

TRANSCRIPT OF THE

Modernizing Public Transportation in the Philippines: Opportunities, Challenges, and Lessons Learned from the Public Utility Vehicle Modernization Program (PUVMP)

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PUV Modernization

By Ms. Joyce S. Rivera

Department of Transportation

Link to presentation slides: [click here](#)

WHAT HAPPENED to PUV Modernization? It was launched way back in 2017. It has been around for six years. What are the updates? Where are we now? With the current issues and concerns that we are facing, what are the plans of the government?

We know the problems in the transportation system, including the greenhouse gas emissions even before the NAMA (Nationally Appropriate Mitigation Action) study. The NAMA study, however, somehow validated those concerns and proposed various strategies. This has been the basis of the PUVMP. Various strategies from the NAMA study were implemented while some are still being explored, considering that others tackle about service contracting.

In the Department Order 2017- 011, there are five main principles being discussed. The PUVMP technically wants a public transport system that CARES. Although not in order, those are the letters of the five principles (Figure 1).

First is about **Comfort** – we want you to be relaxed and productive during your trips; **Accessibility** – not just accessible because of the route networks, but it should be accessible to all sectors or segments of the society because we want to be inclusive here; **Reliability** – there will be public transport service available to cater to our mobility demand and that is not just about operational hours, but what is the acceptable waiting time and is the current supply providing efficient operations? **Environmental soundness** – this is being highlighted as I mentioned earlier about the GHG emissions and the GHG avoidance being brought about by this program which is one of the unconditional commitments of the Department of Transportation that was adopted by the Philippines in the submission of the nationally determined contributions; and finally, **Safety** –we want our vehicles to be safe, not just for the passengers, but also for our drivers.

Because of that, this is now the PUVMP (Figure 2). It is not just one component – it is a very complex project. Again, we are transforming a system. It is not just about the fleet modernization, even if the program name is PUV Modernization, it is actually the public transport system from policies, to strategies, to planning, to implementation.

And of course, being a complex project, it is not just the DOTr that is involved. We need a whole-of-government approach and whole-of-society approach to make this program successful. I am sure there are still government partners that we were not able to identify but technically, these are the agencies mainly involved in our current program (Figure 3). In addition, private stakeholders encompass operators, manufacturers, terminal operators, and commuters.

Let us start with Regulatory Reforms. I am going to give you background of what we are doing now per component as much as possible. Recently, we had various concerns about the program. The department secretary, together with all the heads of transportation, is committed to review all existing policies and strategies for the implementation of the program. It is timely because technically, we have been discussing this since last year when the PUVMP marked its fifth year anniversary. We are in the sixth year, and we are currently checking all policies issued by the department, issued by the LTFRB, issued by the DOTC, issued by partner organizations, or even policies outside the PUVMP which are affecting the program. There is an interim program steering committee that was established in the second quarter of this year. It is led by the secretary and the members are undersecretary from various sectors in the department and the leads of our attached agencies, the LTFRB, the LTO, and the OTC. There is also a technical working group that provides technical and legal guidance to the interim programs steering committee.

