RELAVANCE OF ELECTRIC TRANSPORT IN METROPOLITAN KATHMANDU

Presentation For Stakeholder Workshop On Air Quality & Transport Challenges in Kathmandu

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3. Current Problems Faced By the Sector
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CURRENT SITUATIONS IN URBAN KATHMANDU

Uncontrolled Growth of Population:

- Population 2001 : 1 Million
- Population 2010 : 2 Millions (Estimated)
- Population 2020 : 4 Millions (Estimated)
- Population 2050 : 5 million (Estimated)

- City unable to cope with the required services such as water supply, solid waste management, electricity and transport to this population.
CURRENT SITUATIONS IN URBAN KATHMANDU

Land Use in 1994

Land Use in 2008
CURRENT SITUATIONS IN URBAN KATHMANDU

Uncontrolled Growth of Vehicle Population:

- Vehicle in 2000: 145,926
- Vehicle in 2009: 444,759

Of the above it is estimated that 400,000 vehicles are operative; congestion 74% of these vehicles are motorcycles resulting in traffic congestions.
Total Registered Vehicles - 2009
(Bagmati Zone) - 444,759

- Motorcycle: 74%
- Car, etc: 19%
- Bus: 5%
- Tempo: 1%
- Other: 1%
CURRENT SITUATIONS IN URBAN KATHMANDU
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- **Uncontrolled Consumption of POL:**
  - Consumption Data of May 2008: 83,000 KL/month
  - Annual Consumption of POL
    - 2009: 922,555 KL
    - 2010: 1,172,486 KL
    - 2011: 1,286,095 KL

- Ever increasing demand of POL results in heavy drain of national foreign currency reserve.

- NOC is in cumulative loss of Rs. 20 billions
CURRENT SITUATIONS IN URBAN KATHMANDU

Drain on Hard Currency For POL Imports

Trend of POL Imports
CURRENT SITUATIONS IN URBAN KATHMANDU

Drain on Hard Currency For POL Imports

Trend in Oil Prices

May 1987 – May 2012 monthly average Brent spot prices
Conversion to May 2012 dollars uses US CPI for All Urban Consumers (CPI-U)
Sources: Energy Information Administration and Bureau of Labor Statistics
CURRENT SITUATIONS IN URBAN KATHMANDU

• Increasing Pollution:
  
  A. Primary Pollution:
    • Particulate Matter (PM10) level 198 mg/m\(^3\) as against National Standard of 120 mg/m\(^3\) (results in respiratory and cardiovascular health problems);
    • SO\(_2\) (causes respiratory problem);
    • CO (reduces oxygen changing capacity in blood);
    • NO\(_2\) (results in cough, bronchitis and conjunctivitis);
    • Lb (results in hematological and neurology problems).
  
  B. Green House Gases (CO\(_2\) CH\(_4\) and N\(_2\)O):
    • Contribute to Global Warming;
    • Estimated CO\(_2\) from existing vehicle population : 385,580 ton
CURRENT SITUATIONS IN URBAN KATHMANDU

Air Pollution Levels

NAAQS: 120 ug/m3 (24 hr)
RELEVANCE OF ELECTRIC TRANSPORTATION

HISTORICAL OVERVIEW OF ELECTRIC TRANSPORT

1. **1960**
   43 km long bicable good ropeway with 22.5 ton/hr capacity operated between Kathmandu and Hetauda. Closed down after development of Prithivi Highway and poor management of National Transport Corporation (NTC).
2. 1977

- Completion of Tripureshwor – Suryavinayak Trolley Bus with Chinese Grant of Rs. 40 millions. Initially 22 trolley buses with addition of 10 more buses in 1997. Ferried up to 20,000 pax per day. Closed down in December 2001.

RELEVANCE OF ELECTRIC TRANSPORTATION
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3. 1993
   • Development of Safa Tempo. Proto types taken over by NEVI. Proliferation of system leading to 700 tempos 30 charging station.
4. 1998

- First cable car developed in Mankamana by private investor. But further development hampered due to lack of positive GoN policy on cable cars.
5. 2008
- GoN provides tax incentive for 4 wheeler EV’s.

Marketed by Agni Inc / Mahindra

4 Pax – E2
2 Pax – REVA
RELEVANCE OF ELECTRIC TRANSPORTATION

- Marketed by NEVI Tradelink

4 Pax – Bijuli 1  
5 Pax – Bijuli 2  
14 Pax – Safa 1  
14 Pax – Safa 2
RELEVANCE OF ELECTRIC TRANSPORTATION
Advantages of Using Electric Vehicles

i. Low Operation and Maintenance Cost;
ii. Positive Environmental Impact;
   - for every litre of fossil fuel replaced. EV's will prevent 3 – 10 gm of PM10 from being emitting,
   - reduction in polluting gases,
   - reduction of green house gases.
iii. Each EV can reduce consumption of 2190 lit of fossil
     for per year:
     - reduction of economic burden of imported POL,
     - reduction of health risk,
     - increase of productivity of population.
**Cost of Operation / Maintenance:**

**A: Petrol Vehicle**
- Petrol Cost for small car : Rs. 12.00 /Km
- Lubricant : Rs. 0.40 /Km
- Maintenance : Rs. 0.70 /Km
- Tyre Replacement : Rs. 0.30 /Km

  **Total per Km** : Rs. 13.40

**B: Electric Vehicle**
- Battery Replacement : Rs. 3.50 /km
- 18 kWh @ Rs. 7 /– per unit : Rs. 0.80 /km
- Maintenance : Rs. 0.30
- Tyre Replacement : Rs. 0.30

