GOVERNMENT OF THE PUNJAB
ENERGY DEPARTMENT

PC-II

For

Market Survey for Actualization of Electric Vehicles and Infrastructure in Punjab

Cost PKR 10 Million

July, 2021

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LIST OF ANNEXURES

GOVERNMENT OF THE PUNJAB
ENERGY DEPARTMENT

PC-II FORM

1.	**Name by which survey/ feasibility will be identified**	**Market Survey for Actualization of Electric Vehicles and Infrastructure in Punjab**
2.	**Administrative authorities responsible for:**	
	a. Sponsoring	Energy Department.
	b. Execution	Punjab Energy Efficiency & Conservation Agency (PEECA), Energy Department, Government of the Punjab.

3. Description and Justification and Technical Parameters of the survey

i. General description and justification

Description

Pakistan is the 5th most vulnerable country of the world due to climate change, according to the Global Climate Risk Index. The growing concern over climate change and global warming has proven that electric cars are inevitably the future of transportation around the world. Automakers around the world have recognized this and have started offering dozens of fully electric models while phasing out the internal combustion engine. Several countries in Europe, China, US and India have announced EV penetration policy, Pakistan has also approved an apprising penetration Policy. EVs can dramatically reduce the emissions that contribute to climate change and smog, improving public health and reducing ecological damage. Charging your EV on renewable energy such as solar or wind minimizes these emissions even more.

Research has shown that electric cars are better for the environment. They emit less greenhouse gases and air pollutants over their life than a petrol or diesel car. This is even after the production of the vehicle and the generation of the electricity required to fuel them is considered.

Justification

In Pakistan, transport vehicles are responsible more than 40% of the AQI, registered in metropoles. The study includes guidelines and standardization for EV charging stations.

The transport sector consumes liquid fuel and natural gas, whereas charging stations may consume various kinds of fuels to meet the energy requirement for EVs. As per NEPRA's State of Industry Report 2020, the demand growth rate is projected to be 5.7% by 2030. Pakistan's suppressed energy demand implies that a major portion or all of the idle generation capacity which will be needed to meet the energy demand required by the EVs. In this regard, PEECA intends to study the economic, financial and environmental impacts in detail for the implementation of this policy. This will address PEECA's demand side management scope as under NEVP, total energy cost savings to the country accruing from EVs could range from $790 million to $1.3 billion[1] whereas total automotive fuel savings will lie between 3.8 and 6.1 million tons over 2021-2030 due to reduced ICEV sales. Moreover, total fuel import savings on account of ICEVs displaced by new EVs will range from $1.5 billion to $2.4 billion over 2021-2030.

With the advent of National Electric Vehicles Policy (NEVP) by the Federal government, infrastructure needs to be developed to encourage shifting over to EV. Furthermore, Federal Minister for Science and Technology has stated that EV buses are being introduced in Pakistan. Pakistan's total load demand in summer peaks around 26,000 MW and during winter peaks around 11,000 MW. The installed generation capacity is more than 30,000 MW. To increase base load, EV stations should be installed. The 3-wheeler rickshaw/qinqhi is the most popular & most pollutant (noise & environment) vehicle. Survey will be conducted to determine the adoption rate in Punjab and study of the economic and environmental impacts. This study may include design, analysis and fabrication of prototypes as well as charging requirement, optimal model of solar powered charging stations, cost analysis, economic analysis, and Life-Cycle Assessments.

ii. Implementation period

The feasibility study will be carried out in one (01) year.

iii. Year wise estimated cost

Year 2021-22: PKR 10 Million

Estimated Completion Time of Project: June, 2022

Estimated Financial Requirement: The project will be completed by June, 2022.