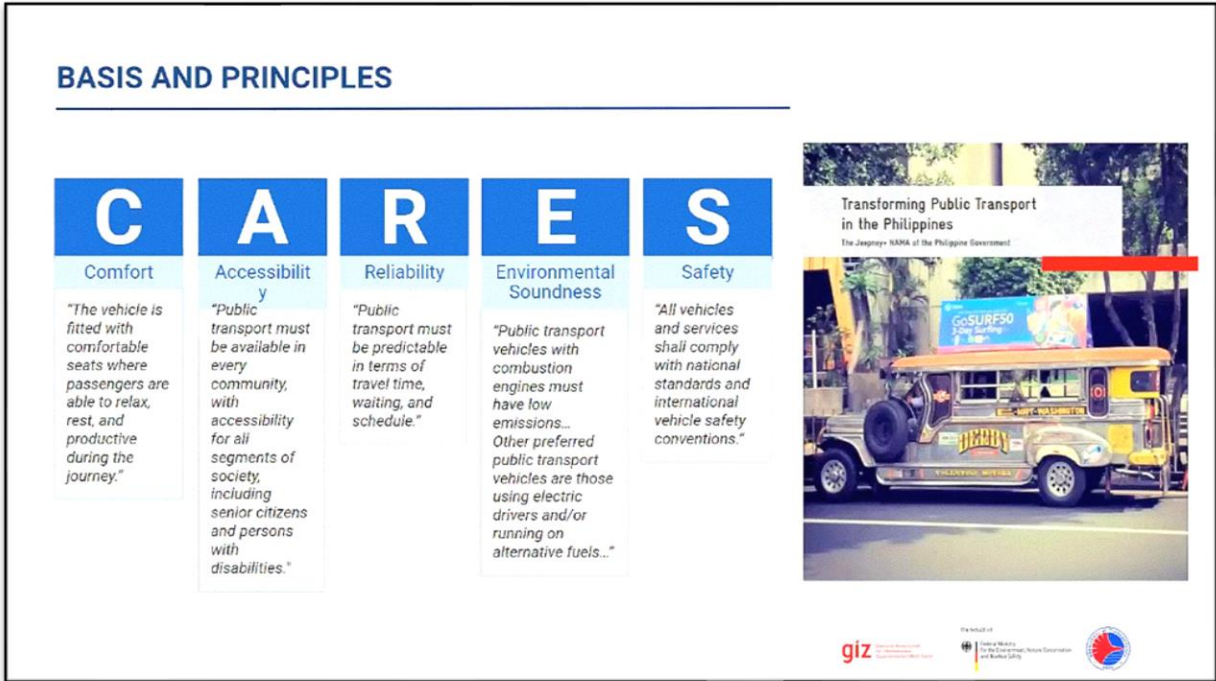


Figure 1. Five Main Principles Discussed in Department Order 2017-011

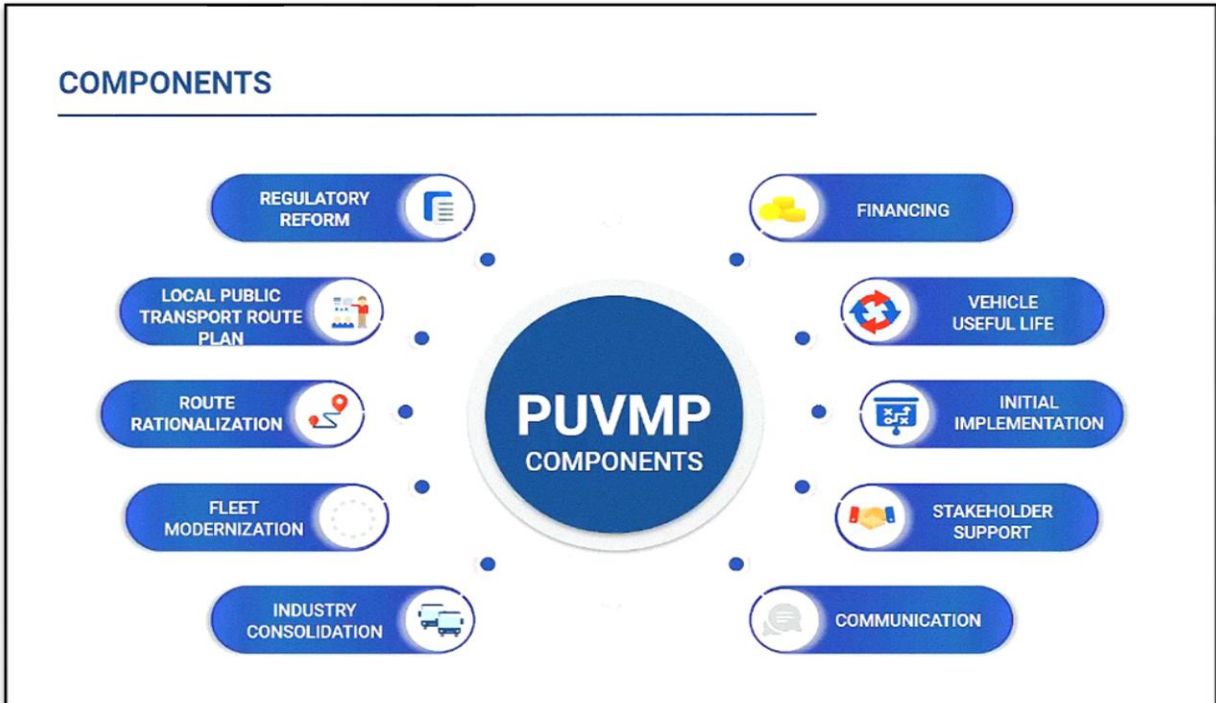


Figure 2. Components of the PUVMP

Organizational Linkages

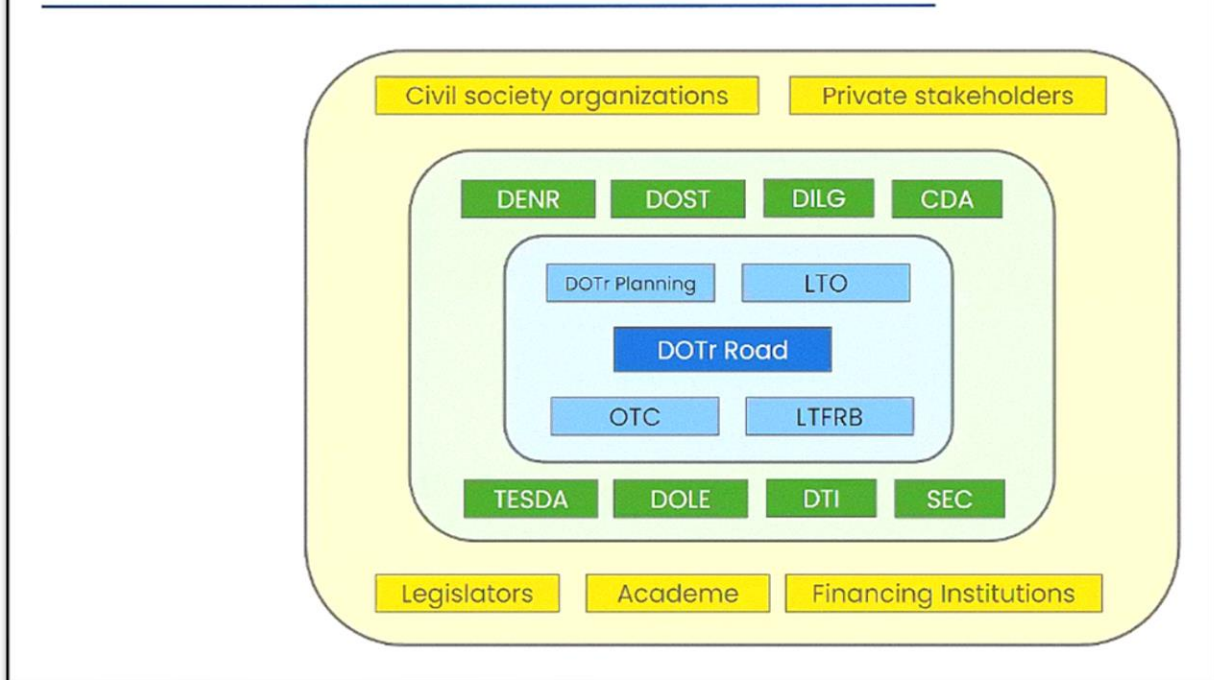


Figure 3. Agencies involved in the PUVMP

Secondly, last May, we opened the call for position papers and proposals from various stakeholders regarding their comments and suggestions about the program. Some filled out the Google forms we sent while others attached their position papers. We are currently analyzing these position papers and we are still receiving entries. We have set a deadline for submission, but it is still open today.

And of course, the conduct of and attendance to various stakeholder consultations. It was just last week, June 21, that the LTFRB began the nationwide consultations. They started off with Calapan for the Oriental and Occidental Mindoro stakeholders. We also had stakeholder consultations in Batangas and recently Zamboanga City and Zamboanga Del Norte. It is a series of consultations which will be conducted in all regions in Metro Manila.

I want to emphasize that PUVMP is not just about the Department Order 2017-011. There are lots and lots of department orders and memorandum circulars that were released to implement the program (Figure 4). In fact, this

is just from our department. There are others from different agencies. And then there is also the National Transport Policy, including the pending bills that we are currently reviewing. We can even share the policy compendium that we have for your reference specially if you are yet to submit your position papers.

For the health planning, this was devolved to our local government units. Why? Because they are more equipped, and they are more knowledgeable of the local situation. However, the Department of Transportation still provides technical assistance. We are currently reviewing around 1,034 drafts, 147 of which are already approved (Figure 5). I want to emphasize for our priority LGUs, provinces and cities including highly urbanized cities and independent component cities, our compliance rate is already high, as opposed to our approval rate considering that route planning is technically new for the LGUs.

We have also conducted workshops. We provide in-person and online workshops to our LGUs and just this week, we had a simulation

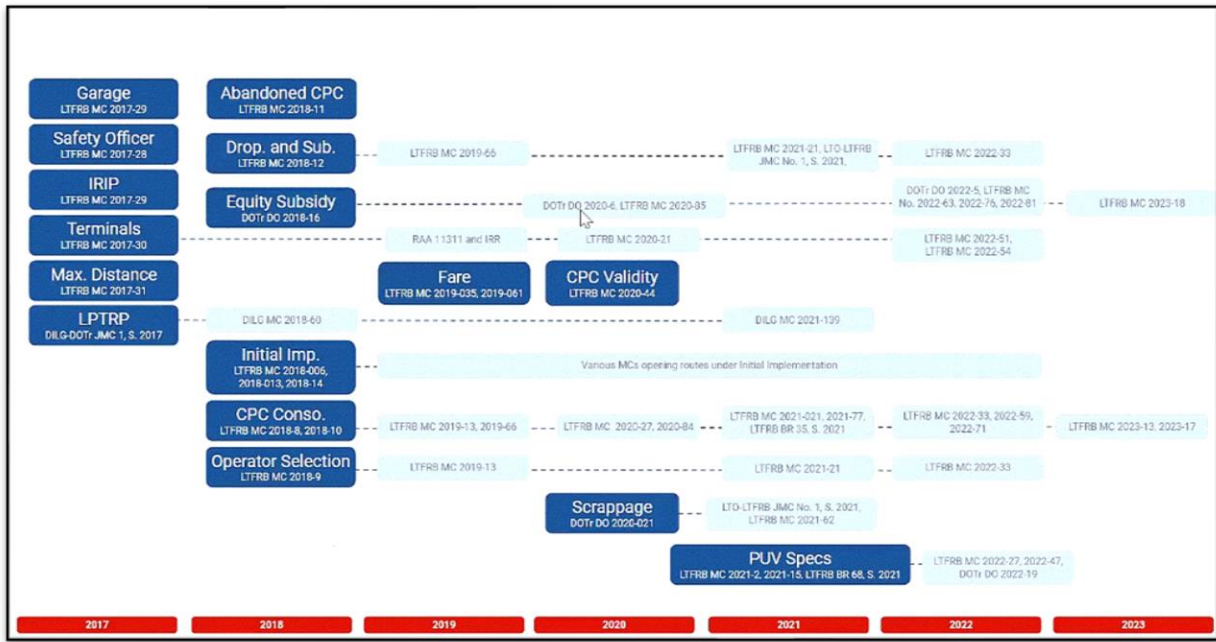


Figure 4. Department Orders and Memorandum Circulares Supporting PUVMP Implementation

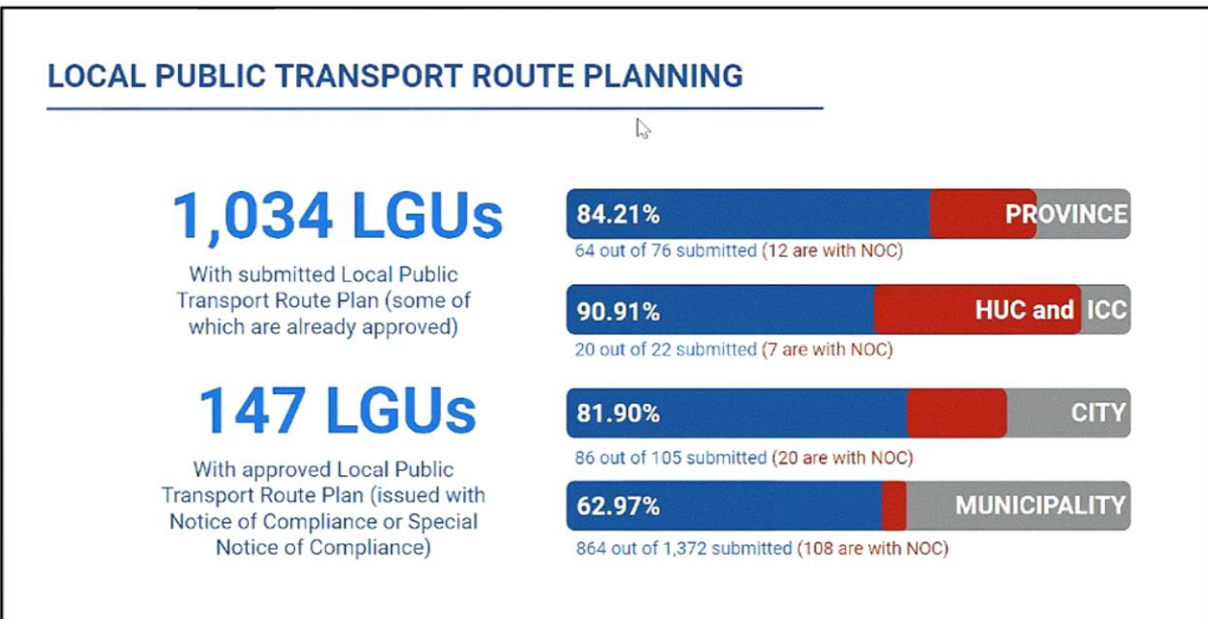


Figure 5. Updates on LPTRP Implementation as of June 2023

exercise together with the SafeTravelPH, the City Government of Bacolod, the LTFRB Central Office and the Regional Office concerned to validate the existing ID route network and the number of units in the LPTRP. This was an exercise that was conducted in preparation for the full implementation of the said approved LPTRP.

