



Nepal_Kathmandu
UEMI_SOLUTIONS
2018

EV READI NESS ASSESSMENT



**Wuppertal
Institut**

UN HABITAT
FOR A BETTER URBAN FUTURE



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This publication is part of UEMI_SOLUTIONS and
the EU funded project Future Radar

The graphic design was prepared by Barbara Lah
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Berlin, 2018

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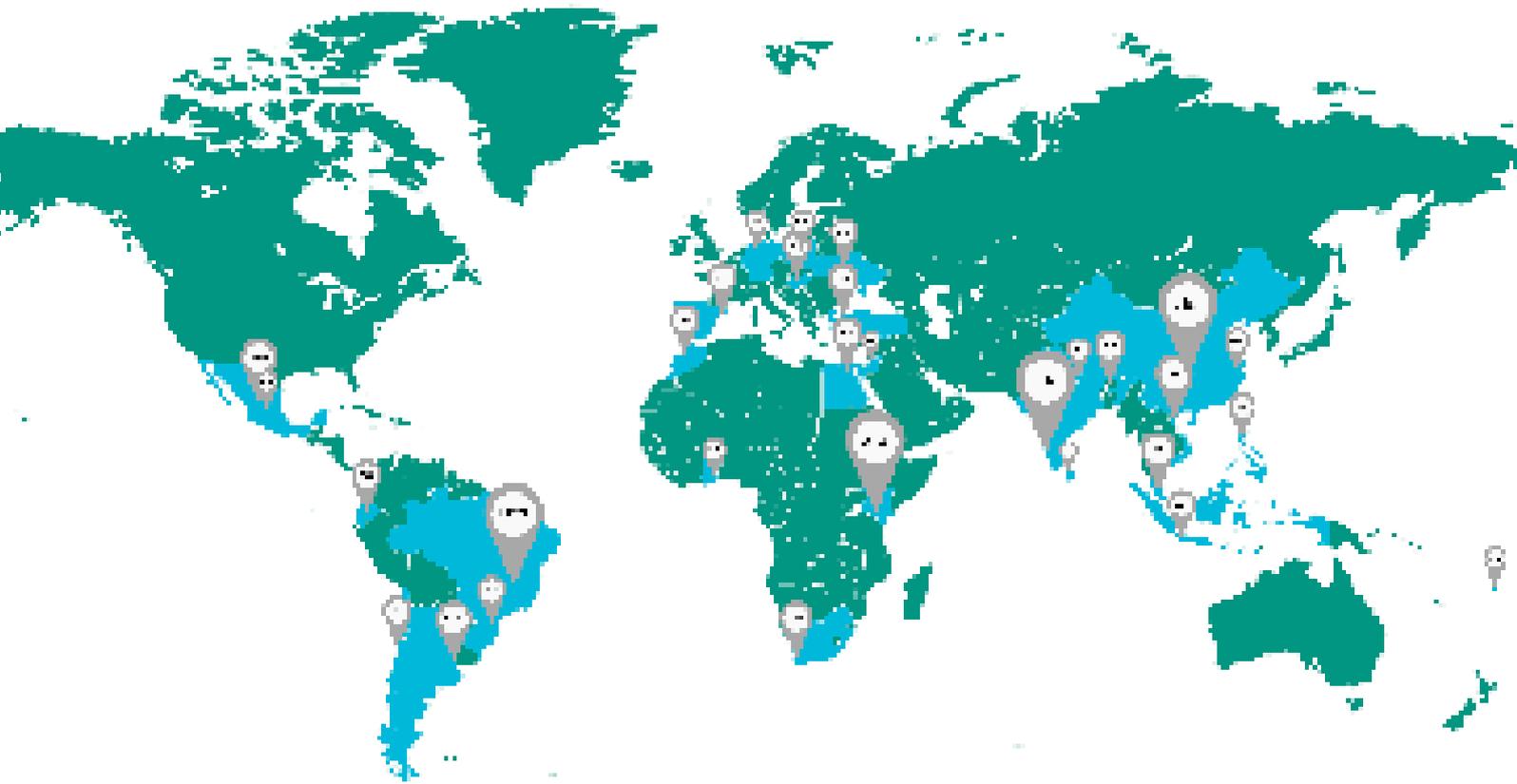
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The project has received funding from the European Union's Seventh Framework Programme and Horizon 2020 under the grant agreements no 604714 (SOLUTIONS) and no 723970 (FUTURE RADAR)



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KEY FACTS & FIGURES

CITY

Kathmandu is the capital of Nepal. The Kathmandu valley includes 3 cities – Kathmandu, Lalitpur and Bhaktapur with a total area of 570 sq. km. The population of the valley is 2.5 million with an annual growth rate of 4.63% (3.5 million unofficial). This represents 9.32% of the entire population of the country. Nepal's **GDP per capita is 729.1 USD (2016)** (World Bank, 2018). GDP growth rate per capita in Nepal is calculated as 3.67% considering the economic growth rate of 5.0% and population projection by Central Bureau of Statistics (CBS) of Nepal (JICA, 2017). GDP per capita is expected to grow at 3.5% in 2018 and 4.1% in 2019. Nepal's GDP growth is expected by 4.9% in 2018 and 5.5% in 2019. The inflation rate in Nepal is forecasted at 5.5% in 2018, the second highest in South Asia after Bangladesh (ADB, 2018). Kathmandu is the important center for economic activities in Nepal, mainly industrial and commercial activities.

