SMART CITIES: E-MOBILITY

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TOWARDS LOW EMISSION MOBILITY

Reality

- 14% of Global Emission
- 24% of Global fuel Emission
- 7.7 Gt of CO2e in 2017
- SOx and NOx emission
- Ave. 1 hour 46 mins per day lost in traffic (55 man days lost per person)

Potential

- Doubling use with similar energy use increasing efficiency
- Better integrated systems
- Incentive/disincentive Policies
- High visual effect!!!
- Electrification will be KEY!
- 2.5% annual growth in clean transport
- High Volume of Investment needs by 2030 – US$192 billion per year
- Private Public Partnership

Impact

7.7 Gt emissions/year down to 2-3 Gt by mid-century.

Reduction of SOx, NOx, and fine particulate matter in local atmosphere
THE GCF MOBILITY

Avoid

Avoid and reduce the need for motorized travel

- Non-Motorized Transport
- Transit Oriented Development,
- Telecommuting,
- Fiscal policies
  - road or fuel pricing,
  - improved logistics,
  - local production,
  - intelligent transport systems, etc.

Shift

Shift to more environmentally friendly modes

- Walking and Cycling
- Railways
- Urban Public Transport
- Transport Demand Management
- New Mobility Services

Improve

Improve energy efficiency of transport modes

- Renewable Energy
- Electric Mobility
- Fuel Economy
- Special purpose vehicles
- Risk guarantee instruments for the Fis
- Financial products for vendors/ distributors (vendor finance through OEM; factoring etc.

Reduce or shorten trips
Measures:
- Non-Motorized Transport
- Transit Oriented Development,
- Telecommuting,
- Fiscal policies
  - road or fuel pricing,
  - improved logistics,
  - local production,
  - intelligent transport systems, etc.

Reduce emissions per trip unit or per transport unit
Measures:
- low-carbon vehicles and fuels,
- Policy measures such as efficiency standards
- Taxation and Import incentives based on Efficiency and mode (hybrid, EV).
- Financial incentive for mass or public transit using efficient vehicles.
- Disincentive or congestion charges/parking charges in Urban centers
- Public Procurement for low emission rolling stock and leasing
- PPP – using public sector for bulk procurement to be on-sold via private sector;

Improving demand and use
Measures:
- Efficient tires, eco-driving, improve load-factor,
- Improved road and traffic conditions,
- Fleet management and sizing
- Road taxes, Carbon Tax!
- FIT for EVs/PHEV
- Financial Products to credit lines for equipment, leasing facilities)
- Split incentive – Infra as a public entity and rolling stock as private. E.g. Railway operation
- Special purpose vehicles
- Risk guarantee instruments for the Fis
- Financial products for vendors/ distributors (vendor finance through OEM; factoring etc.
BARRIERS FOR E-MOBILITY

Technological barriers
1) the lack of relevant information for decision-making; e-buses are still new to many
2) the current operational limitations (perceived or otherwise) of e-buses and charging infrastructure

Financial barriers
1) the difficulties in making the necessary changes to rigid procurement structures
2) long-term, sustainable financing options

Institutional barriers
1) the lack of political leadership and pragmatic public policy
2) the lack of institutional authority (too many cooks), funding, and physical real-estate.
Two Prong Mobility Focus

1. Enabling Environment for uptake of Low Emission Mobility initiatives

   • Regulation and Policy
     • Policy and regulation on Transport Planning
     • Fuel subsidy retraction or REFIT for EV
     • Development of Holistic Integrated Mobility Plans

   • Funding Proposal
     • Develop a more holistic focused project, then just a bus replacement project
     • Incorporate gaps in Policies and Fiscal Instrument for resilient infrastructure; low emission rolling stock and NMTs
     • Introduction of Sustainable Public procurement
     • Innovation in business models for Implementation
2. Implementation

Specification for implementation
- Focus on Urban Mobility
- Emphasis of “transport project – BRT/Metro” towards holistic development- “Adding spokes on a wheel”
- Encourage electrification in a clean grid system Incorporate O&M as part of the project for rolling stock

Financial Products
- Bulk procurement via Public sector
- Leasing from Public to Private
- Vendor financing for distributors
- Risk Guarantee instrument to concessionaires
- Credit facility to Private operators for Low emission Mobility

GCF Instrument
1) Readiness for enabling environment
2) PPF Project development
3) Investment through Funding Proposals
4) Align project with other sectors like
   a) Urban and Cities;
   b) Resilient infrastructure
   c) Renewable Energy
THE COST OF MOBILITY

- **Average Victorian car**: 243.8 grams of CO₂ per person kilometre travelled
- **Top Range EV (Victorian grid)**: 209.1 grams
- **Dual occupancy car**: 121.9 grams
- **Motorcycle**: 119.6 grams
- **Train**: 28.6 grams
- **Tram**: 20.2 grams
- **Bus**: 17.7 grams
- **Top Range EV (Green power)**: 9.7 grams
- **Bike**: 1.5 grams
- **Walking**: 1.5 grams

*Footprint size indicates space in square metres required per occupant.*
T.O.D. AS AN OPTION?

• Connectivity

Accessibility
Alternative transport
Last mile connectivity

Mass Transport the Vertebrae
Densify
Compact
Transit
Shift
Cycle
Walk
Node
T.O.D. FOR SMART CITIES

**Benefits of TOD**
- Reduce Dependence on Driving
- Allow people to live, work and play in the same area
- Stimulate local economy
- Access to better life services
- Increase community “feeling”
- Provide better access between urban and sub-urban areas
- Last mile connectivity via bicycle, e-pedicab, routed share ride etc.
- BRT and Metro Rails the main backbone for TOD
- Lower Carbon Footprint
GDF- ADB-GREEN BRT KARACHI
Modal Shift towards 0-emission mass transit coupled innovation on technology and financing

Project Description

› The BRT will use 0-GHG emission biomethane hybrid buses a world first.
› Produce its own biogas from cattle waste to cover 100% of the methane demand from BRT buses.
› Incorporating Last Mile Connectivity

Public Procurement for Private Sector Operation

› Bulk procurement of buses to be leased to Private operators on a full TCO basis
   › Cost of bus reduced due to economies of scale
   › Standardization of fleet ease of maintenance
   › Spare parts agreement simplified
   › Private sector does not need to put in any Capital only the old bus
   › Lease includes maintenance for 3 years

Sources (USD mil) | GCF financing going towards
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GCF Loan | 37.2
GCF Grant | 11.8
ADB | 442
Govt of Pakistan (Grants) | 92.5
Total | 583.5

Ratio: 1:11

Mitigation: 2.6 MtCO2e (lifetime)

• Incremental cost of the buses
• Installation of Bio-gas facility
• Climate proofing the road
• Last mile connectivity