For industry consolidation, we have here the accreditation being done by the OTC (Figure 6). As you can see, the number of cooperatives boomed throughout the years because of PUVMP. From 65,000 members, we now have around 262,000, and from 427 cooperatives, it is already 1,700.

Figure 7 shows the number of franchises or certificates of public convenience (CPCs), under a consolidated entity that is either a cooperative or corporation. From 12,508 PUJ units under consolidated entity in 2019, they are now 98,000 while the UV Express increased from 780 to 14,289 units. Per latest MC of the LTFRB and as committed by the Secretary, the consolidation of CPCs will end by December 31, 2023. Hence, the Department of Transportation is in full force with the LTFRB and the OTC in encouraging our individual operators to really consolidate into a juridical entity or to affiliate themselves to an existing consolidated entity.

For the Fleet Modernization, there are various safety concerns on the designs of our traditional units. With that, the Department of Trade and Industry – Bureau of Philippine Standards (DTI-BPS) developed the Philippine National Standards (PNS) for the public utility vehicles. There are already Philippine National Standards for six types of public utility vehicles: Class 1, 2, 3, and 4, as well as Minibus and Bus. All of these except for the bus are already adopted by the LTFRB. LTFRB is currently reviewing the PNS 2165: 2022 and is conducting stakeholder consultations before they release the complementing MC for this.

So far, there are already 112 models compliant to the Philippine National Standards. Among the six types of PUVs, we only have compliant models for Class 1, 2 and 3, although there are applications for Class 4, minibus and bus. The operator may choose among the 112 models as long as it has a certificate of compliance. Of

these 112 models, 57 are locally manufactured pending the ongoing validation of DTI CARS-PMO. These 112 models are made by 48 manufacturers and assemblers, 22 of which are local.

Here is the total number of operational units nationwide: there are more than 7,000 units of Class 1, 2, and 3 type, with a large share from NCR, as well as Regions 6, 7, 8, and 3.

For everyone's information, what we have in the Philippine National Standards are just dimensional limits. They do not talk about any artistic designs. The manufacturers are free to design their models and their units as long as they are within the dimensional limits provided in the Philippine National Standards. The unit can be plain, or it can also be colorful as you can see on the upper right photo in Figure 8.

The recent enactment of the Electric Vehicle Industry Development Act (EVIDA) looks into the electrification of public transport, considering just transition and sources of renewable energy and readiness of our infrastructures like charging stations. So far, we have 6 electric PUV models out of 112 models earlier. These are from 5 manufacturers. Nationwide, we already have 375 units largely from Regions 7, 8 and 12. In Region 7, in addition, there is already a green route, the Lapu-Lapu loops. Green route is a route that is being traversed only by electric PUVs. The department will also be releasing guidelines on how to determine green routes that will be integrated in the local public transport route planning.

For financing, we are aware of the 5-6-7 concept which is 5% equity, 6% interest and 7 years to pay. That is with a government financing institution and lately we have expanded to private financing institution. Here are the details on the number of loan approvals for both: currently, our equity subsidy for the government financing institution is PhP160,000 per unit, while for private financing institution, it is PhP210,000 to PhP600,000 depending on the mode.

There was also a recent memorandum circular by the LTFRB providing guidelines for alternative certificates. This has been the

INDUSTRY CONSOLIDATION



Figure 6. Transport Cooperatives and Members Accredited by the OTC for Industry Consolidation

INDUSTRY CONSOLIDATION

31 Dec 2023

As per LTFRB MC 2023-017 operators have until end of the year to file for Applications for Consolidation of CPCs, for routes with no existing consolidated juridical entity yet.

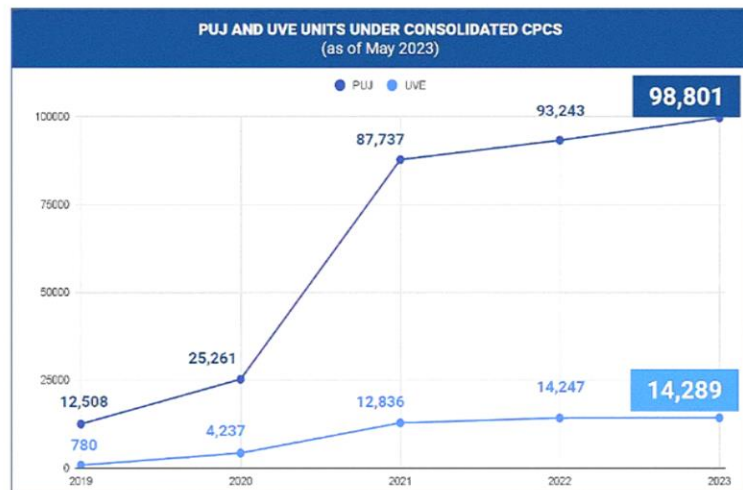


Figure 7. PUJ and UVE Units Under Consolidated Certificates of Public Convenience (CPCs)



Figure 8. PUV Models

concern of most operators considering that the financing institution is requiring an approved route plan before they approve the loans. They are now accepting the alternative certificate in lieu of that approved route plan.

For the vehicle useful life, way back in 2021, we have three qualifying CCT facilities. We also have sixteen facilities that expressed their intent to participate; two of which are set to be accredited this third quarter, technically tomorrow. Twelve facilities are yet to be accredited while the other two are still in the process of accreditation.

For the social support component, we have two programs. First one is the *Tsuper Iskolar*, together with the TESDA (Figure 9). We have an allocation of 350 million and 100 million in 2018 and 2021 GAA (General Appropriations Act), respectively. Additionally, we also have allocation in 2022 GAA and in 2023 GAA. If you want to apply, you can approach your LTFRB Regional Office, or maybe TESDA Regional Office or the OTC if you are a cooperative.

We also have an Entrepreneur Program (Figure 10). You need to come up with a business plan in which you will be supported with capital materials instead of cash, once approved. We already have remaining slots for

2022 GAA and there is also additional allocation from the 2023 GAA.

For communications, I think that is why we have webinars such as this as well as the consultations I mentioned earlier in view of the review policies and strategies because we want to connect more with the public. And lately we have released campaigns such as *Drayberified Arangkadang May Alam*. This is to clarify current issues we may have. The PUVMP also has an official Facebook page, the *Sama-Sama sa Arangkada* where we post updates as well as laymanized materials.

Part of our review of the policies and strategies is also the review of the current processes in LTFRB, OTC, and DOTr to be more friendly with our stakeholders. Second, we want to establish realistic targets. We are currently computing the possible targets not just at the end of the year but multi-year.

We also want to establish a feedback mechanism. Aside from the consultations, this is where the stakeholders can provide their comments and provide input to us in a way. We are looking into convening the multi-sectoral Governance Committee, which was directed to the special provision in GAA. So currently, we

are checking who should be the nominees as representatives for that subcommittee.

And lastly, the institutionalization of the program: it should be ensured that the program will continue, including the people working on it, and all other components or policies will be supported by a Republic Act and not just a mere Department Order (DO) or a Memorandum Circular (MC).

There are already pending bills both in the Senate and the House. For the Senate, we already have one from Senator Grace Poe. For the house there are various authors who compiled the bill.

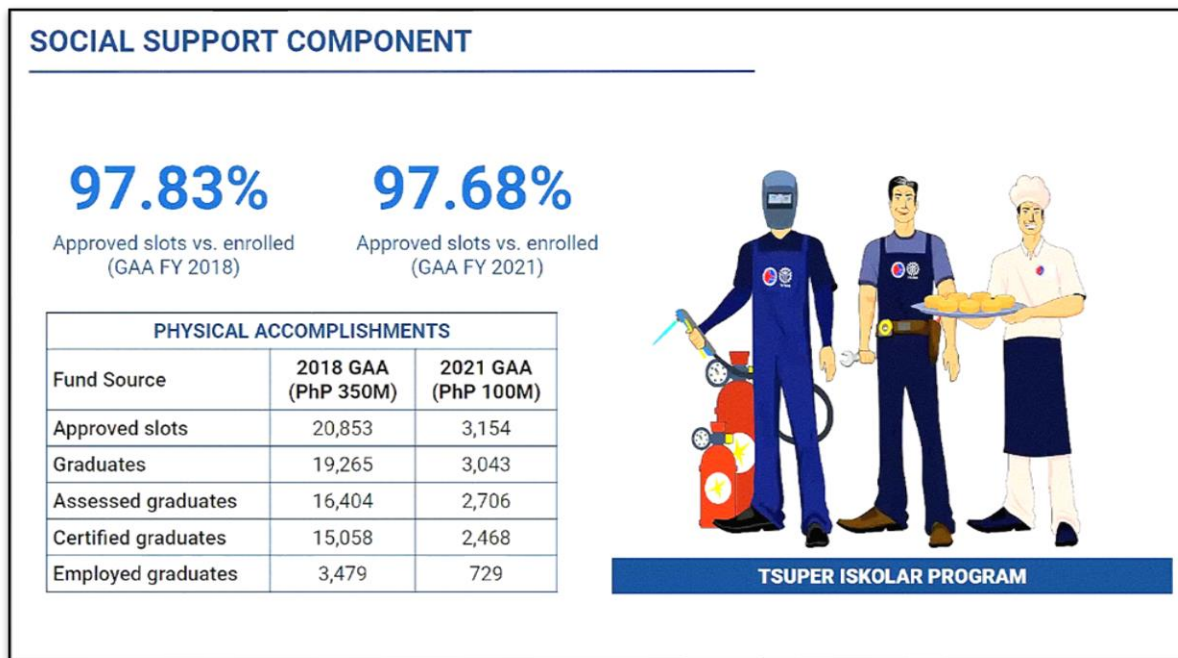


Figure 9. Tsuper Iskolar Program with TESDA



Figure 10. Entrepreneur Program

Practices Implemented in Operating our PUVMP

By Mr. Melvin B. Dela Cruz

Basicano Transport Service and Multi-Purpose Cooperative

Link to presentation slides: [click here](#)