  **Total per Km** : Rs. 4.90
RELEVANCE OF ELECTRIC TRANSPORT

HISTORICAL OVERVIEW OF ELECTRIC TRANSPORT Development

Positive GoN Incentives for EV Development:

1993: Customs incentives for 3 wheeler;
2008: Custom and excise incentives for 4 wheeler.
Waiver of annual registration taxes on EVs.
RELEVANCE OF ELECTRIC TRANSPORT

HISTORICAL OVERVIEW OF ELECTRIC TRANSPORT Development

Agencies Which Supported EV Sector Development:

1. USAID by developing the SAFA Tempo prototype in 1993 and assisted in its proliferation;
2. DANIDA through ESPS Component No. 5 Air Quality Management helped integration of the EV industry;
3. Local NGO's: Clean Energy Nepal (CEN), Matin Chautari, Clean Air Network Nepal (CAAN), Nepal Forum of Environmental Journalist (NEFEJ).
RELEVANCE OF ELECTRIC TRANSPORT

HISTORICAL OVERVIEW OF ELECTRIC TRANSPORT Development

Current Situation of Electric Transport Sector:

1. Trolley bus system closed due to mismanagement;
2. SAFA Tempo Industry fully developed with 4 manufacturers, 31 charging stations and over 700 Safa Tempos in Operation but faces a deadend;
3. 4 wheeler EV's have found entry into Nepal, but face many operational problems.
MAJOR PROBLEMS

- Operational sustainability affected by electrical load shedding;
- Lack of dedicated routes to Safa Tempos
- Safa Tempos operating in mixed vehicle route find it difficult to compete with the bigger mini buses owned by the dominating transport unions;
- Frequent and hap-hazard changes in government decisions regarding tax incentives to the EV sector create difficulties in the sector. As an example battery import was completely stopped during 2008 as GoN revoked the customs incentives in batteries. The decision was corrected only after tough lobbying by EVAN;
OTHER PROBLEMS

- Batteries imported are allegedly of substandard quality and often fail to meet the standard life cycle targets;
- Exodus of trained drivers and technicians to foreign countries due to poor condition of transport sector in Nepal;
- Lack of an apex umbrella body that will champion and advocate for the causes of the EV sector;
- Lack of an institution to undertake research and development in the EV sector;
- Lack of an institution for training of EV sector manpower such as drivers, mechanics, electricians;
- Lack of centralized maintenance centre;
- Lack of battery bank.

PROBLEMS AND MITIGATIONS
1. GoN should provide additional subsidies in the import of Electric Vehicles and Components;
2. GoN to discourage use of polluting ICEVs by increasing import duties and other taxes on such vehicles;
2. Creation of EV Promotion Centre with GoN/Donor Assistance to:
   a. implement R&D in EV sector;
   b. training of manpower for sector;
   c. setting up of battery bank;
   d. monitoring of battery waste disposal;
   e. setting up of EV maintenance centre;
   f. undertake advocacy of EV sector;
RECOMMENDED MITIGATION MEASURES

- Providing efficient trolley bus services on major routes within Kathmandu;
- Replacing, for operation on core city routes, the currently operating micro buses with Safa Tempos and 4 whheler zero emission buses with capacity of 14 passengers;
- Decrease of the duty tariffs of 4 wheeler zero emission vehicles to the level enjoyed by the 3 wheeler Safa Tempos;
- Arrange so that double electricity feeders are provided by NEA to all trolley bus traction stations and all electric vehicle charging stations so that the effect of load shedding is minimized;
- Provide Time of Day (ToD) meters to all charging stations and reduce the electricity charge of vehicle charging to be at par with electricity rates prescribed for the agriculture sector;
Discouraging the import of ICEVs for private use by increasing the import duties, annual registration charges and parking fees;

Making it mandatory that ICEVs over 15 years of age are scrapped and cannot operate in Kathmandu;

Limiting the import of ICEVs to sizes of between 9-12 meters and only for public transport and making it mandatory that such vehicles are of Euro III standard and above.
1. Develop network of electric transport systems on the tertiary routes as envisaged in KSUTP replacing polluting ICEVs.

2. Develop trolley bus systems along the existing ring road and on primary routes envisaged in KSUTP as well as routes such as Maharajgunj to Lagankhel, Tinkune To Kalanki, Tripureswar to Baudha, Along the Bishnumati Corridor.

3. Develop electric train operation on the outer ring road planned in Kathmandu.
MEASURES FOR BATTERY HANDLING

1. Incorporate Battery Handling Company;
2. Preliminary Treatment of Batteries Acid in Nepal;
3. Export of Battery Lead to India or Bangladesh.
TECHNICAL BOTTLENECKS TO ELECTRIC TRANSPORT

1. Battery Pollution;
2. Power Shortage.
POWER SHORTAGE SOLUTION

1. Provide Double Feeder Connection to all Trolley Bus Stations and EV Charging Station;
2. Encourage EV Charging Stations to Use Off-peak Energy.
1. Short Term Measures
2. GoN & NEA should assist in speedy implementation Projects requiring PPA with 1,580 MW capacity;
3. GoN & NEA to strengthen the national Transmission Line network and implement wheeling system
4. GoN to implement power banking system between Nepal & India
5. GoN to take steps to establish hydropower Fund and interest subsidy;
6. Develop energy mix system and implement solar and wind power plants for energy generation
LONGER TERM MEASURES

1. Implement large storage projects such as West Seti (750 MW) and Budhi Gandaki (600 MW) with priority

2. Unbundling of NEA into Generation, Transmission, Power Trading Entities that are independent

2. Increase the number of cross border power exchange transmission lines between Nepal & India to facilitate power exchange & trade

3. Improve investment climate in Nepal to draw large foreign investments in the sector of hydropower
THANK YOU FOR YOUR ATTENTION!