LGU and eMobility

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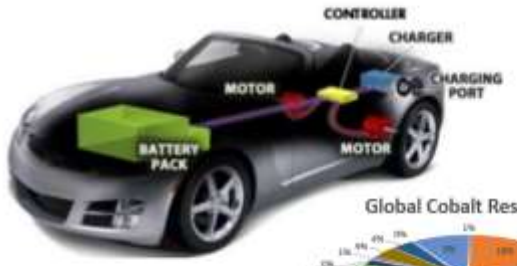
Outline

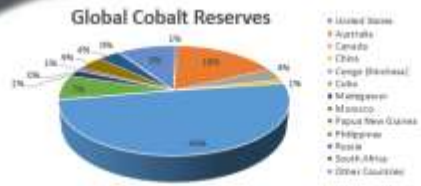
- Why Electric Vehicles?
- eJeep, eTrike and eBus Economics
- EV Value Chain Analysis – Case of eJeeps
- Urban Living eMobility Laboratory – the Case of Pasig City
- Key Learnings

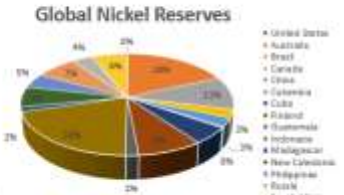
Why eMobility?

Industry Development

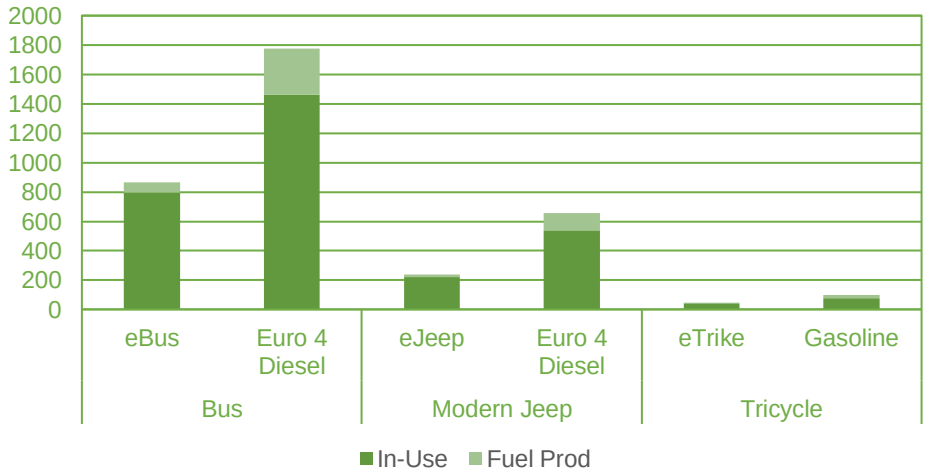


- We can build it!!
- We have Nickel and Cobalt

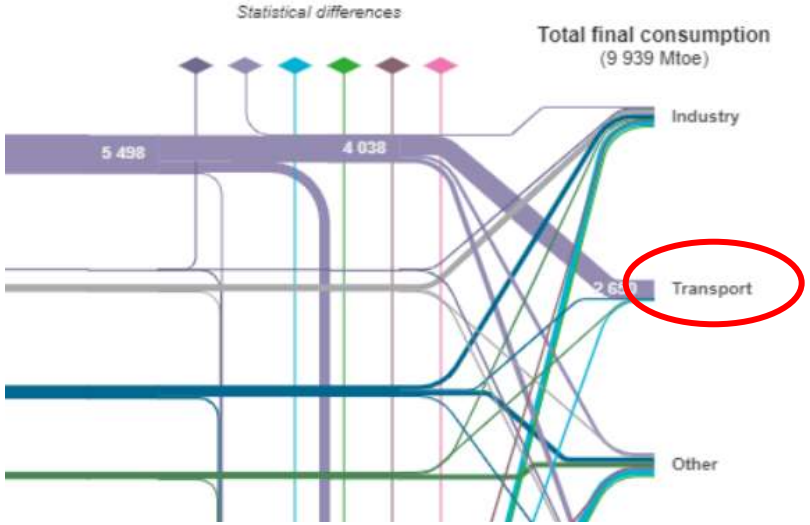




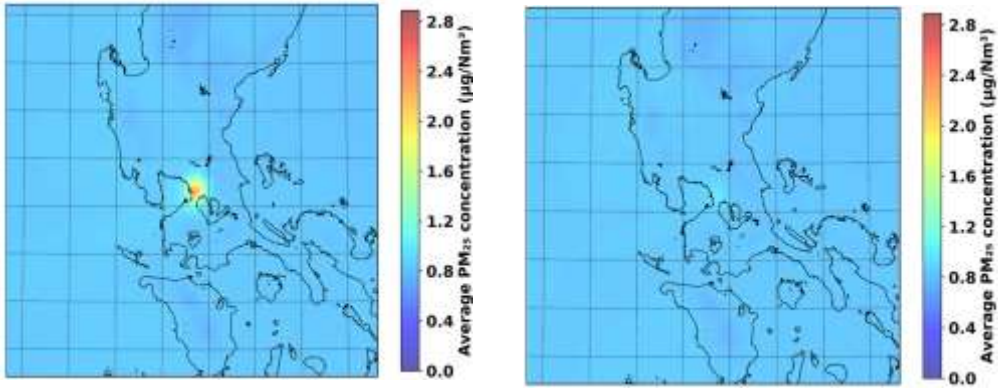
GHG Emissions



Transport and Petroleum Use



Air Pollution



Scenario	Region							Total
	CAR	NCR	1	2	3	4A	5	
E-Jeepney	-3.48	8032.95	-31.69	-4.06	108.94	515.62	-24.51	8593.79

Avoided Annual Health Impact Million Php

eMobility Economics

Electric Vehicle Association of the Philippines

Cost Item	Electric Tricycle	Bajaj Maxima Z	Savings
Investment	420,000.00	176,000.00	- 244,000.00
Energy	142,628.06	642,673.78	500,045.72
Reg. Maint	60,396.74	112,793.33	52,396.59
Midlife Rebuilding	7,826.47	16,260.34	8,433.87
Batt Rep	58,585.89	-	- 58,585.89
Salvage Value	- 17,318.49	- 8,000.00	9,318.49
Health	9,330.83	38,612.37	29,281.53
GHG	5,547.32	14,813.42	9,266.10
BOP	4,867.21	40,872.33	36,005.12
Taxes	- 89,262.60	- 171,398.31	- 82,135.71