CO₂ EMIS- SIONS

Nepal is one of the least contributors to the greenhouse gas (GHG) emissions. As of 2010, Nepal's own emissions bring about less than 0.1% of global emissions. Nepal's CO₂ emission is 8,031 CO₂ emissions (kt) (World Bank, 2018a), which is 0.3 per metric tons of CO₂ per capita (World Bank, 2018b).

Nepal's economic growth, social transformation and rapid urbanisation have increased vehicle ownership and usage – a higher trend in urban areas. Road transport dominates the transport infrastructure in Nepal (cars, bus, motorcycle and marginal non-motorised transport). Urban rail system and Bus Rapid Transport (BRT) are not available yet but the feasibility study is undergoing. Within 2008-2013, the national average annual growth rate of motorcycle and 4-wheel light vehicles (car, jeep and van) was 19.5% and 8.4% respectively (UNCRD, 2015). In the Kathmandu Valley, the number of vehicles registered tremendously rose—**an increase of over 12-fold** from 45,871 in 1990/1991 to 570,145 in 2010/2011. The highest number of vehicles type in the valley was motorised two-wheelers. (Shrestha, Shrestha, & Shrestha, 2017). A significant number of citizens also walk in the valley, but at times air pollution affects the pedestrian.

**12 FOLD INCREASE OF VEHICLE
REGISTRATIONS**

GDP 729.1 USD

KATHMANDU



E-VEHICLES IN KATHMANDU

Nepalese e-mobility sector is still in a nascent phase, but the support from the government and private sectors are seen to foster electric vehicles (EVs) in the country. This paper gives an overview of e-mobility in Nepal and in the capital city of Kathmandu - on its status, measures considered, and political and technical support on its implementation.



DESCRIPTION & MEASURES

In the Kathmandu Valley, air pollution was the second leading cause of death in one of the main hospitals of the Kathmandu Valley in 2011. To reduce air pollution in the Kathmandu Valley, these 3 measures are urgently required: improving vehicle speed, promoting public transportation, and introducing electric vehicles that could reduce public transportation energy demand by more than 60% (Shrestha, Shrestha, & Shrestha, 2017).

Electric vehicles initiative in the Kathmandu valley are:

1.

1997-2001, trolley bus was running for 13km in the Kathmandu valley, developed with the assistance of the Chinese government but stopped its service is discontinued due to inefficient management, corruption, low revenue collection, and political interference (Shahi, 2017)

2.

Since 1996, electrically powered 3 wheeler Tuk-Tuk (Safa Tempo) was in operation. It has 6-8 seating capacity serving people for shorter distance route. Currently, 1,200 Safa Tempos run in Kathmandu (Shahi, 2017). Safa Tempo can be considered a successful e-Tuk Tuk in Kathmandu which can pass through narrow streets of Kathmandu and stops at shorter distances.

3.

Less than 100 electric cars are in the valley, mainly imported from India, China and South Korea (which is negligible compared to fossil fueled cars). E-scooters are a solution to replace the growing and highly used fossil fueled scooters

4.

A few small electric cars are produced in Nepal by Hulas Motor Company as an experiment

5.

Nepal Electrical Authority opened a demo charging station at its office in order to boost public interest in EVs

6.

As public transportation services are still not adequate in the city, an addition of e-bus improves accessibility and environment

ELECTRIC VEHICLES INITIATIVES OUTSIDE KATHMANDU

1.

Currently, e-Rickshaws are running in the southern part of Nepal as a good public vehicle for short distances

2.

On the process of procurement of 125EVs including buses, rickshaws and taxis to be introduced in Southern Nepal (Lumbini), with the support from ADB (a project from Asian Clean Energy Fund (ACEF) as part of the South Asia Tourism Infrastructure Development Project (SATIDP). They are planned to be operated at same the time when Gautam Buddha International Airport will be completed, which is under construction (Ghimire, 2016)

3.

EV importers and distributors are also planning to establish charging stations in different locations (The Himalayan Times, 2017)

4.

The Electric Vehicles Association of Nepal (EVAN) has sought infrastructure - charging stations and the route permit from the Department of Transport Management (DoTM) for the promotion of electric vehicles (but the department has not yet taken any decision) (The Himalayan Times, 2017)



CURRENT POLICY PROCESS

SUSTAINABLE TRANSPORT

The sustainable transport in Nepal (mainly in urban areas) include improvement of infrastructure and promote public transportation and NMT, and create a suitable environment for electric vehicles. As mentioned in Nepal's Nationally Determined Contribution (NDC), the government of Nepal has endorsed some policies aimed to promote electric vehicles (EVs). The targets in NDC of Nepal to support EVs (Government of Nepal, 2016):

- Environment-Friendly Vehicle and Transport Policy (2014). This policy aims to increase the share of the electric vehicle up to 20% by 2020 (from 2010 level), promote the transformation of other regular vehicles to electric vehicle, and provide subsidy scheme for the promotion of electric and non-motorized vehicles;
- By 2050, Nepal will decrease its dependency on fossils in the transport sector by 50% through effective mass public transport means while promoting energy efficient and electrical vehicles; and
- Electrical (hydro-powered) rail network by 2040 to support mass transportation of goods and public commuting.

