Market launch of Lithium batteries for electric vehicles in Nepal

2019

Proceedings of

Lithium Battery Workshop

"Reliability of Lithium Batteries to make Electric Vehicle more Energy Efficient"

January 3, 2019
Hotel Greenwich, Kathmandu

REPIC

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

State Secretariat for Economic Affairs SECO

Swiss Agency for Development and Cooperation SDC

Federal Office for the Environment FOEN

Swiss Federal Office of Energy SFOE

Clean Energy Nepal

January 3, 2019

CLEAN ENERGY NEPAL

1. Background

With ever increasing demand for efficient and clean public transport and worsening air quality due to fossil fueled vehicles, urban lives are becoming challenging. Realizing that clean transport can play a big role in transport related GHG emission reduction, thereby contributing the sustainable development goal of clean energy sector. Electrifying of the public transport was thought of a great idea to kick start and with time, the innovation and engineering has led technologies steps ahead. The electric vehicles are being made more energy efficient and environment friendly with the evolution of new technologies.
In Nepal, EVAN and CEN with support from the REPIC, Switzerland initiated a pilot project to do a feasibility test of Lithium Powered safa tempo. Since last two years CEN has analyzed the performance level of Lithium powered safa tempo and has done some assessment.

In this regard, Clean Energy Nepal (CEN) together with the Renewable Energy and Energy Efficiency Promotion in International Cooperation (REPIC), Switzerland conducted a workshop on "Reliability of Lithium Battery to make Electric Vehicle more Energy Efficient". The workshop was organized to share the outcomes and major findings of the pilot project initiated to test the feasibility of Lithium battery powered safa tempo in Kathmandu.

2. Objective

The main purpose of this workshop is to summarize the results of the project, to inform once more the users what is important for a long life of the batteries and to advocate for replication of the using Li batteries.

3. Program Participants

Participants from different organizations, educational institutions, local government bodies, general public, vehicle importers, stakeholders and media were notable attendees of the workshop. The workshop held on 3rd January, 2019 was attended by around 40 participant, including President of Electric Vehicle Association of Nepal (EVAN) and CEO (Shree Eco Visionary P.Ltd) Umesh Raj Shrestha, Chairman of Clean Cooperative Mr. Hridaya Manandhar, owner and Manager of Tempo charging station Mr. Ramhari Neupane, Engineer Mr. Anil Bajracharya were amongst the speakers, Professor Dr. Amrit Nakarmi, Activist Mr. Bijaya Man Serchan of Pashupati Energy, Mr. Madan Shah from the Swiss Embassy.

Figure 1: Representative from various organizations participating in the workshop

4. Proceedings

The workshop was formally commenced by Program Manager, Rajan Thapa of CEN. Opening and program overview was shared followed by three presentations, findings and discussion along with a way forward. The presenters focused on market launch of Lithium batteries in safa tempos of Nepal, the advantages and disadvantages of Lithium batteries in comparison to lead acid batteries.

Opening Remarks

The program commenced with the opening remarks and program overview from Mr. Rajan Thapa, Program Manager, CEN in which he highlighted the agenda of the workshop along with a brief history of development and initiation of this project.

Presentation 1: Market Launch of lithium batteries for vehicles in Nepal Development of the Project and Results

Markus Eisenring from Eisenring Engineering Office (partner of REPIC) compared the performance between Lithium and lead acid batteries. He shared about different advantages of using Lithium battery in vehicles to drive towards cleaner transport modes and urged stakeholders to prioritize the cleaner and efficient technologies. "In the initial phase, by end of 2016, 3 Safa Tempos were equipped with Li batteries and it has now increased to 25 Tempos" said Mr. Eisenring. He further highlighted that operating with Lithium batteries can save a lot of energy (energy reduced from 6.6 kWh/loop to 2.8 kWh/loop) compared with lead acid battery. He highlighted the outcome of the project which led to that fact that lithium battery is very appropriate for replacing the lead acid battery, as for Li batteries lifetime cost is less and lifespan is much higher.