Financial NPV	672,118.68	939,727.45	267,608.77
Economic NPV	602,601.44	862,627.26	260,025.82

Cost Item	Battery Electric Bus	Euro 4 Bus	Savings
Investment	27,339,432.50	8,815,000.00	- 18,524,432.50
Energy	10,035,454.48	20,786,263.61	10,750,809.14
Reg. Maint	5,655,996.67	8,916,596.52	3,260,599.85
Midlife Rebuilding	2,828,709.89	1,774,037.15	- 1,054,672.74
Batt Rep	383,075.81	-	- 383,075.81
Salvage Value	- 1,359,595.14	- 400,681.82	958,913.33
Health	562,098.47	1,739,295.79	1,177,197.32
GHG	334,175.73	667,271.17	333,095.44
BOP	293,205.25	1,841,095.92	1,547,890.67
Taxes	- 5,778,201.77	- 6,254,114.48	- 475,912.71
Financial NPV	44,883,074.20	39,891,215.46	- 4,991,858.74
Economic NPV	40,294,351.89	37,884,763.86	- 2,409,588.03

Cost Item	Electric Jeepney	Euro 4 Jeepney	Savings
Investment	2,744,000.00	2,200,000.00	- 544,000.00
Energy	3,783,911.62	5,127,278.36	1,343,366.74
Reg. Maint	1,238,907.51	2,005,214.80	766,307.28
Midlife Rebuilding	360,017.62	442,754.59	82,736.97
Batt Rep	420,098.40	-	- 420,098.40
Salvage Value	- 143,805.24	- 100,000.00	43,805.24
Health	124,411.13	429,026.30	304,615.17
GHG	73,964.23	164,593.55	90,629.33
BOP	64,896.10	454,136.99	389,240.90
Taxes	- 1,063,995.86	- 1,522,806.58	- 458,810.72
Financial NPV	8,403,129.92	9,675,247.75	1,272,117.83
Economic NPV	7,602,405.51	9,200,198.01	1,597,792.50

VCA : eJeeps

EV Parts / Mod. Prod.