NDC TARGET

ONGOING

On-going feasibility study on replacement of fossil fueled car with e-cars, monorail, BRT (The JICA study suggested the option for BRT route on the wide road, preferable at the inner ring and outer ring of Kathmandu)

No Sustainable Urban Mobility Plan (SUMP) in the valley yet

SUMP



POLICY ENVIRONMENT

- The Government of Nepal has imposed the charge of 0.5 Nepalese Rupees (NRs) on every litre of fossil fuel since 2007 to spend that on programmes and activities aimed at tackling air pollution in the valley. The tax revenue has reached around NRs. 5 billion (around 39 million Euros) at the Ministry of Finance which is planned to be invested in the EV infrastructure, but it has not been spent yet (The Kathmandu Post, 2018)
- The Government has eased the import of electric vehicles at a custom duty of 10 percent (instead of 40%) and 13 percent Value Added Tax, effective from 2016/2017.
- The Government of Nepal has proposed reducing customs duty for EVs from 40% to 10% for private EVs, and 1% for public EVs
- Schemes like tax reduction and exemption are not enough to promote EVs in Nepal but require to work on long-term solutions including better financing model o encourage both entrepreneurs and users (Shahi, 2017)



TECHNOLOGY REQUIREMENTS

TECHNICAL BARRIERS TO THE PROJECT

Charging stations

- Not enough electric charging stations are built yet
- The electric cars, scooters owners are charging batteries at home

■ **not enough electric charging stations**

Battery

- For operationalization - batteries, chargers, repair and maintenance environment weak
- No proper batteries disposal and recycling system exist
- Require knowledge and local capacity for EVs

■ **no power batteries disposal**



ELECTRICITY MIX & RELIABILITY OF THE GRID

- Nepal's main electricity generation is from hydropower, operated by Nepal Electricity Authority (NEA), the state-owned power utility
- Nepal's total electricity production right now is around 800 MW and imports 300MW from India (Lama, 2017)
- A surplus electricity from the hydropower in the system is expected by the end of 2018 with the completion of the 456 MW Upper Tamakochi Hydroelectric Project (UTHEP), which support the uptake of EVs in the country (Lama, 2017)
- Nepal's NDC also stated the plans for clean energy for the country:
 - To achieve 80% share of electricity from renewable sources in the energy mix by 2050;
 - To expand its energy mix focusing on renewables by 20% by 2020;
 - 4,000 MW of hydroelectricity by 2020 and 12,000 MW by 2030;
 - 2,100 MW of solar energy by 2030 with arrangements to distribute it through the grid;
 - Additional 220 MW of electricity from bio-energy by 2030; and
 - Additional 50 MW of electricity from small and micro hydropower plants

POLICY & GOVERNANCE REQUIREMENTS

SUPPORT FROM THE LOCAL, STATE AND NATIONAL POLICY LEVELS

- Nepal government
- Public and private transport companies
- Kathmandu Municipality

KEY STAKEHOLDERS

- 1 ■ Minister or State minister of Nepal
- 2 ■ Electric Vehicles Association (EVAN)
- 3 ■ Department of Transport Management (DoTM)
- 4 ■ Ministry of Public Infrastructure and Transport
- 5 ■ Kathmandu Valley Development Authority (KVDA)
- 6 ■ Sajha Yatayat (PPP in public bus services)
- 7 ■ Alternative Energy Promotion Centre (AEPCC) - work for government to coordinate private sector, service providers, end users and even development partners
- 8 ■ Nepal Electricity Authority - for charging stations



READINESS

Infrastructures for charging stations are not enough. One EV charging is available in Kathmandu, established by Nepal Electricity Authority (NEA) as a demonstration purpose. Few others are currently available in shopping complexes. (The unavailability of charging stations is also blamed because the number of electric vehicles are less in market) (The Kathmandu Post, 2017)

Summary of the key issues of assessment

- Availability of electricity
- Provision of recycling of battery system is not mature
- New hydropower plants are under construction and additional electricity generation will affect positively in the uptake of EVs in Nepal
- As Nepal's around 80% of automobile import is from India (along with other countries), India's announcement of not producing any gasoline and diesel cars by 2030 makes Nepal to urgently devel-

Availability of electricity

op strategies to tackle the situation. This announcement will have a tremendous opportunity for Nepal to EVs powered by hydroelectricity and reduce fuel imports (KC, 2018)

Raising awareness for the benefits of EV vehicles

- Require ease in EV Autoloan
- Nepal government needs to set up a network of charging stations and locate proper place for the stations (preferably near NEA substations and offices) (Onlinekhabar, 2018)
- Need to initiate awareness raising campaign to show the benefits of EVs

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RESEARCH



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