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Electric Bus Service between Almaty and Bishkek

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ADB

AGENDA

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Project overview, goals and options

Background

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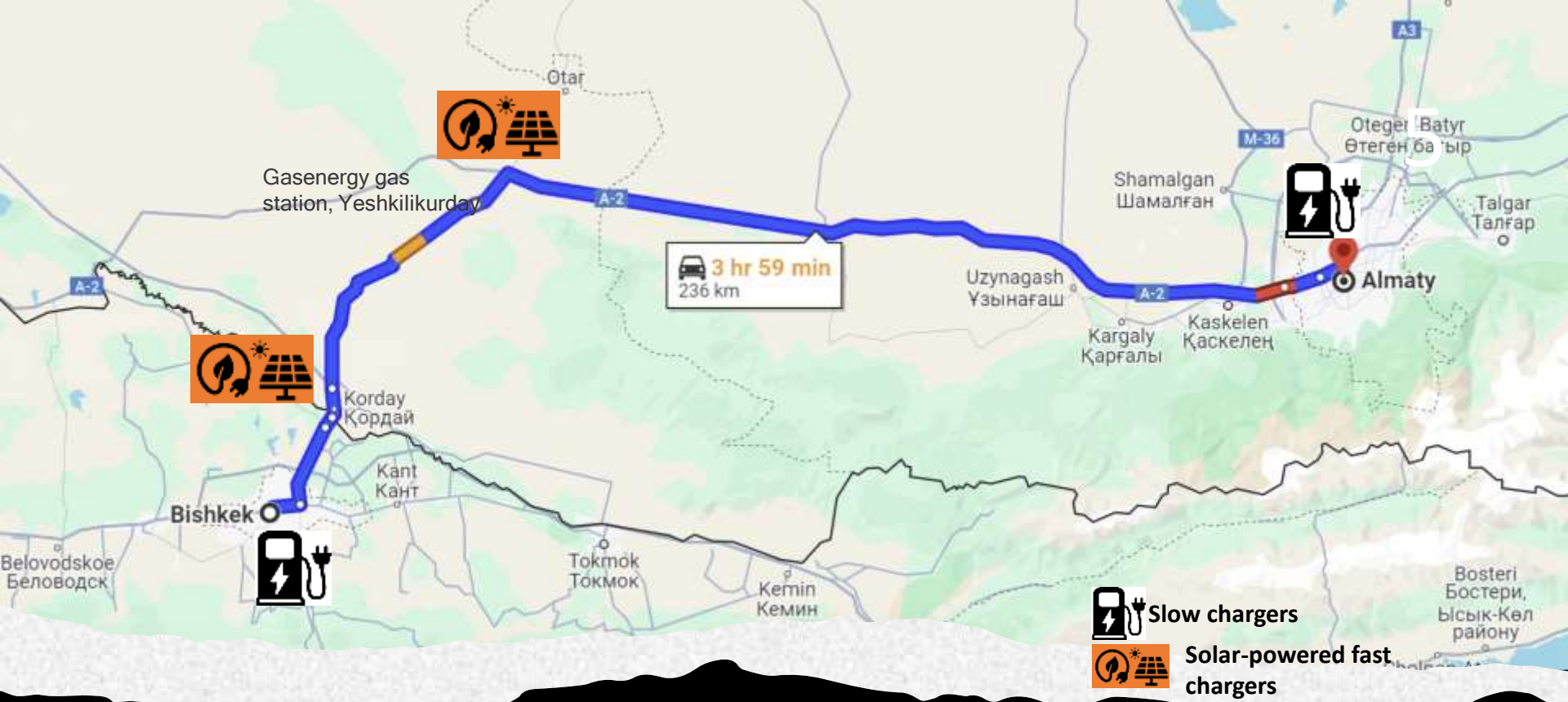
- The Almaty-Bishkek Economic Corridor (ABEC) aims to strategically align the economies of both cities and their surrounding regions, with a particular focus on fostering growth in the services and agricultural sectors
- Despite the close proximity of Almaty and Bishkek, there is no formal, contemporary, and high-quality bus service connecting the two cities and their respective airports
- The proposed cross-border, inter-city electric public transport solution will facilitate economic integration, address connectivity gaps, enhance service levels, and support the transition to green transport infrastructure
- This presentation provides further details to the financial appraisal and procurement alternatives presented in February, including summary of technical and legal considerations



REGULAR ELECTRIC CROSS-BORDER BUS PROJECT BETWEEN ALAMATY & BISHKEK.

