

E-Motion Summary Argentina



Client	AFD
Version	02
Date	07/04/2021
Authors	Jürg Grütter
Revision	Verena Arauz and Daniel Wunderlin
Contact	Rte. des Esserts 92, 1854 Leysin, Switzerland jgruetter@transport-ghg.com , www.transport-ghg.com

Overview

1. Argentina has an area of 2,737,000 km² and 45 million inhabitants. In 2019, the GDP per capita was 9,900 USD. Argentina is, along with Brazil, Mexico and Colombia, one of the main producers of automobiles and auto parts in Latin America. Lithium reserves represent a unique opportunity for the transition towards electric mobility.

Climate and Energy Policies

2. According to the NDC 2020, total emissions in Argentina in 2016 were 364 MtCO_{2eq} (Ministerio de Ambiente y Desarrollo Sostenible, 2020). In the NDC the country commits to an absolute net emission target for 2030 of 359 million tCO_{2eq}. The transportation sector was responsible for 56 MCO_{2eq} in 2016, representing 15% of the country's total GHG emissions of that year (Ministerio de Ambiente y Desarrollo Sustentable, 2017, p. 13). Road transport, mainly trucks and automobiles, accounts for more than 90% of GHG emissions in the transport sector.

3. Argentina launched the development of its National Electric Mobility Strategy in May 2018 with the support of UN Environment. Argentina is currently formulating specific legislation on electric vehicles, establishing the conditions for the installation or operation of charging centers, and at the same time, exploring possible options for the local development of the electric mobility industry. In May 2019, a pilot test was conducted to assess the feasibility of implementing electric buses in the Autonomous City of Buenos Aires and in the same year the Government of the Province of Mendoza purchased 18 electric buses.

4. In 2019 25% of electricity was produced with renewables. In the NDC, the country commits to increase the share of non-conventional renewable energies by 2030 (Ministerio de Ambiente y Desarrollo Sostenible, 2020, pág. 29). The carbon grid factor is 0.382 kgCO₂/kWh.

Transport Sector

5. Argentina has a vehicle fleet of nearly 19 million units in 2019. Road transport GHG emissions of Argentina in 2019 are estimated at 55 million tCO_{2e}¹. Commercial vehicles including taxis, buses and LCVs are responsible for around one quarter of GHG emissions and 30% of pollutants (PM_{2.5} and NO_x). GHG emission from the transport sector are expected to grow under a BAU scenario by around 10% reaching 61 million tCO₂ by 2030.

Barriers and Enabling Factors

6. Enabling Factors and Barriers to Commercial EVs in Argentina

Enabling factors	<ul style="list-style-type: none"> • The Government has passed some initial bills and regulations as well as an electric vehicle mobility law. • Argentina is a producer of Lithium, which is an important raw material for e-mobility. • Argentina has realized various bus and LCV pilots and is thus gaining initial experience with EVs.
Barriers	<ul style="list-style-type: none"> • Lack of experience and know-how on creating an enabling EV surrounding including regulations (e.g. concession contracts), business models and financial support policies. • Commercial EVs are perceived to lack profitability and have much higher upfront costs. • For taxi and LCV deployment an urban public fast charging infrastructure is required. This is not yet available making operations of such vehicles problematic. • Lack of financial support for the purchase or operations of commercial EVs. • Argentina has large reserves of gas with the Ministry of Transport (MOT) favouring usage of Compressed Natural Gas (CNG) for vehicles.

¹ Tank-to-wheel approach; well-to-wheel approach including Black Carbon: 73 MtCO_{2e}

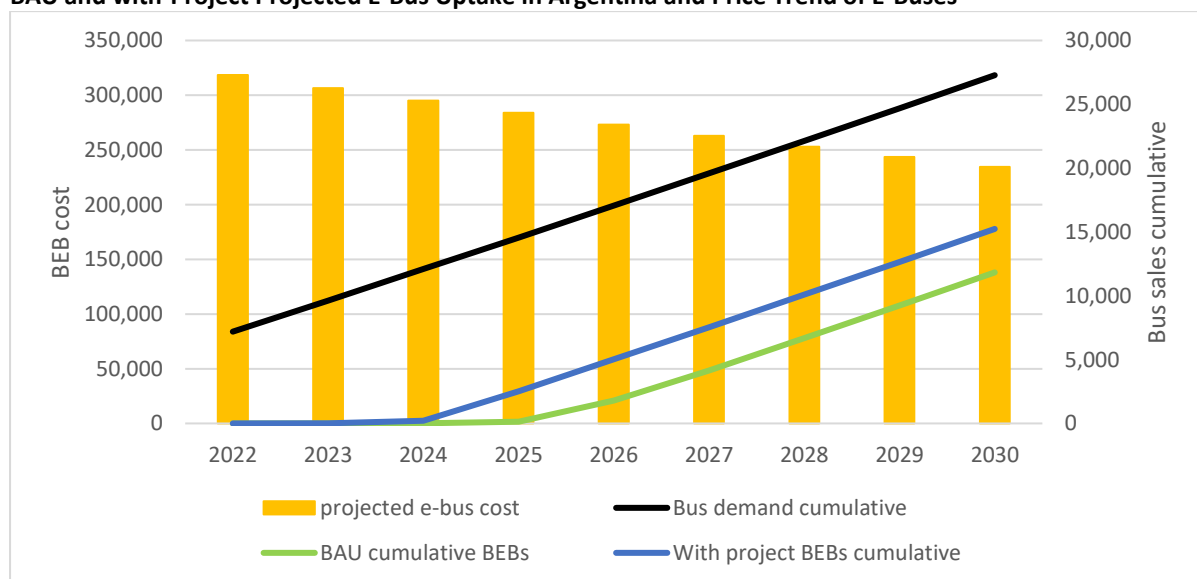
Market Analysis

7. The investment in **Battery Electric Buses (BEBs)** with the current financial conditions and business models is not profitable, a high risk, requires a significant increase in owners capital and results in potentially serious liquidity problems. The total cost of ownership (TCO) does give the indication that e-buses are potentially an interesting alternative. However, BEBs will require a different financial structuring and financial incentives to be a viable business proposal in Argentina.