Ito po ang aming mga naging karanasan. Ang kooperatiba namin ay nagsimula noong 1982 at sama sama po kaming mga operator na naghanap at nagkaroon ng prangkisa. Unang una sa Bagong Silang, Novaliches, nagsimula po kami ng 61 units. Ang Bagong Silang ay bagong bago lang na dini-develop at naging relokyasyon ng mga nalipat na nanggaling sa iba't ibang lugar sa Metro Manila.

Kami ay bumuo ng Vision and Mission para sa paggabay sa aming kooperatiba: isang samahang nagkakaisa, matatag, maunlad at maaasahan at may pagmamahal sa Diyos at kapwa, nagsisilbi sa pangangailangan ng mga kasapi at ng mga komunidad. Inisip namin na makapaghatid ng isang ligtas at maayos na serbisyong pampublikong transportasyon na tulad ng aming sasakyan ngayon na modernized vehicle at traditional jeepney; tagapagturo ng kaalaman hinggil sa kooperatiba; kaagapay sa maayos na pamumuhay; tagapamayapa sa di pagkakaunawaan; tagapagpatupad ng batas at polisiya; tagapagtaguyod ng mga programa at serbisyo na tumutugon sa mga pangangailangan ng kasapi; tagapamagitan sa pagkuha ng mga programa, serbisyo at tulong mula sa pamahalaan at ibang ahensyang grupo.

Nais ng grupo namin na maiayos ang pamamahala, maiangat ang uri ng paghahatid ng programa at serbisyo para sa tuloy tuloy na pag-unlad. Katulad ng sinabi ng DOTr na kailangan nating maging buo para sa maayos na public transportation.

Itong lugar namin na Bagong Silang ay dating bundok pero sa pagdami ng mga na-relocate dito ay nadagdagan ang aming mga prangkisa ng 139 sa isang ruta lang namin. Tapos, sa iba pang ruta namin na Camarin-Balintawak, mayroon kaming nailabas na 70 units; 16 na units naman sa rutang Bagong Silang-Philcoa; at 27 sa Evergreen Subdivision-Philcoa. Mayroon din kami sa SM Fairview na 19 units. Sa kabuuan, ang aming prangkisa sa Basicano

Transport Service Cooperative ay 218 units po nang kami ay nagsimula na.

Noong taong 2000, kami din ay nakapagpatayo ng refilling station sa tulong ng Office of Transport Cooperatives (OTC). Natulungan kami ng OTC at ng Cooperative Development Authority (CDA) na magnegosyo ng refilling na gasolinahan dahil mayroon kaming ganoong karaming units at sa tulong din ng Total Gas. Kaya lang, ang naging problema namin doon sa negosyo na iyon ay hindi ito tinangkilik ng aming mga miyembro dahil sa mataas na presyo ng aming diesel dahil ang iba naming mga katabing gasolinahan ay mas mababa sa amin. Ito po yung hinarap naming mga problema noong kami ay maupo at manungkulan dito.

Ang naging solusyon na lang namin dito ay ang pagdalo namin sa kooperatiba. Sa amin pong kooperatiba, ang mga miyembro ay hindi nasanay sa pagpapa-kooperatiba. Nasanay sila na hanapuhay lang ang kanilang naging hangad, na parang kanya-kanyang pamamahala at walang pakialam sa isa't isa. Ang salitang kooperatiba ay parang samahang asosasyon lang iyon na nabuo sa amin. Kaya ang naging solusyon namin ay manungkulan po kami. Nakita namin na hindi tinatangkilik at wala yung diwa ng kooperatiba. Lumahok kami sa mga programang seminar sa kung paano kami mag-aaral at kinausap namin ang kooperatiba sa kung papaano ang pagkokooperatiba. Nalaman namin na ito pala ang tunay na diwa ng kooperatiba: hindi ito samahang nag-aayuda lang o samahang tumutulong lang palagi kundi samahan na nagnenegosyo. Iyon ang natutunan namin na naiparating naman namin sa aming mga miyembro. Kaya iyong sa nasabing pag-aaral, kahit may bayad ay talagang isinulong namin para lang matuto kami na mai-share namin sa mga miyembro na hindi tumatangkilik at walang diwa ng pagkokooperatiba.

Yun ang mga nakalap naming mga kaalaman sa pagseseminar namin na ibinahagi namin sa aming mga miyembro. Nagpapatawag din

kami ng balik-aral para malaman nila kung ano ang mga obligasyon at mga karapatan nila dito sa kooperatiba. Kaya unti-unting nalilinaw ang isip ng mga member namin at unti-unti din tinatangkilik na nila ang aming mga negosyo sa Kooperatiba.

Taong 2014, noong medyo gumaganda-ganda na ang aming pamamahala, mayroong isang kooperatiba na lumapit sa amin upang mag-merge. Dito po kasi sa ruta namin, kooperatiba na kami pero nagkaroon din ng isa pang kooperatiba na naitatag. Kaya noong sila naman ay nahirapan sa pamamahala, kami po ang nilapitan nila. Dito sila nagpaampon sa amin. Ito ang Kooperatiba na may 15 units kaya nadagdagan yung 280 units namin. Lyon yung ruta naman na Robinsons Fairview-Bagong Silang.

Ito yung isa sa talagang malaki ang naitulong sa amin sa Basicano. Ang malaking kaalaman ay ibinigay sa amin ng 1TEAM sa pamamahala ni Ginoong Yuri Sarmiento, Presidente ng 1TEAM. Bilang chairman, karangalan ko na makasama doon sa 1TEAM. Dito namin natutunan ang fleet management. Wala pang seminar sa OTC at DOTr pero natutunan na namin sa 1TEAM ang fleet management. Nakita namin ang kagandahan ng fleet management na katulad ng ginagawa ng mga kooperatiba na kung mayroon kang refilling station, mayroon kang auto supply, lahat iyon ay may tagakonsumo ka na kaya talagang kikita lahat ng negosyo kung fleet management po ang paiiralin. Ang nakasanayan, kahit sa kooperatiba, ay kanya-kanyang pamamahala, kanya-kanyang garahe, bimibiyah sa umaga, hindi na nakakabiyah sa gabi. Ngayon, sa fleet management na natutunan namin, kung anong oras kami nag-dispatch, talagang hanggang sa gabi naseserbisuhan namin ang mga mananakay. Hindi na umuuwi ang mga drayber namin at sasabihin na “ayoko na, pagod na ako!”. Kailangan ang isang namamahala ay serbisyo ang ibibigay sa mga mananakay. Iyan ang natutunan namin sa 1TEAM.

Sa biyaya ng Panginoon, nagkaroon ulit kami ng 18 units na modern jeep. Sa nangyari na kaalaman namin sa fleet management,

napabuti namin ang pamamahala sa kooperatiba na masinop. Kaya nabigyan kami ng tiwala ng Landbank na mapautang, para mabili namin yun, at mabayaran ang 18 units na iyon. Doon sa 18 units na iyon, hanggang ngayon mayroon pa ring mga problema, lalo noong panahon ng pandemya. Hindi na-dispatch lahat kase kailangang limitado lang ang mga bibiyah.

Ito ang 18 units namin. Maraming natulungan dahil mayroon kaming mga tinatanggap na drayber, Passenger Assistant Officer (PAO), at saka mga dispatcher, cashier at mekaniko. Ang mga empleyado ay mayroong kanya-kanyang schedule at duties. Kami ay mayroong dalawang garahe na inuupahan na kung saan ay mayroong nakatalagang bantay na syang nangangalaga ng mga sasakyan at garahe.

Mayroon din kaming mga kinakaharap na problema sa pagpapatakbo nitong modernized unit katulad ng mga sira, maintenance, aksidente, at may mga empleyado na nahuli naming nangupit. Tapos, yung hindi namin binibigyan ng schedule, ayun na-DOLE pa kami. Ngunit itong mga ito, napagtutulong-tulungan naman namin sa pamamagitan ng laging pag-uusap. Lyon din naman ay lagi naming nareresolba; nagkakaroon kami lagi ng solusyon.