[1] Policy Brief – USAID (Modeling the Impact of Pakistan's National Electric Vehicle Policy)

iv. Manpower requirements

Specialist team in the field of Electric Vehicles, local or foreign, accompanied, with relevant experience.

v. Financial plan

Source		Amount for Capital Expenditure (PKR)	Amount for Recurring Expenditure
a.	Sponsors own resources	–	–
b.	Federal Government	-	-
c.	Provincial Government	**10 M**	-
d.	DFI's / banks	-	-
e.	General Public	-	-
f.	Foreign equity (indicate partner agency)	-	-
g.	NGO's / beneficiaries	-	-
h.	Others / Own sources of University	-	-
	Total:-	**10 M**	

Fund Allocation (for each Financial Year)	Amount (PKR Million)
FY 2021-22	10

4. Expected outcome of the survey feasibility study and details of projects likely to be submitted after the survey

i. Expected Outcomes of the Survey

- Efficient technological shift in transport sector.
- Reduction in carbon footprints.
- Decreased fuel imports.
- Employment and business opportunities for people.
- Achievement of NEVP goals and objectives.

ii. Details of Projects Likely to be Submitted After the Survey

Following this study, PEECA may propose research and development as well as prototype development EV two and three-wheelers, in collaboration with academia. The project will directly support: existing Industry manufacturers to adopt new standards; policy making and support to Government; Training platform for skilled labor for EV industry; and support in standards development for Pakistani market.

In view of increasing potential of EVs, PEECA intends to establish a state-of-the-art Electric Vehicle design and fabrication facility in collaboration with academia with the objective to aid in evolving fuel efficient, innovative and cost-effective automobile

technologies as well as undertaking research on various policy issues to support Punjab Government to make automobile policies and provide incentives to help build and maintain a market for fuel efficient electric vehicles. This will further enhance the competitiveness of locally manufactured vehicles with latest technologies to minimize the revenue in imports of vehicles.

CERTIFICATE

1. Certified that the project proposal "**Market Survey for Actualization of Electric Vehicles and Infrastructure in Punjab**" has been prepared on the basis of instructions provided by the Planning Commission for preparation of PC-II for infrastructure sector projects.

Vetted by: _____
(Consultant)

SAZGAR ENGINEERING WORKS LIMITED

Checked by: _____
(Name & Designation of Head of Executing Agency)

Reviewed by: _____
(Chairman Review Committee)

Approved by: _____
(Secretary Energy, Government of Punjab)

ANNEXURE-A

Terms of Reference (TORs) of the Consultant

1. Duties & responsibilities

The duties and responsibilities of Consultant shall include but not limited to the following:

- Assess various market segments of Electric Vehicles e.g., 2&3 Wheelers, 4-Wheelers, Buses and Trucks.
- Provide guidelines for standardization and Electric vehicle (EV) charging stations for various segments of EVs.
- Analysis of energy efficiency and carbon emission mitigation thorough EV penetration.
- Specify Punjab Specific EV measures that may help achieving the EV penetration target of NEVP. Conduct an overall policy incentives review of NEVP (National Electric Vehicle Policy) and charging infrastructure in Punjab, including electricity market policy review.
- Conduct an overall study of the EV and EV charging market in Punjab and plot the scenarios of its future development under different assessing.
- Analyze the electricity sector of Punjab, including potential of renewable energy sources and energy storage systems.
- Determine the most cost-effective development structure option of Punjab's network of charging stations, including pricing policy and financial analysis.
- Analyze potential EV charging solutions in Punjab for the period 2020-2030, including determining the economic viability potential of own sources of electricity generation.
- Improving the standards and regulation of provincial bodies for e.g., Punjab Transport Authority (PTA), City Development Authorities (CDA) and others for easing EV penetration.
- To determine the adoption rate in Punjab and study of the economic and environmental impacts.
- This study may include design, analysis and fabrication of prototypes as well as charging requirement, optimal model of solar powered charging stations, cost analysis, economic analysis, and Life-Cycle Assessments.
- Identify new business models and investment requirement for setting up charging infrastructure using private investment as well as public-private investment models. .
- Suggest pilot project that may be launched to assess and validate various technologies of EVs for different vehicular segments.