8. Concessional loans help to resolve the liquidity issues and result in a marginal improvement of the investment profitability but investment risks remain high with an unsatisfactory payback time. It is clear that concessional loan conditions are not sufficient to tilt an investors decision with the current risk profile of BEBs in the country. An upfront grant of 5% on the total initial investment combined with concessional finance resolves to a large extent the profitability and risk issue.

9. Under a BAU scenario BEBs in Argentina start to get commercially viable around 2025 due to decreasing vehicle purchase costs. The E-Motion program has as basic function to accelerate EV deployment. It uses financial assistance (FA) to deploy an initial at-scale fleet used to reduce the performance risk perception of future investors by having actual performance data of large-scale fleet application, by reducing risks and costs of new market entrants, by having appropriate maintenance facilities in place and by having new business models in place. Technical assistance (TA) is used to reduce entry barriers e.g. concession contract issues, asset turn-over contracts, or new business models. Capacity building and training reduce in parallel performance risks. The figure below shows the projected e-bus market deployment with and without project.

BAU and with-Project Projected E-Bus Uptake in Argentina and Price Trend of E-Buses



10. Comparing the with and without project scenario we can state a faster uptake. This results in additional 4.9 million tCO_{2e} reduced, as well as 179 tPM_{2.5} and 21,000 tNO_x avoided. Thus the program has a decisive impact on accelerating climate friendly technologies.

11. The investment in **e-taxi** with current financial conditions and business models is marginally profitable but with a considerable risk and higher owner capital requirements. One of the major risks is that revenues will be lower when using an e-taxi. Taxis are often driven with 2 shifts especially during weekends (Friday to Sunday) or on special days. During such days the driving range of the e-taxi will be insufficient without re-charging. Home-charging takes 6-8 hours and is too slow. Also public

chargers available are in general too slow. A fast-charging urban network of 100-150kW chargers is a necessity to ensure that e-taxi owners do not lose a significant part of their revenues. Therefore currently e-taxis cannot be considered a financially viable investment except for special cases such as luxury taxis or low-mileage units with very regular schedules.

12. The main impact of a concessional loan for taxis is an improved liquidity. The concessional loan is sufficient to make the investment financially attractive. However, a fast charging network is still required.

13. Under a BAU scenario electric taxis start to get commercially viable around 2026. This could be accelerated by deploying an initial fleet and especially by establishing a fast-charging infrastructure targeted to taxis.

14. The investment in **e-LCVs** with current financial conditions and business models is not profitable. This situation remains even with concessional loans. In the case of LCVs the commercial BAU deployment is considered as very promising. This is due to local manufacturing and very low electricity prices. A commercial market take-off is expected also without further intervention and the value added of additional program incentives in this area is therefore considered to be limited. It is suggested therefore to rather focus the emphasis on urban sanitation vehicles, where to the moment no unit has been deployed and where market readiness is further off than with e-LCVs.

Investment Projects

15. Proposed Investment Projects

ID	Project	Delivery model	Expected year	CAPEX
1	100 12m BEBs for Buenos Aires ²	Special Purpose Vehicle (SPV) either PPP or private led which owns buses and leases them to multiple operators	2024	42 MUSD
2	15 electric sanitation vehicles for Cordoba	Municipality project	2024	6.5 MUSD
3	15 electric sanitation vehicles for Rosario	Municipality project	2024	6.5 MUSD

Financial Assistance (FA)

16. FA includes concessional loans for electric buses and sanitation vehicles. In the case of buses the project includes buses, charging infrastructure, grid connection and required bus depot upgrades. GCF participation in concessional loans is 30% for buses and 20% for sanitation vehicles with an estimated interest rate of 0.75%.

17. Investment grant support worth 5% of the total e-bus and 20% of the sanitation vehicle investment. In absence of such support investments will not take place.

Technical Assistance (TA)

18. TA includes (i) Elaboration of roadmaps for public transport, taxi and LCV electrification; (ii) Structuring of concession contracts considering alternative business models; (iii) capacity building and training; (iv) Policy advice in battery regulations concerning battery re-usage, recycling and disposal; (v) Knowledge products and outreach. The forementioned TA is executed by GIZ. TA is also given for

² The total demand is estimated at 300 units but due to funding limitations only 50% of units are included in the Program

project preparation (full feasibility, due diligence) of individual investment projects. Latter TA is executed by CAF.

GCF Intervention at a Glance

19. Financial Parameters

Parameter	Value
Total CAPEX excluding TA	57 MUSD
GCF Loan	16 MUSD
GCF Grant FA	5 MUSD
GCF Grant TA	3 MUSF
Total GCF	24 MUSD
Co-finance ratio	61%

20. Impact Parameters

Parameter	Direct Impact	Indirect Impact	Total Impact
GHG in tons lifetime asset	204,000	4,740,000	4,940,000
PM _{2.5} in tons lifetime asset	6	170	180
NO _x in tons lifetime asset	740	20,000	21,000
Energy saving in TJ lifetime asset	2,290	53,000	55,000
GCF cost per tCO_{2e} avoided	116		5
Total cost per tCO_{2e} avoided	294		12

Direct impact: due to investment projects

Indirect impact: Due to acceleration of EV deployment caused directly by the FA and the TA