Ang aming 18 units na modern ay na-award sa amin noong July 2019 (Figure 11). Kami ay nagsimulang bumiyah matapos naming matanggap ang aming Provisional Authority, buwan ng October 2019. Mula October 2019 hanggang March 2020 bago ang pandemic, ang aming average collection noon ay ₱4,000–₱5,000 per unit. Ang average diesel expense namin ay nasa ₱1500–₱1700. Ang average dispatch namin dati ay 9 units. Sa 18 units, 9 to 11 units ang aming nadi-dispatch noong panahon na iyon.

Noong panahon ng pandemic, June to October 2020, walang nakabiyah noon. Pero masuwerte kami na pinayagan kami na bumiyah ngunit sa pinaiksing ruta lang. Ang

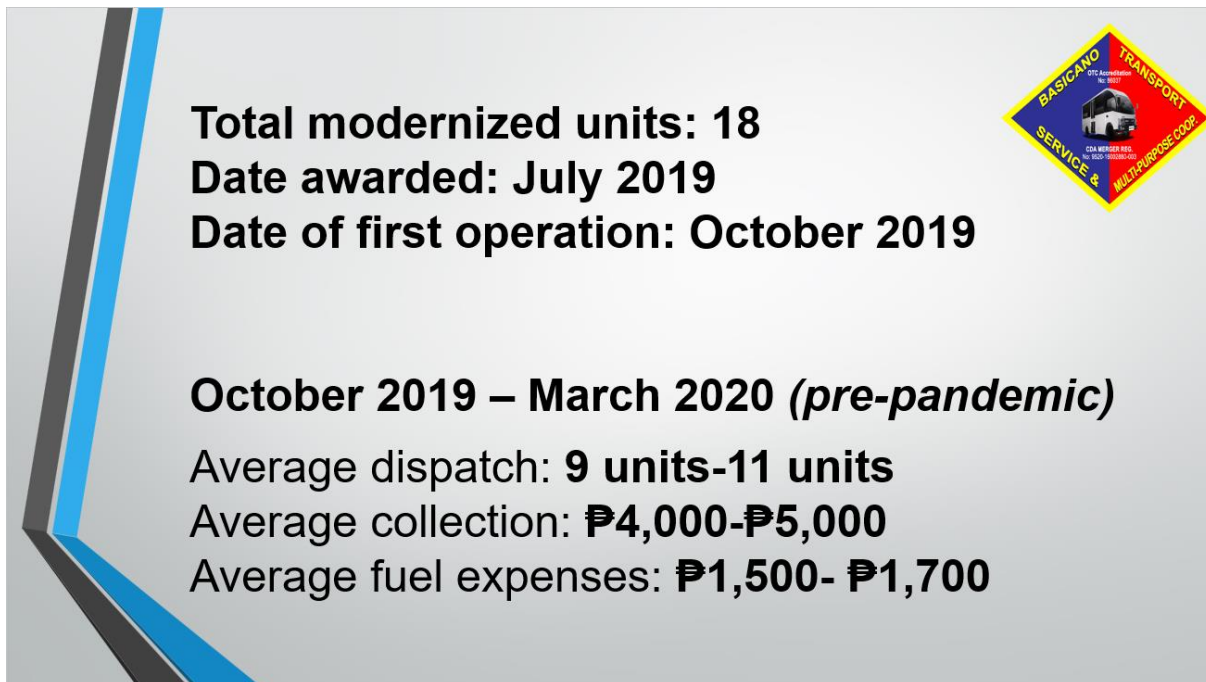


Figure 11. Basicano Transport Service and Multi-purpose Cooperative Operations of Modernized Units Before the Pandemic

aming ruta dati ay Bagong Silang-Philcoa. Siguro sa pag-aaral ng LTFRB, mainam na putulin nila ang ruta namin at maging Bagong Silang via SM Fairview at ito ay naging isang loop. Mula Bagong Silang-Philcoa ay naging Bagong Silang-SM Fairview na lang. Kaya lang, 7 units lang ang aming napatakbo noon. Sa 18 units, yung 11 units na isang prangkisa namin ay hindi maitakbo. 7 units lang ang aming nakayanan.

Noong panahon na ito ay nagkaroon kami ng shifting sa biyahe. Marami talagang mananakay sa lugar namin, kadalasan ay nagpupunta ng ospital, kaso 7 units lang ang bumibiyaha sa amin. Kaya ang ginawa namin, may mga drayber kaming pang-umaga at pang-gabi rin. Kaya 4 ang bumibiyaha sa amin kada isang unit kaya lang 7 units lang talaga ang bumabyaha. Ang naging average collection namin noong June 2020 to October 2020, panahon ng pandemya ay ₱3,000 to ₱3,500 per shift. Kaya sa kabuuan, sa isang maghapon ay nag-a-average kami ng ₱6,000 to ₱7,000. Ang average diesel expenses naman noon ay nasa ₱1,400 to ₱1,600.

Noong 2020 na aming units lamang ang bumibiyaha sa ruta ng SM Fairview-Bagong Silang, ang collection namin ay nasa ₱7,000 to

₱9,000 at ang average diesel expenses namin ay ₱1,600 (Figure 12). Itong panahon na ito, 7 units lang talaga ang aming naibiyaha. Yung 11 units ay hindi lumabas ang Provisional Authority namin. Sa amin pong 18 units, 2 ang aming Case Number– isang para sa 11 units at isa para sa 7 units. Bumagal ang proseso para sa aming 11 units. Isa iyon sa magiging concern ko mamaya yung sa Central Office. Kasi sa NCR Regional Office, wala kaming problema. Sa Central Office, talagang mabagal yung aming pagpo-proseso ng mga papel kaya lagi yung 11 units namin ang naiwan sa pag biyahe.

Simula noong June 2020, ang naging total collection namin ay ₱9,443,000 (Figure 13). Tapos binawas namin yung diesel expenses na 1.5 million pesos, at ibang gastusin namin tulad ng mga pangpasahod sa tao, allowance ng empleyado, at maintenance. Umabot ng 5 milyon kaya kahit papaano noong October 2020, sa panahon ng pandemya, nagkaroon kami ng net income na 4 million pesos mahigit.

Yung diesel namin, ang kagandahan nito ay mayroon din kaming refilling station. Yung aming refilling station, kahit papaano ay kumikita rin. Kaya napakaganda talaga ng fleet management na kung lahat ay