240KM. CROSSING AT KORDAY/ AKZHOL

Max gradient	7.2%
Maximum elevation	1,230m
Travel time	4h
Road conditions	Paved, 2-4 lanes
Daily distance per bus	480km
Bus battery capacity	420kWh (HVAC, movement and charger energy usage)
Departures	8am – 21pm
Bus capacity	45 people, modeled at 75%

Goals and rationale for the cross-border regular electric bus service

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Goals for the electric bus project:

- ***Scheduled, reliable bus service for improved connectivity.*** *Positive impact on economic integration in services and tourism sectors over the distance of 240 km between the cities*
- ***Upgrade in user experience.*** *Comfortable, modern buses going from city center to city center, carrying 45 passengers at a time*
- ***Support transition to sustainable modes of transport.*** *Long-distance EV buses are innovative and can support the uptake of private electric vehicles*
- ***Improvement in transport services competitiveness.*** *Service providers compelled to offer improved experience to remain in business.*
  Out of the 5.2m people crossing the Akzhol/ Korday BCP, 70% are the potential market for the bus service (3.5m people)
- ***Support transition to knowledge-based economy.*** *Demand for highly skilled EV technicians and electrical engineers*
- ***Access to affordable concessional funds.*** *Climate-friendly projects attract donor funds*
- ***Balance the reduction in emissions with project costs.*** *Savings in CO2 emission per value of investment into the project*

Two project options for achieving these goals

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The project can be designed in two ways:

- A maximum, full-scape option, where we introduce high frequency of buses, fast charging infrastructure on the road and ensure that majority of the energy demand is met by solar power, OR
- A minimal conservative option, where the number of trips is less frequent and charging takes place at the depots through slow chargers, powered through the grid.

Infrastructure requirements of the two options	Buses required	Daily departures	Solar powered fast charging sites	Slow chargers at depots	Energy demand met by solar	CO2 emissions avoided (tailpipe)	Qualitative benefits
Full scale ebus option	18	2 x 16	2[1]	2 x 4	~80%[2]	45,000 t[2]	• Stimulus from improved mobility • New skills • Uptake of private EVs
Conservative ebus option	8	2 x 6	0	2 x 3	0%	11,000 t	

Note 1: Each solar-powered fast charging site has 2 fast chargers and 1 solar backup battery
Note 2: CO2 emissions reduction and solar energy generation is based on preliminary calculations. This can be refined furtherupon project structuring/ feasibility study

What is the preferred project option?

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Evaluation criteria (based on the defined project goals)	Project options: Full scale ebus option	Conservative ebus option	Diesel bus option
Scheduled, reliable bus service for improved connectivity. *Positive impact on economic integration in services and tourism sectors*	●	●	●
Upgrade in user experience. *Comfortable, modern buses going from city center to city center*	●	●	●
Support transition to electric sustainable modes of transport. *Long-distance EV buses are innovative and can encourage the uptake of private electric vehicles*	●	◑	○
Improvement in transport services competitiveness. *Current service providers compelled to offer improved experience to remain in business*	●	◕	◑
Support transition to knowledge-based economy. *Demand for highly skilled EV technicians and electrical engineers*	●	◕	○
Access to affordable concessional funds. *Climate-friendly projects attract donor funds in the short and medium term*	●	●	○
Balance the reduction in emissions with the cost of the project. *Tons of CO2 emissions saved per size of investment*	●	◑	○

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Procurement options

How can we deliver the project?

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The project can be delivered in three ways:

- **In-house delivery.** Government departments (MoTr, MOF, MoE) from both countries will execute the project
- **Outsourced Operations and Maintenance.** Government departments will set up the infrastructure, and choose private company(ies) to delivery the services and asset maintenance
- **Public Private Partnership.** Government departments will oversee the tender and manage the contract with a private sector group of companies to execute the project. The private sector consortium will be responsible for designing, construction, financing, operating and maintaining of all assets.

Note:

- The preferred procurement model can be selected in line with the preferred project option.
- The selection of project option and procurement model should ideally be clarified and elaborated further in cooperation with the relevant experts in the government.
- Following the preferred project option and procurement model identification, the project should progress into affordability analysis.

Cost of delivering the project under different procurement models over 15 years

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Cost to the government under different procurement models *NPV in USD*	In-house delivery	O&M outsourced	Public Private Partnership
	Quantitative assessment of procurement options (USD)		
Conservative ebus option	-33.5m	-36.1m	-39.5m
✓ Full-scale ebus option	-62.9m	-65.7m	-80.1m
	Qualitative assessment of procurement options (indicative)		
Skills and capacity to deliver the project on time and budget	*Low/ Medium*	*Low/ Medium*	*High*
Quality and consistency of service	*Medium*	*High*	*High*
Level of motivation to increase passenger numbers	*Low*	*Medium*	*High*
Understanding of long-term technology risks	*Low*	*Medium*	*High*
Innovation in service (e.g. other sources of revenue, cost efficiencies)	*Low*	*Medium*	*High*
Conclusion	✗	✓	✓✓

The quantification of procurement models' selection requires more work and discussions with government officials

Cost details for delivering the project under different procurement models (15 years)

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Cost to the government under different procurement models (risk adjusted):

NPV in USD	In-house delivery			O&M outsourced			Public Private Partnership		
Conservative ebus option	**-33.5m**			**-36.1m**			**-39.5m**		
	Initial & Lifecycle capex	**Revenue**	**Opex**	**Initial & Lifecycle capex**	**Revenue**	**Opex**	**Initial & Lifecycle capex**	**Revenue**	**Opex (NPV of unitary pmts)**
	-3.3m & -2.4m	9.9m	-37.6	-3.3m & -2.4m	9.9m	-40.3m	0.0	0.0	-39.5
Full-scale ebus option	**-62.9m**			**-65.7m**			**-80.1m**		
	Initial & Lifecycle capex	**Revenue**	**Opex**	**Initial & Lifecycle capex**	**Revenue**	**Opex**	**Initial & Lifecycle capex**	**Revenue**	**Opex (NPV of unitary pmts)**
	-12.1m & -7.8m	26.4m	-70.0	-12.1m & -7.8m	26.4m	-72.8	-3.3m & -2.4m	0.0	-80.1m

Both project options, regardless of procurement models, are NPV negative over the 15 years, under current operating and revenue assumptions. Right now, to cover the cost of investment into the electric buses, charging infrastructure and the cost of operations, the government is required to subsidize the bus service.

