minimum wage of 10,000 W per hour)
- ❖ We recognize that in Lao PDR, sustainable transport solutions are required
- ❖ Lao PDR government is not currently in a good position to subsidize transport
- ❖ Therefore, only solutions that would be sustainable (from a business perspective) should be considered

**Self-Sustaining**

**Profitable**

**Environmentally  
Friendly**