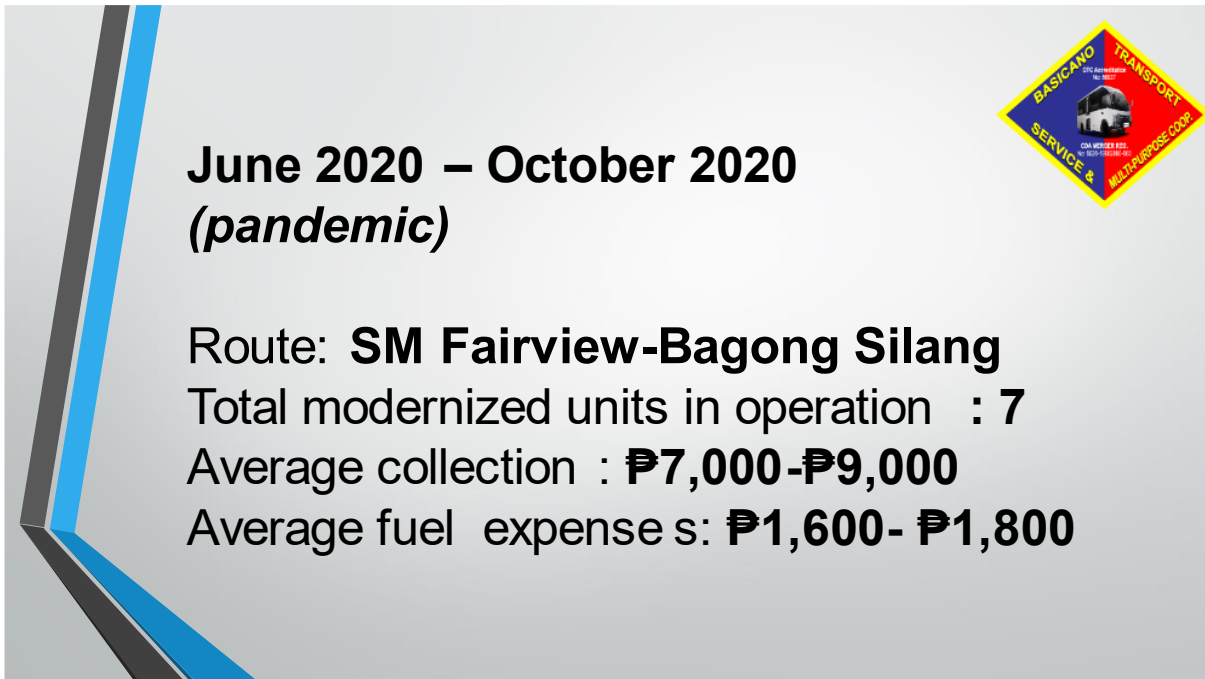


Figure 12. Operations of Modernized Units During the Pandemic

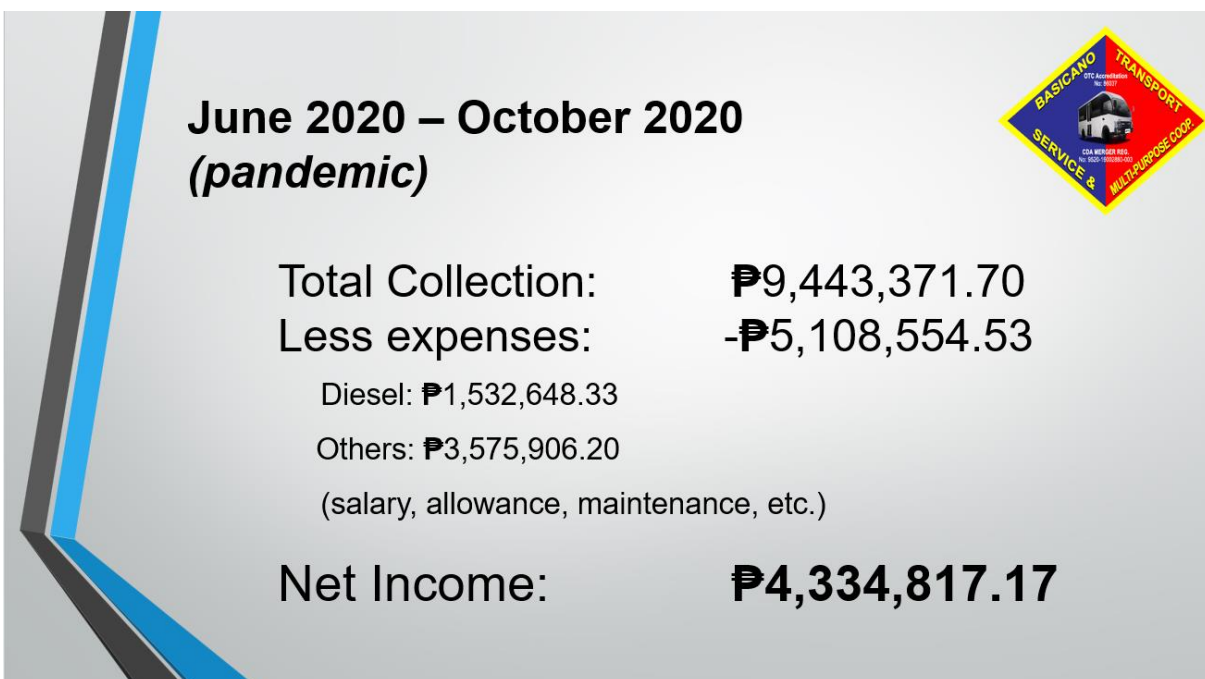


Figure 13. Breakdown of Total Income and Expenses of Modernized Unit Operations During the Pandemic

tatangkilik. Isa iyon sa benepisyo, ang lahat ng negosyo ng kooperatiba ay mayroong tagakonsumo.

Ang service contracting ay isang magandang nangyari sa amin, isang programa ng sangay ng gobyerno partikular ang Department of Transportation at LTFRB. Ito ang nakatulong

sa amin kasi hindi kami kikita nang ganito kung sa biyaha lang talaga dahil maraming kakompitensya tulad ng traditional units. Dati kasi kahit may kakompitensya, palibhasa mayroong service contracting na bumiyaha kami ng libreng sakay. Ito ang aming mga kinita: noong service contracting 1 (SC1), nagkaroon kami ng net income na ₱5,423,000

milyon; sa SC2 naman ay kumita kami ng ₱9,113,000; at sa SC3, ay mababa lang ang kinita namin, ₱2,479,000 lang, kasi hindi kami nabigyan ng Provisional Authority para sa 11 units namin kaya malaki talaga ang nawala. Dahil doon sa kawalan ng suporta dito sa mga modern jeep – modern na nga pero mabagal ang proseso ng LTFRB sa pagbibigay ng Provisional Authority.

Bukod sa aming kooperatiba, ang mga proyektong ito ay nagbigay saya sa aming mga drayber dahil sa kumikita ang kooperatiba namin. Nagkaroon kami ng pagkakataon na maisama namin sa service contracting 3 ang mga traditional na unit. Maraming naging masayang operators dahil yung kikitain daw nila ng anim na buwan o isang taon, sa dalawang buwan lang daw ay kumita sila. Kaya napakaganda talaga ng programa ng gobyerno na service contracting. Sana magkaroon ng ganoong programa lagi ang gobyerno para yung mga nasa transport na industriya ay magkaroon talaga ng suporta. Katulad namin, naging masaya ang mga operator.

Ito yung aming mga kinita sa pagpapatakbo ng PUV units namin (Figure 14). Noong taong 2021, mayroon kaming average collection na ₱4,500,000 to 5 million pesos. Diesel namin noon ay nakakakonsumo kami sa halagang ₱3,700 on average, sa aming 14 units. Sa panahon na limitado ang sakay at pinaigsi ang aming ruta, iyan ang panahon na limitado lang ang mga sakay. Noong 2022 naman, naka-average kami ng 6 million to 7 million pesos, ₱6,000 to ₱7,000 per unit, tapos ₱3,200 per unit naman po ang gastos namin para sa diesel. Noong panahon na tumaas ang pamasaha, nag-full capacity na ang sakay ng mga unit, gumanda na ang biyahe ng panahon na ito.

Itong 2023, tumaas ang pamasaha kaya naging ₱7,000 to ₱10,000 ang aming naging average collection. ₱3,500 to ₱3,700 naman ang average expenses sa diesel para sa 14 units na aming nadi-dispatch. Ngayon ay mas gumanda na ang aming biyahe at ang aming kita dahil bumalik na kami sa dati naming ruta,

yung original na mas mahaba naming biyahe. Bukas na rin ang mga establisimiyento.

Mayroon kaming mga unit na kumita na ng ₱10,000 hanggang ₱12,000. Kaya lang ang nagiging problema namin sa ngayon ay ang pagdami ng mga traditional na jeep na hindi naman naka-rehistro pero nakakatakbo pa rin sa kalsada. Isa iyon sa mga nagiging concern namin.

Ang aming modernized na 18 units ay patuloy na bumibiyaha at sila ang tumutulong para sa mga gastusin ng kooperatiba tulad ng pasahod sa mga empleyado, upa sa aming opisina at terminal, garahe at marami pang ibang gastusin.

Hindi ko masasabi na kami ay successful na, kundi sana magpatuloy pa yung programa ng ating gobyerno na masuportahan ang katulad namin na nangarap na maging malaki at makatulong sa ating gobyerno na mabago natin ang dati na kapag sumakay ka ng jeep, natatakot ka na baka may mang-holdap. Ngayon ay hindi na.

Kapag sumakay ang mga mananakay, ang tanong sa amin ng mga pasahero, ilan daw ba ang units namin, o kailan daw ba kami madadagdagan, dahil talagang kulang pa ang units dito sa aming ruta. Marami talagang mananakay na gustong-gusto ang cooperative. Kaysa naman nga daw doon sa luma na papasok sila nang nakayuko at bababa rin nang nakayuko. Kaya sabi nila sana madagdagan pa raw ang aming units.

Ito ang aking maibabahagi sa inyo: ang aming kooperatiba ay nakasuporta sa programa ng gobyerno sa pagsulong nitong modernong sasakyan at modernong transportasyon upang makatulong sa kalikasan – yung global warming na nangyayari, mabawasan ang mga nag-uusok na lumang dyip. Dito kasi sa modern jeepney kahit papaano nakakatatlong taon na kami mahigit o apat na taon na hindi pa mausok ang aming mga sasakyan. Kaya kahit kaunti lang iyan, nakakabawas na rin kami ng usok sa kalsada.



Summary of operations of modernized units

Year	Average Daily Collection per unit (in pesos)	Average Fuel Expenses per Unit (in pesos)	Number of Units in Operation
2021	4,500-5,000	3,700	14
2022	6,000-7000	3,200-3,500	14
2023	7,000-10,000	3,500-3,700	14

Figure 14. Summary of Operations of Modernized Units

Short Talk: Good Practices and Lessons Learned on PUVMP Implementation

By Mr. Margarito Sello

Sapang Palay-Minuyan Loop Transport Service Cooperative

Kami ay narehistro noong 2014 sa Cooperative Development Authority (CDA) at na-accredit kami sa Office of Transportation Cooperatives (OTC) nitong 2015. Una, dahil sa napuntahan naming seminar noong May 31, 2019 doon sa City State Tower sa may Mabini, naipaliwanag ang fleet management system sa modernization. Napakaganda ng aming naranasan at natutunan. Napakaganda sa baw't kooperatiba o asosasyon o korporasyon na malaman yung sitwasyon na ganito. Dahil doon sa seminar na iyon, malalaman mo kung paano maipamalakat, paano harapin ang challenges, at paano ma-implement ang programa.