Presentation 2: Technical Aspects of Li Batteries

Thomas Kuster from Eisenring Engineering Office (partner of REPIC) shared about the technical aspects of lithium battery installation and operation and its technological advantages with especially designed Battery Management System (BMS) that controls and ensures durability of Lithium battery to optimize the energy consumption. He compared old lead acid battery and new Li battery in terms of weight, energy, life and cost, in which it was expected that the life of Li battery would be about 6 to 7 years, with cost of $7'920 whereas the lead acid battery cost about $3'360 and had a lifetime of about 1 year. He concluded that Li battery has high lifetime and can return the rate of its actual cost by making additional profit.

Presentation 3: Brief History of EVs in Nepal
Reliability of Li Battery to make Electrical Vehicle more Energy Efficient

Mr. Rajan Thapa highlighted the major findings of the survey conducted by CEN in 2018 among the safa tempo drivers and owners. He told that Lithium batteries are more economic, incurs less maintenance time and cost, number of operating days, and provides less risk to damages. He added that Lithium batteries are environmentally safe and has durable life and these competitive advantages over the lead acid battery has more number of people interested towards it. He shared a finding of how safa tempos equipped with Lithium batteries had been running for more than two years and left no signs of deterioration and the performance still being very impressive.

Outcome Sharing

The major benefits of Lithium battery based on its study on energy efficiency, reliability, durability, performance and weight were highlighted. The workshop concluded on a positive note that has successfully demonstrated and piloted the lithium battery in ten safa tempo and has been replicated in 15 more safa tempo through encouraging participation of private investors. The experts of this survey shared that many people have been shifting towards Lithium battery, despite its initial cost being one of the downside, Li battery has high durability and can return the rate with additional profit. Whereas using lead acid batteries results in bad loss for the investors compared to using Li batteries.

Remarks from Special Guests

President of Electric Vehicle Association Nepal (EVAN) Mr. Umesh Raj Shrestha said "There are numerous advantages of Lithium battery which outweighs the disadvantages therefore many people are replicating it and are encouraged towards it". He also added that in the context of Nepal, the financial burden is a major downside for many tempo owners who wants to shift towards Lithium battery from lead acid battery. Mr. Shrestha also informed that they have been encouraging the use of Lithium battery in E-scooters and other electric vehicles.

Ganga Bahadur Thapa, Chairman of National Economic Concern Society Nepal emphasized that the government should allow tax subsidy for batteries and spare parts imports of E-vehicles which is a great way of promoting alternative energy, sustainable and environment friendly vehicles. Mr. Thapa voiced that there should not be just policy formulation, but also implementation of policies.

Anil Bajracharya, an Engineer told that the Li battery had more durability because it has a Battery Management System (BMS), an advanced technology system for the repair.

One of the drivers named Lithium battery as "Natural sleeping Tablet" as it ensured the regular pickup without any disturbance and freed the stress of daily performance. He said that "Lithium batteries have helped to uplift business; because of its performance capacity, we no longer need empty runs in order to recharge the tempos at odd hours".

The drivers also complained that there is no specific vendor of Lithium batteries which becomes a limitation for people wanting to shift towards using it.

At the end, there was an interactive session among the investors, intellectuals, drivers and project management teams.

Findings and recommendations

In the interactive session among the investors, stakeholders, intellects and program management team, the speakers and participants voiced for better and affordable cleaner transport and active collaboration amongst relevant stakeholders. The workshop concluded on a positive note that through this survey it has successfully demonstrated and piloted the Lithium battery in ten safa tempo and has been replicated in 15 more safa tempo through encouraging participation of private investors.