Lack of local EV Assembly demand	10
Higher power and operating cost	9
More established foreign competition	8
Weak local parts and components supply chain	8

Battery Cell Production

Low purity of nickel reserves	6
Foreign control of lithium battery raw material supply	10
Lack of local battery cell demand	10
High HPAL investment cost	8
Weak local supply chain	5
Higher power and operating cost	9

Supply / Vehicle Assembly

Higher power cost and operating cost	8
Lack of access and higher cost of higher quality EV components	8
Lack of local demand	10
Lack of Technical Regulations	5
Limited financial capacity to expand production	3
Investment too small to meet incentive thresholds	9
Strong threat from cheaper imported units	5
Limited design flexibility and uneconomical production process due to lack of demand	10
Weak local supply chain	8

Market Development

Flooding concerns	6
Inadequate/Lack of capacity to invest	10
Inferior performance and features compared to conventional units	5
Limited availability	5
Higher Total Investment	10
Negative technology reputation	6
Technology skeptism due to lack of famliarity	7
Technical support doubts	8
Technology inertia why shift when	7

Technical Support

High spare parts cost due to low demand	8
Limited financial capacity of Local EV suppliers to stock on big volume of spare parts	10

Financing

Financially high risk market	10
Lack of familiarity with global EV financing services and practices	3
Lack of familiarity with the technology	3
Limited government resources	10
Unclear CBA	5

Charging/Battery Swapping Services

Lack of demand for third party battery leasing/swapping/charging station providers	8
Limited operator financial capacity to invest on spare batteries and swapping station	10
Varying battery/charging technical requirements	7

Battery Disposal

Lack of knowledge on battery recycling technology	8
Limited volume to support commercial investments on reusage	9
Lack of standards and regulations on EV battery reusage.	9

Moving eMobility Forward: eJeeps

Barrier	Significance	Nat Gov	LGU	Priv Sect
Performance, reliability and durability uncertainty due to lack of famliarity	0.16	3	4	3
Technology inertia - why shift when we are doing perfectly fine with conventional?	0.16	5	5	
Flooding concerns	0.14	3	4	3
Negative technology reputations due to prior experience	0.14	5	5	
Most local EV companies are too small to access investment incentives	0.14	10		
High risk due to lack of credit history and financial credential of the market	0.13	4	4	3
Limited government capacity to provide significant support to adoption	0.13	2	4	4
Higher power cost and operating cost (manufacturing)	0.12	6	4	
Lack of access and higher landed cost of higher quality EV components from MFN countries.	0.12	10		
Unclear Cost-Benefit relative to Euro 4 diesels	0.12	4	3	3
Lack of Technical Regulations	0.08	8	2	
Strong threat from cheaper imported units	0.08	10		
Limited financial capacity to expand production	0.05	6	4	
Lack of familiarity with global EV financing services and practices	0.04	5	2	3
Lack of familiarity with the technology	0.04	3	4	3

Top 3 Things that LGU can do?

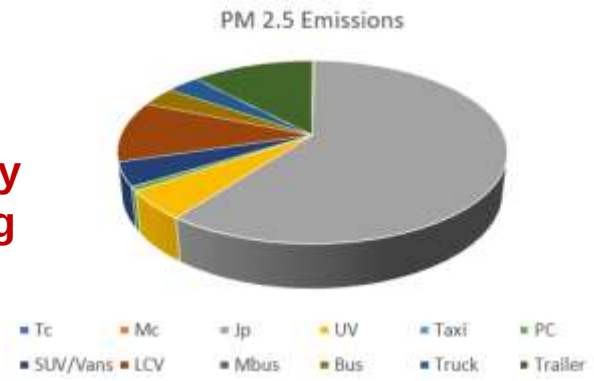
- **Initiate and Support Pilot and Demonstration Programs**
- **Extend additional support for first adopters**
- **Become a focal point for eMobility multi-stakeholder cooperation**