Kami ay nakapagpalabas ng 20 units sa kasagsagan ng pandemic noong June 2020. Napakalaking hamon ang aming hinarap dahil hindi namin malaman kung ano ang aming gagawin. Pero salamat sa Diyos dahil siya ang nagbigay ng mga probisyon, humipo ng mga tao upang magbigay ng tulong katulad ng aming LGU. Sila ay naging katuwang namin upang makakuha kami ng shuttle service sa panahon ng pandemic. Nagpapasalamat din kami sa Starmall, at sa mga call center kaya kami ay nakapagbigay ng suporta sa aming mga miyembro, sa PAO, at sa mga drayber. Kami ay nakapag bigay ng mga serbisyo at ayuda hindi lamang sa mga miyembro namin kundi sa ibang nasasakupan pa dito sa San Jose Del Monte. At isa pa, ito yung aming karanasan na napakaganda bagama't pandemic at kami po'y mayroon utang sa bangko na napakalaking halaga pero hindi kami lumiban sa paghuhulog nito para naman hindi kami masira doon sa aming pangako sa bangko. Kaya, salamat sa Diyos dahil pinangyari sa amin iyon na kami ay binigyan ng suporta.

Salamat din sa gobyerno natin dahil sila'y nag-isip hindi lamang sa modernization kundi sa baw't tao o baw't transport ay sila'y nagbigay ng ayuda, lalo na ang DOTr na kung saan ay mayroong free ride. Kami ay nasali sa Phase 1, Phase 2, at Phase 3. Sa biyaya ng Diyos,

kami ay pumasa at kami ay talaga namang nakaipon. At doon sa ipon na iyon, unti-unting nakikita namin ang resulta na ginagawa ng gobyerno kung tayo'y susunod sa kanila. Marami kaming natulungan na nangangailangan ng trabaho. Nakapagpundar kami. Napakaganda ng aming nagawa lalo na yung in-implement namin yung fleet management na iyan. Napakaganda po.

Ngayong bumalik na sa normal ay patuloy naming ipinapatupad o ginagawa ang fleet management na ito. Sa pamamagitan ng fleet management, nakikita namin yung mga sasakyan na sila ay sunod-sunod – hindi nag-aagawan o kung ano pa man. Kaya nasabi ko na napakaganda kung ating i-implement ang ating natutunan sa ating nasasakupan at ating sundin. Maganda po dahil sabi ko nga kanina, wala pong gobyernong nag-iisip sa hindi ikagaganda ng kanyang mamamayan. Kaya muli, saludo kami sa DOTr, LTFRB, LTO, CDA at OTC sa pagbibigay ng suporta doon sa mga nangangailangan, lalo na sa mga sumusunod na magkaroon ng modern PUV. Kaya ito ang aming panawagan: sa ating mga kasama sa hanay ng transportasyon, kooperatiba man o korporasyon, yakapin po natin ang programang ito na PUVMP dahil tayo rin ang makikinabang nito at ang ating buong pamilya at ang bansa sapagkat maiibsan ang polusyon na ating dinaranas sa kasalukuyan. Nakikita na natin ang polusyon ay talaga naman grabe na ang nangyayari. Kailangan yakapin natin dahil ito ay napakaganda.

Sabi ko nga, sa maigsi kong pananalita, panawagan nawa'y buksan natin ang ating kaisipan, kasama ang mga lider na chairman man o presidente. Bigyan natin ng pagkakataon ang ibig ng gobyerno sa atin na napakaganda na mangyari sa atin. Dahil kami, naranasan namin mula sa 20 units, ngayon ay 40 units na ang mga jeepney na nandito sa San Jose Del Monte, Bulacan. Huwag natin pagmatigasin ang ating puso dahil ito ay para rin sa atin.

Engineering the LPG PUV Using an OEM Vehicle Platform

By Dr. Edwin N. Quiros

University of the Philippines Diliman

Link to presentation slides: [click here](#)

Hayaan ninyo akong ibahagi nang mabilisan ang isa sa aming mga ginawang pagsasaliksik upang makapagbuo ng isang prototype na PUV. In particular, ang PUV na ito ay LPG-powered. So, let me just mention the title here, which is the “Engineering the LPG-PUV Using an OEM Vehicle Platform”. OEM stands for Original Equipment Manufacturer. This is a project we have done together with the DOE and the DOST under the umbrella of UP NCTS.

Gusto ko i-present ang aming mga ginawa in terms of the original objectives of our project at kung ano ang ginawa namin bilang tugon sa mga objective na ito. Una sa mga objective na iyan ay ang paggawa ng isang PUV na naka-base sa Original Equipment Vehicle Platform. In other words, hindi ito yung traditional jeep na binuo from ‘chop-chop’ na parts. Although hindi ko naman masabi na hindi namin ginawa iyon in a way as we will see later. And further, ginawa rin namin ang prototype na ito para umayon sa ating standards which at the time was PNS 2111:2015 CLRV Dimensional Limits. Inumpisahan namin ang project some time around 2017 and that was the time when early development of the PUV was still ongoing. And then we were told to introduce weight reduction as much as possible doon sa design ng ating PUV body and to construct the entire PUV using approved manufacturing processes. And definitely after the prototype is made, kailangan i-roadtest ito para makita natin ang performance. So, against these objectives, ano ba yung mga nagawa namin?

In terms of answering the objective number one, *ito ang nagawa naming prototype (Figure 15). Isa itong PUV na ang capacity ay 18 passengers at the time. Tinapatan lang namin yung mga jeepney na 9-9 ang sakay doon sa magkabilaan ang upuan sa likod. And this falls eventually compliant with the later standards ng ating PNS which is 2126:2017 for PUVs. This one that we have made, pumapasok sa Class 1. Ito yung hitsura ng natapos na PUV*

na nakaparada that time sa UP-NCTS noong bagong dating siya, and also when it was being road-tested around UP Diliman campus.

In terms of introducing weight reduction, *ang pwede lang naming magawa during the construction nito ay gawing magaan ang floor ng PUV. So ang ating sub-floor ay ginamitan ng marine plywood at diyan ipinatong ang final PVC matting para sa sahig (Figure 16). In terms of the frames ng windows, gumamit tayo ng aluminium. Yung harapan at likod na panels ng ating PUV body ay ginamitan natin ng fiberglass.*

And as far as satisfying the OEM platform, *naghanap po tayo ng modelo ng light truck cab and chassis na pwede nating gawing basehan na gawing platform para sa ating PUV body. Dito kami nahirapan dahil ang iniisip namin na LPG-powered vehicle ay hindi commercially available, at least dito sa Pilipinas. Hindi kami nakakita ng light truck or medium duty truck na ang kanyang makina ay gumagamit ng gasoline – ang karamihan po niyan ay diesel. And among those models, yung brands na medyo nilapitan namin ay mayroong pag-aatubili na pagbentahan kami lalo na nang malaman nilang gagawin naming PUV dahil at that time, gumagawa rin sila ng sarili nilang modelong PUV. So, there were some procurement difficulties in that aspect.*

Eventually we ended up with a company that sells this platform. *Ang brand niya ay NAVECO. This is the Chinese version of the new brand IVECO in Italy. So iyan ang ating cab and chassis na platform na ginamit. Pinalitan natin ng makina yan. Gumamit tayo ng gasoline engine. Brand new ito, at mayroon siyang ECU – meaning, computer controlled itong brand new engine. And we converted it to LPG by using the Tartarini LPG system which was installed by Cleanfuel. So we assembled it, at iyan yung PUV prototype (Figure 15).*

- a) Use an OEM vehicle platform, light truck or pick up (cab and chassis), to develop a jeepney design of 18-20 passengers that conform to PNS 2111:2015 CLRV Dimensional Limits

- ➔ Final prototype was constructed using an OEM vehicle platform with 18-passenger capacity conforming with PNS 2126:2017, PUV Class I (9-22 passengers, all seated); UNECE Category M2 Class B



Figure 15. Project Objectives vs. Accomplishments (First Objective)

- b) Introduce weight reduction measures in the body design

- ➔ Final prototype was constructed with marine plywood and vinyl matting flooring, aluminum window frames, molded fiberglass front and rear body panels



Figure 16. Project Objectives vs. Accomplishments (Second Objective)

Ang nag-assemble at nagbuo at gumawa ng body ng lahat ng nandoon sa loob ng passenger cabin ay Fil-Asia Automotive and Industries Corporation sa Pasig.

Pagkatapos nating mabuo ang ating PUV-LPG, ni-road test natin iyan sa UP para

magkaroon tayo ng idea ng kanyang fuel consumption. Ito yung picture ng ating PUV na ni-road test sa UP (Figure 17). Ito yung ruta na dinaanan during the road test. Ito ang rota ng UP-Ikot. Ang total distance nito around the loop is roughly 5 kilometers at mayroon itong 22 stops around this route. If you try to average

that, the distance between every stop, is between 200-300 meters. So practically, *parang* stop and go *ang* operation *ng ating ruta dito*. And this was tested at full load and no load. *Kapag sinabi po nating* full load ay *iyon pong weight ng ating PUV kapag puno ng pasahero*.