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Considerations for choosing a private sector partner

Who is an ideal project PPP partner?

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Requirements	Considerations
Diversity of technical expertise among consortium members	• Production and/or maintenance of electric buses/ fleets • Expertise in fast and slow charging technologies • Firms experienced in renewable/ solar power generation & integration with electric grids • Construction firms capable of building the necessary infrastructure • Evidence of good governance among consortium members (clear lead member, primary point of contact, defined roles and responsibilities)
Financial strength and stability	• Ability to cover their share of investments and withstand potential financial, construction, operational, regulatory risks • Ability to attract adequate funding to the project • Ability to establish clear terms for funding contributions and revenue sharing among consortium members
Commitment to sustainability	• Companies' adherence to sustainable practices and processes • Ability to monitor and report on environmental impact
Technical philosophy in consideration of price	• Openness to international standards for electric vehicles and charging infrastructure to ensure compatibility and interoperability between different manufacturers • Innovative, flexible and scalable to accommodate future expansions and technological change • Compliance to intellectual property rights to protect proprietary technologies and innovations brought by consortium members

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4 Next steps

Proposed next steps

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01 Assign a project team
Review the cost estimations, risk quantification and conduct high level legal review in cooperation with ADB project lead

02 Decision to proceed and MOU
The project team and government will confirm their decision to proceed with a detailed feasibility study. MoU signed by both governments to confirm their commitment to the development of the project.

03 Mandate letter
Appointment of ADB as the transaction advisor for the implementation of the project under PPP modality

04 Pre-tender
Prepare feasibility study, information for bidders, conduct market sounding, analyze sources of funding, ensure regulatory framework's compatibility for cross-border electric transport service. Prepare tender documents

05 Tender
Support in managing the tender process, bidder pre-qualification, selection, negotiations and contract award

06 Post tender
Prepare contract management manuals and training on project oversight, reporting, quality assurance and stakeholder mgmt

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Questions

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Annex

Pending issues ahead of finalizing the financial and procurement models

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Permitting and requirements

- Do the permitting regulations in both countries allow for cross-border private bus operators?
- Do the permitting regulations in both countries allow private charging station operators?
- Do permitting regulations in Kazakhstan allow for solar power generation setup by private companies?
- Can municipal bus depots in both countries rent space and chargers to privately operated buses?
- What are the customs and immigration procedures for people and luggage, to ensure fast border crossing?

Legal

- State of PPP laws in both countries for solar power, electric charging, and cross border public transport
- Constraints, legal requirements to companies involved in public procurement of public transport, charging infra and solar power generation, in both countries
- PPP tendering process compatibility in both countries
- State of climate regulations, carbon pricing and trading, and commitment to international agreements
- Investor protection measures in PPP laws in both countries (payment guarantees, termination, regulatory change incl in taxation, scope changes to project during or after setup)

Engineering

- Can excess energy in solar backup batteries be sold to the grid in Kazakhstan?
- Can on-route charging stations be connected to the grid, when backup batteries are depleted due prolonged to overcast weather?
- Do municipal bus depots have space and capacity for long-distance buses

Example of cost allocation between the governments

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Conservative ebus option	KGZ	KAZ
Bus purchase and replacement	2,240,000.0	-
Slow chargers cost, replacement and grid connection	246,359.5	246,359.5
Electrcity cost for bus service	471,053.9	711,315.9
Bus service operating costs	323,780.2	323,780.2
Salaries and office costs	19,361,343.1	19,361,343.1
Bus maintenance	-	3,153,935.4
Slow charger maintenance	57,151.3	57,151.3
	22,699,688.0	**23,853,885.3**

Full scale ebus option	KGZ	KAZ
Bus purchase and replacement	10,945,163.3	-
Fast chargers cost, replacement and grid connection	-	641,198.3
Solar PV panels and backup battery packs		5,465,122.2
Slow chargers cost, replacement and grid connection	356,599.1	356,599.1
Electrcity cost for bus service	693,355.4	1,047,002.6
Bus service operating costs	860,914.0	860,914.0
Salaries and office costs	34,254,302.3	34,254,302.3
Bus maintenance	4,205,247.2	4,205,247.2
Solar and fast charger maintenance		1,232,233.6
Slow charger maintenance		279,406.3
	51,315,581.2	**48,342,025.4**

- The numbers reflect public sector delivery model
- The numbers are presented in future value (not discounted to present value) in USD
- The example serves as an illustration only