Project_Scoping
Urban Electric Mobility Initiative
2019

NEPAL PROJECT SCOPING

SCALING UP E-MOBILITY FOR PUBLIC TRANSPORT IN THE KATHMANDU VALLEY

Wuppertal Institut

UN HABITAT
FOR A BETTER URBAN FUTURE

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PROBLEM STATEMENT

While the Safa Tempo are providing a valuable service, they need improvements both in terms of their technical performance and their looks and comfort. The Safa Tempo use lead acid batteries which are not very efficient and need to be replaced every year or so. Lithium-ion (Li-ion) batteries last much longer and give a longer range so that the batteries do not need to be changed mid-way during day as it is currently done. Converting Safa Tempo battery to Li-ion will therefore improve performance as well as profitability and make them more sustainable. Many Safa Tempo owners also want to replace their batteries with Li-ion batteries, but the high upfront cost of Li-ion batteries is holding them back. Furthermore, there is also a need for suitable policies and standards on electric vehicles and charging equipment, as well as local capacity to operate and maintain EVs, to scale up their use. This project is therefore designed to address these issues related to e-mobility by helping improve the performance of Safa Tempos, develop appropriate standards and local capacity to operate and maintain the EVs.

COUNTRY OVERVIEW

POPULATION OF 2.5 MILLION

KATHAMNDU

OVERVIEW

The Kathmandu valley includes 3 cities – Kathmandu (the capital city), Lalitpur and Bhaktapur and has the population of 2.5 million with annual growth rate of 4.63% (3.5 million unofficial). Air pollution is the leading cause of death in the valley, including pollution due to fossil-fuel run transport. Air pollution in Kathmandu is very high with average annual PM2.5 levels that are five times higher than WHO guidelines. Also Nepal imports 100% fossil fuels which has many issues including energy security. The Government of Nepal is supporting promotion of electric vehicles in the country through favorable policies and actions. Beside few electric cars and buses, E tuk-tuk named 'Safa Tempo', with a seating capacity of max. 11 people is running in the valley. It is considered as an easy and affordable means of public transport which can pass through narrow streets of the city and stops at shorter distances (Shrestha, 2018).

After diesel energy three-wheelers were banned in 1990s due to air pollution, clean and environment friendly Safa Tempo was introduced in the Kathmandu valley. More than 600 of them run in the valley, each travels 100-120 km per day with 2 sets of lead-acid batteries. Batteries are swapped in the charging station. On average 127,000 people uses Safa tempo daily (Bhatt, 2013). Though Safa tempo is a success story for EV in the valley, its design, technology and battery are quite old and need modification and battery disposal plan need to be in place. Therefore, the project concept intend to upscale Safa Tempo that support efficiency in public transport. As Nepal's main electricity generation is from hydropower, the power supply for EVs is fairly clean. With few new hydropower construction, Nepal will have soon surplus power generated through hydropower.

SCOPING STUDY SUMMARY

CREATING AN ECOSYSTEM FOR ELECTRIC MOBILITY

ELECTRIC MOBILITY

In Kathmandu, the demo project will contribute to create an ecosystem for electric mobility in Kathmandu by demonstrating different EVs to enhance public transport, suitable charging solutions and services. It will support the integration of several innovative last-mile solutions such as **E-tuk-tuks** (for public transport) and **E-scooters with E-minibuses**, (e.g. 8 meter length), the buses in use currently and forthcoming E-buses. Few diesel buses will be converted to E-buses replacing the drive system (motor, transmission and rear axle). The E-buses/E-minibuses and E-tuk-tuks (refurbished and new) are planned to run on the existing routes. As charging infrastructure is poor or non-existent in public, suitable options for charging EVs and batteries will be suggested. E-buses and E-minibuses with Lithium-ion (Li-ion) battery large enough to allow for the daily operation (without charging) up to 14 hours will be sought, together with charging strategies such as plug-in overnight charging located in the depot. Several existing E-tuk-tuks will be remodelled - mainly converting lead-acid batteries into Li-ion batteries and refurbishing the chasis, assembling the vehicle parts locally. New E tuk-tuks with Li-ion batteries and fast charging system will be introduced together with innovative business model, such as battery leasing/pay-per-use model. This will provide better services for E tuk-tuks as public transportation in the city. E-scooters sharing system, that reduce the dependence on owning private vehicles, will also be sought in the demonstration project with state-of the-art technologies such as GPS positioning, contactless payments and docking stations integrated into charging facilities.
The project will improve the viability of EVs and the adoption of suitable charging system through technology innovations (battery leasing and range extension), and innovations to business models for vehicle (e.g. revolving funds), charging and services.

IMPROVE THE VIABILITY OF EVS

OVERALL OBJECTIVE

The overall objective of the project is to promote clean and efficient public transport through EVs. This will be achieved by enhancing the performance of Safa Tempos, developing standards for EVs and charging infrastructure and building local capacity of EV operation and maintenance. The project consists of six components:

SHORT DESCRIPTION

(i) Safa Tempo conversion to Li-ion batteries which will be facilitated through soft loans in partnership with a financing institution to cover parts of the capital costs. During the project period 15 Safa Tempos will receive loans to convert their batteries into Li-ion and the fund will be revolved till all Safa Tempos are converted.

(ii) Upgrading of at least 30 Safa Tempos by enhancing their looks and comfort

(iii) Piloting of four new small 8 seater EV as a public transport along two routes in the historic core area of Lalitpur as a demonstration project

(iv) Development of standards for EVs and charging station in partnership with Department of Environment

(v) Capacity Building of 60 drivers/mechanics, prioritising women, to ensure proper O&M of the EVs.