- There are 700 electric public transport vehicles (Safa Tempos) in use in Nepal. These vehicles are dependent on a single lead acid battery supplier so people should be made aware regarding the benefits of Lithium battery.
- Lithium battery is economic, safe, durable, environmentally friendly, has long lifetime, low weight and less risk to damage.
- Lithium battery's efficiency and lifetime depends on the speed, condition of vehicle, and drivers driving style.
- There should be coordination among institutional stakeholders and academics for research to meet the objective of cleaner, efficient public transport
- There should be tax subsidy for battery and spare parts import of EVs.

In the closing remarks, Rajan Thapa remarked that the reliability and advantages of Lithium battery could be very beneficial for the safa tempo drivers and for Kathmandu valley as an environment friendly vehicle. He expressed that the benefits from this kind of survey and research will in turn help enhance public knowledge and awareness level.

Annex 1: Program Agenda

Time	*Program*
8:30-9:00	Registration and Tea
9:00- 9:10	**Welcome and Objective Sharing** – CEN
9:10- 9:30	**Overview of the Project** **Development of the Project and Results** – Markus Eisenring
9:30- 9:50	**Technical Aspects of Li Batteries and BMS** – Thomas Kuster
9:50 – 10:10	**Lithium Batteries as Alternatives to Lead Acid Batteries in Nepalese Electric Vehicles** **Reliability of Li Battery to make Electrical** **Vehicle more Energy Efficient** – Rajan Thapa, CEN
10:10-11:00	**Experience Sharing** a. Electric vehicle scope in Nepal, Umesh R. Shrestha b. Financial aspect of Li battery, Hridaya Mandhar c. Technical issue and available resources, Anil Bajracharya d. Experience sharing from Tempo Ower e. Experience Sharing From Tempo Driver
11:00-12:00	**Discussion, Question and Answer followed by Closing**
12:00-1:00	Lunch

Annex 2: Presentations

Please find the presentations in the link below:
http://www.repic.ch/repic-en/projects/completed-projects/energyefficiency/eisenring-nepal/

- Reliability of Li Battery to make Electrical Vehicle more Energy Efficient
- Development of the Project and Results
- Technical Aspects of LiFePo4Batteries and BMS
- Technical matters that must be observed (only partially presented)

Annex 3: List of Participants

S. N	Name	Institution
1	Bijaya Man Sherchan	Pashupati Energy
2	Keshav Raj Pokhrel	NYCA/PMC
3	Mamata Sapkota	Patan Multiple Campus
4	Suvechha Kaldan	Patan Multiple Campus
5	Priti Sakha	Khwopa College
6	Madan Sah	Swiss Embassy
7	Amrit Nakarmi	CES/DOE/TU
8	Saroj Khanal	RSSN
9	Binaya Shakya	Shree Eco Visionary
10	Shreya KC	PMC
11	Hridaya Manandhar	Clean Cooperative
12	Sudip Bhandari	EVAN
13	Anil KBajracharya	SEV
4	Damodar Pd. Dhital	SchEMS
15	Shravan P. Chaulagain	
16	Sushant Tiwari	Safe and Sustainable Travel Nepal
17	Buddhi Kumar	
18	Bharat Paudel	EVMIAN

19	Ram Krishna Bhandari	
20	Bal Krishna Chaulagain	
21	Ram Hari Neupane	
22	Netra Bhat	
23	Sanju Shrestha	CEN/NYCA
24	Ram Hari Bhandari	
25	Janak Tiwari	SDEP-Nepal
26	Bhusan K. Shrestha	Auto Nepal
27	Ipak Malla	Branding media
28	Yamuna Subedi	
29	Suresh Thapa	
30	Dharma K Shrestha	Nevi- lazimpat
31	Ganga Bahadur Thapa	National Economy Concern Society
32	Prayash Shrestha	Nepalaaja.com
33	Kashiram Bajgain	Aarthik Abhiyan Dainik
34	Elina Shrestha	CEN
35	Keshab Pd Satyal	Seti Prakashan
36	Umesh R Shrestha	EVAN
37	Markus Eisenring	Eisenring Engineering
38	Thomas Kuster	Eisenring Engineering
39	Rajan Thapa	CEN