2. Methodology

- Review expected policy changes in the short term.
- Compare local policies with international best practice and determination of gaps versus international best practice specially focusing on countries with similar market realities.
- Review the electricity market under CTBCM for following; .
    - structure, regulated and unregulated segments, tariff policy;
    - supply/demand forecast, development plans;
    - applicable framework for development generation from RES and usage of energy storage systems and application to vehicle charging infrastructure.
- Assess the current state of the charging infrastructure market in Punjab and predict its development by 2030 by completing:
    - SWOT analysis of market direction;
    - PEST analysis of market influence factors;
    - Assessment of existing risks and barriers to entry (including for independent charging infrastructure);
    - A map of risks in the market.
- Undertake an affordability analysis to determine the likely market for electric vehicles in Punjab, based on the existing policy to incentivize EVs.
- Assess the potential of EV usage in provincial ministries and departments.
- Assess potential changes to EV policies going forward and recommend the key policies intervention that should be considered.
- Determine the market potential for the development of EV charging infrastructure in Punjab by:
    - Assessing macroeconomic factors, strengths and weaknesses, as well as opportunities and risks;
    - Assessing the geographical location of Punjab – transit corridors passing through Punjab, including CPEC;
    - Conducting customer analysis (individuals, legal entities and government agencies), vehicle usage scenario and key aspects of mentality;
    - Assessing the degree of investment attractiveness based on a review demonstrating the relevant influence factors;
    - Analyzing potential operators of a network of charging stations in Punjab (competitive environment), with their description and structuring, as well as determining the market share by 2030.
- Reviewing energy policies, grid codes, market rules, strategies and objectives.
- Assessing the regulatory framework, the risks and barriers for the achievement of national energy objectives.
- Assessing the network assets' capacities, constraints and characteristics. Assess their operational technical and environmental performance.

- Assessing the level of flexibility, reliability and security of supply of the system provided by the existing assets.
- Reviewing the stakeholders' assumptions on the baseline of the electricity demand scenarios and the network's assets. Prepare the outlook for the 10-year and 20-year timeline.
- Evolving dispatch profiles to underscore the potential for EV charge and the need for systems, such as electricity storage, and Vehicle to Grid (V2G) integration with system in order to balance additional demand.
- Concluding qualitatively on the opportunity of electric vehicle charge.
- Applying a least cost generation expansion tool over the relevant time frame, to define qualitatively and quantitatively the potential EV possibilities as well as energy storage needs. Build a simplified economic model including CAPEX, OPEX and incomes from expected services.
- Conduct a preliminary study for potential locations of EV charging stations in urban and sub-urban areas, and motorways.

Hira Ashraf | Program Engineer (PEECA) | Energy Department

From: Zubair Aamir <zubairaamir21@yahoo.com>
Sent: 09 July 2021 12:54
To: zubairaamir21@sazgarautos.com; Hira Ashraf | Program Engineer (PEECA) | Energy Department
Cc: Abdur Rahman | Program Manager (PEECA) | Energy Department; Waqas Ali Khan | AM – Audit & Planning (PEECA) | Energy Department
Subject: Re: Vetting of PC-II for Actualization of Electric Vehicles in Punjab _ PEECA

Assalamo Alekum Hira Ashraf sahiba,

I have gone through your sent document and found perfect for further proceeding.

Zubair Aamir
General Manager
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On Thursday, July 8, 2021, 05:13:42 PM GMT+5, Hira Ashraf | Program Engineer (PEECA) | Energy Department <peeca.pe4@energy.punjab.gov.pk> wrote:

Dear Mr. Zubair Aamir (CTO Sazgar Engineering)

Please refer to our telecom and the subject of the email.

Punjab Energy Efficiency & Conservation Agency (PEECA) is intending to conduct a feasibility study regarding actualization of electric vehicles in Punjab, for which PEECA has prepared a PC-II. You are requested to find attached the draft PC-II on “Market Survey for Actualization of Electric Vehicles and Infrastructure in Punjab” and provide your feedback on it.

In case of any query, please feel free to contact.

Regards,

Hira Ashraf

Program Engineer

Punjab Energy Efficiency & Conservation Agency (PEECA)

48-A, Ghalib Road, Block-C II, Gulberg III, Lahore