eMobility Focal Point: The Case of Pasig City

CitieSWITCH to E-mobility
Science Based Clean Air Planning and eMobility Program

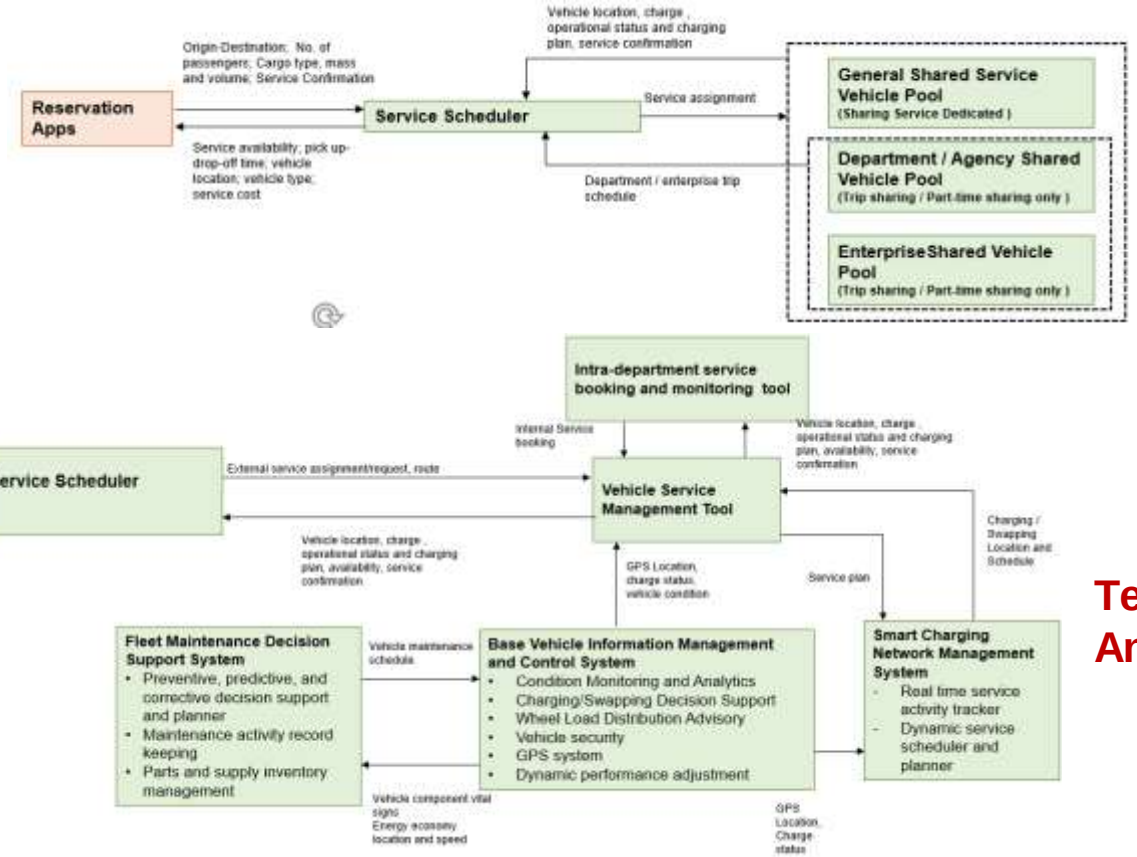
Urban Living eMobility Lab
10 Living Labs: Kathmandu, **Manila/Pasig**, Hanoi, Montevideo, Quito, Kigali, Dar es Salam, Hamburg, Madrid and Nanjing (self-funded)

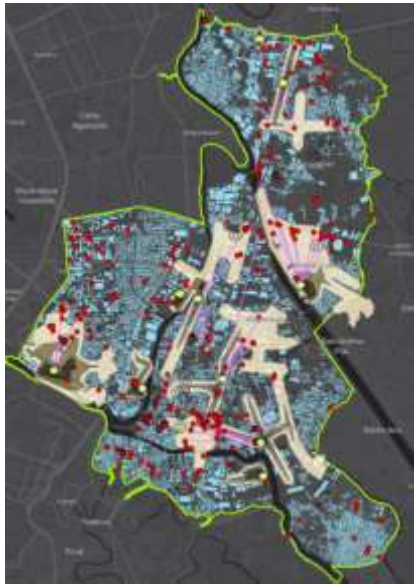
Science based eMobility Planning



Technology-enabled operation

Shared Service and Smart Charging Network





Smart and Multi-platform Vehicles

eQuad and FLEV

Technical/Economic Analysis

eMobility Focal Point: The Case of Pasig City

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- **Take the Lead**
- **Create Experience**
- **Create Trust**
- **Generate right product, service and approach**
- **Optimal benefits**
- **Attract private sector cooperation**

Key Points

- eMobility solution is multi-faceted
- eMobility solution requires multi-stakeholder efforts
- eMobility is not just public transport
- LGU has important role to play : Take the lead, build trust, put in stake and catalyze cooperatiion

[Thank You]

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evap
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