(vi) Public awareness campaign through publications, social media/media and branding of EVs.

The project will support national targets, particularly Nepal's Environment Friendly Transportation Policy 2015 and Nepal's Nationally Determined Contribution to the Paris Agreement, which aims to increase the number of EVs by 20% by 2020 compared to 2010. Promotion of EVs is also mentioned in the National Transport Strategy 2015, National Urban Strategy 2017 and Climate Change Policy 2001. Lalitpur Metropolitan City has also mentioned EV promotion in its annual plan for this year and this project will directly contribute towards this plan.

FINANCING

The innovative pilot project concept on 'scaling up e-mobility for public transport in the Kathmandu Valley' is submitted on December 2018 to the 2019 TUMI Global Urban Mobility Challenge for the award of financial support/grant by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. The technical support on project proposal development and activities is provided by "Urban Pathways" project – funded by the International Climate Initiative and implemented by UN-Habitat, Wuppertal Institute and UN Environment.

Project financing and implementation

The demonstration project concept is prepared and will be implemented by 'Sajha Yatayat', a public transport cooperative in Nepal based in Lalitpur and Lalitpur Metropolitan City (LMC) in partnership with Safa Tempo entrepreneurs, Electric Vehicle Association of Nepal (EVAN) and Subidha Saving and Credit Cooperative which is a financing institution where many Safa Tempo owners are members. As Sajha Yatayat and Safa Tempo entrepreneurs are transport operators, and LMC is the local government responsible for public transport, this will ensure long term sustainability of the project. They will also invest their own funds in the project activities, which will increase their ownership over the project's outputs and they will also be involved in scaling up the activities in the future. The establishment of a revolving fund for improving Safa Tempos will ensure that project's work will continue even after the completion of the project.
The total budget planned for the project is 318,968 Euros out of which TUMI support of 143,968 Euros is sought. Sajha Yatayat, LMC and Safa Tempo entrepreneurs will also contribute 175,000 Euros, which is 55 percent of the total project budget.

Project beneficiary and substainability context

The main beneficiaries of the project will be EV entrepreneurs, many of whom are drivers and owners of the Safa Tempo, and the local public, particularly those living in the historic core area of Lalitpur, as well as tourists who visit the area. The project will also work with financing institution to mobilize additional investment for the demonstration project and soft loan for EV owners.

It will also collaborate with the vocational training institutions to internalize training curricula for prospective mechanics. The trained people will help to repair and maintain the EVs through private workshops. There will also be a collaboration with Tribhuwan University of Nepal for technical inputs.

Some of the sustainability context of the proposed project are:

Accessibility and inclusiveness

The demonstrated EVs will provide easy access for citizens to many parts of the Kathmandu valley. Although the Safa Tempo cannot accommodate wheelchairs because of the small size and design, they will be used by other disabled people as well as children and elderly. The fee for using the EV will be kept low considering affordability and wider accessibility.

The proposed project will provide job opportunity and awareness raising for many of the Safa Tempo entrepreneurs (also are owner/drivers) who come from poor economic background. At least half of the drivers trained to operate the EVs will be women who are also from lower economic background. The EV service will mainly benefit the local people and business of the core areas of Lalitpur.

Climate friendliness and health

As the EVs will not produce any emissions and as Nepal's electricity source is also primarily hydropower, the project will have negligible impact of climate. As these are public transport vehicles, they will also contribute in reducing the use of private vehicles, most of which are powered by fossil fuel.

The proposed project will result in reducing air pollution, which will result in improved health of the residents of the Kathmandu valley as well as tourists, particularly in the core areas of Lalitpur. Currently WHO estimates that Kathmandu's air pollution results in the loss of almost 10,000 lives each year.

Integration into wider planning

The proposed project will be an integral part of Lalitpur Metropolitan City's overall transport plan, which will enhance walkability, access to clean public transport and reduce private car use, LMC has already mentioned promotion of EVs in its annual plan and it is already working with Sajha Yatayat for improvement of public transport.

Maintain the project after the project life

- With improved Safa Tempos and efficient Li-ion batteries, EV entrepreneurs will be able to expand their services and revenue allowing them to pay back the soft loans and operate their Safa Tempo as a profitable business
- The soft loan will be revolved by Subidha Saving and Credit Cooperative so that ultimately all the 700 Safa Tempo can benefit and be improved. As the financing institution will also charge a service fee, the fund can continue to operate in a sustainable manner
- Sajha Yatayat will operate the new EVs in Lalitpur core area in a business model with revenue from passenger fares covering all operation and maintenance costs
- The trained drivers and mechanics will also be engaged in the EV industry

Project planning

The proposed project consists of three phases: (i) Design Phase (ii) Implementation Phase and (iii) Monitoring Phase which will be carried out in 1.5 years. LMC, Sajha Yatayat and EVAN will form a Project Steering Committee to guide the project. A stakeholder's workshop will be organised to finalize the detail work plan for the project. The detail design of the six key project components – (i) Safa Tempo conversion to Li-ion batteries (ii) Upgrade of Safa Tempo (iii) Piloting of new vehicles for public transport in core Lalitpur area (iv) Standards development (v) Capacity building (vi) Public awareness – will be completed during the design phase. During the implementation phase, all the six components will be implemented in partnership with stakeholders. Monitoring will be carried out by the Steering Committee and in the final phase evaluation of the project result will also done. This will be further discussed and disseminated in a workshop with stakeholders.

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