At ito ang *nakuha nating* fuel economy figures (Figure 18). *Tingnan natin itong* highlighted sa yellow. *Noong unang try namin ay in-adjust namin ang* LPG system *para ang ating PUV ay makaakyat doon sa isang matarik na kalsada* within UP Campus. And with that adjustment of LPG system, *ang fuel economy noong* first try *namin doon sa loop na ipinakita ko kanina ay* 1.6 -1.76 kilometers per liter. This is very bad. *Sabi nga namin, masyadong maliit na* fuel economy. So *ang ginawa namin ay in-adjust ulit namin ang* LPG system. *Ang tawag namin diyan ay* tuning. *Tinotono natin yung* fuel injection system *para magkaroon ng acceptable na* fuel economy *at yung acceptable na* ride drivability *ng ating* prototype LPG.

At ito pa ang *nakuha natin*. *Kinukumpara namin ang* konsumo *kung ang ginagamit ay purong* LPG *at kung* gasoline. By the way, *dahil gasoline ang* engine *natin, ang ating PUV ay pwedeng* tumakbo either LPG or fully gasoline. So *ito ang* comparison *ng ating* fuel consumption between gasoline and LPG: *sa* LPG *ay* 2.54 kilometers per liter *at kung* gasoline *ay* 3.01 kilometers per liter. *Ito ay kung* tumatakbo *ang* LPG *na bukas ang* aircon. *Sinubukan din naming* patakbuhan *nang* full load *ito*. *Ang kanyang* gross vehicle weight *ay* roughly 4,200 kilograms. With the same weight, *sinubukan naman namin* patakbuhan *nang hindi naka bukas ang* aircon. *Bukas lang ang* *bintana at* tumaas *ang* *ating* fuel economy from 2.54 to 2.8 kilometers per liter. *Ganoon din ang* *sa* gasoline, *tumaas din ang* *kanyang* fuel economy. Just for comparison, *tinanggal natin yung* load, driver *lang*. Roughly, *gumaan ang* *ating* weight to 3,300 kilograms. *Tumaas* definitely *ang* fuel economy.

Now, *ang gusto ko sigurong* *i-point* out *ay ang* comparison *ng* fuel economy *kung* tumatakbo *sa* LPG *at* tumatakbo *sa* gasoline. Apparently, *mas mababa ang* fuel economy *ng* LPG, *dahil dito* *sa* full load with aircon: 2.54 versus 3.01.

Parang hindi magandang tingnan. Ganoon din dito kung walang aircon: 2.8 versus 3.7.

Ngayon itong mas mababang fuel economy *ng* *ating* LPG *ay, sa* *tingin* namin, *dahil mas mababa ang* energy content *ng* LPG *kaysa sa* *gasolina* per liter. *Ang* comparison *nito ay ang* 1 litro *ng* LPG, *ang* laman *niyang* energy or heating value *ay* halos 75% *lang* *ng* 1 litro *ng* *gasolina*. And this is what I think explains *kung* bakit *mas mababa ang* kilometers per liter *ng* LPG *at* *ng* *gasolina*. *At* maliban *pa* *riyan, ang* fuel economy *ng* LPG *ay* pwedeng *i-adjust* *depende sa* tinatawag *na* tuning *ng* *kanyang* fuel injection system. *Naa-adjust* *iyon, para maging* matipid *o* kaya *maging* malakas *ang* *ating* makina *pero* makonsumo. *Iyon ang* characteristic *ng* *ating* LPG system.

Mayroon kaming ginawang study before with the DOE *na* LPG *rin ang* jeepney *ng* unit iba *ang* hitsura. *Mas* magaan *ito* *pero ang* *kanyang* design dimensions *ay* hindi *kagaya ng* *ating* modern PUV *ngayon*. And definitely, *itong* earlier version *ng* LPG Jeepney was lighter: 3,430 kilograms versus *ang* *ating* 4,200 kilograms. *At* dahil *mas* magaan *ito* *ay* *mas* mataas *ang* *kanyang* fuel economy: 3.48 when we tested it *hindi* *sa* loob *ng* UP Campus, *kundi sa* *ruta ng* UP-SM North which was roughly 13 kilometers round trip *at* *ang* average velocity *ay* more than 30 kilometers per hour. *Dahil* *diyan, mas* maganda *ang* *kanyang* fuel economy *dahil* *mas* nakakakambiyong siya *nang* mataas, siguro *tercera, cuarta at* mayroon *pang* portion *na* nakaka-quinta *siguro* *ito* *kung* mayroong quinta *itong* sasakyan *na* *ito*. *Ang* gusto kong *i-point* out *dito* *ay* adjustable *po* *ang* fuel economy *ng* *ating* LPG— *depende* *yan* *sa* klase *ng* sasakyan, *sa* *ruta* *at* *sa* *kung* papaano *itinono ang* *ating* LPG engine. I think from these studies, *kung* pag-uusapan *po* *ay* konsumo, kayang habulin *ng* LPG *ang* konsumo *ng* diesel, kayang tapatan with the proper adjustment *ng* *ating* LPG System.

I also want to show some of the features that we included in this prototype LPG. For one, this vehicle can run on either gasoline or LPG. This means fuel flexibility. *Kung* naubusan *tayo ng* LPG *habang* bumabyahe, *pwede* *itong* tumakbo *gamit ang* gasoline. *Mayroon* kasi *itong* separate *na* gasoline tank *na* pwedeng mag-shift *ng* fuel *para* tuloy-tuloy *ang* takbo *ng*

d) Road-test the prototype jeepney design

➡ Final prototype was road tested along a selected UP-Ikot route.



Figure 17. On-Road Test of the Prototype Jeepney along UP-Ikot Route

d) Road-test the prototype jeepney design

➡ UP-Ikot Road Test Results are shown below.

FUEL ECONOMY ROAD TEST (UP - IKOT)					
	Tuning	FUEL	GVW (kg)	Ave. Speed (kph)	Fuel Economy (km/l)
With Aircon* FULL LOAD	1st	LPG	4200	12-14	1.76
	2nd	LPG	4200	13.85	2.54
	2nd	Gasoline	4200	13.66	3.01
No Aircon FULL LOAD	2nd	LPG	4200	13.33	2.8
	2nd	Gasoline	4200	12.54	3.7
No Aircon NO LOAD	2nd	LPG	3300	14.63	3.22
	2nd	Gasoline	3300	13.72	4.37

* Aircon duty cycle during tests is unknown

- Re-tuning (2nd) was performed after the first (1st) tuning LPG test run
- Fuel economy difference between LPG and Gasoline is within range of percent difference in Heating Value/liter

Figure 18. On-Road Fuel Economy Test Results (UP-Ikot Route)

ating sasakyan hanggang sa makarating tayo sa next refueling station ng LPG kung kinakailangan.

Iyon pong dimensions ng ating vehicle ay compliant sa PNS 2126: 2017 (Figure 19). At noong dini-design namin ito, ginamitan namin ng ergonomics para masatisfy ang requirements sa human clearances ng ating mga pasaherong nakaupo at nakatayo.

At dahil din sa inbutan ng COVID-19 ang project implementation na ito, we responded to the requirements ng ating COVID-19 pandemic. Noong bumabalik na ang public transport at sumasakay na muli ang mga tao sa PUVs, in-advise kami na kailangang maganda ang ventilation para ma-minimize ang transmission ng COVID-19 which means opening windows. Dinisenyo natin ang windows ng PUV para talagang mabuksan ang bintana and the way it's done is to make the sliding panes slide vertically. So, yung ating sliding panes ay taas-baba, hindi horizontally na pakaliwa o pakanan dahil yung horizontal diyan, kalahati lang ng opening ang mabubuksan. Samantalang kung vertical ay talagang mabubuksan ang buong bintana which will allow better ventilation doon sa loob ng ating sasakyan kung tumatakbo ito nang hindi naka-aircon. And also in emergency cases, madaling lumabas dito sa bintana dahil maluwang kung kinakailangang lumabas nang mabilisan.

We also tried to put seat partitions dahil mahaba ang benches sa loob ng PUV kaya kapag biglang pumreno ang ating sasakyan at ito ay puno, maiipit ng mga pasahero sa likod ng mga pasahero sa harapan. To address that, naglagay kami ng seat partition. Ito ang kulay dilaw na handlebars para lang ma-control yung compression ng mga pasahero during sudden braking.

We also put signages to indicate that certain seats in the passenger cabin are not necessarily reserved but preferably occupied by PWDs. Itinapat natin iyan doon sa mga upuan na inilalaan natin doon sa mga person with disabilities.

And of course, naglagay tayo ng signages para sa ruta, para madaling makita ng mga

pasaherong nasa labas kung saan papunta ang ating PUV kung gamiting pampasada.

Naglagay din tayo ng public address system sa loob. Ito yung microphone ng driver at speakers. For instance, sa present location kung nasaan na yung ating PUV kung bumabiyaha, o kung saan papunta, at kung ano mang announcement na kailangan niyang ipahayag sa mga pasahero.

We also installed an electronic fare payment system para sa cashless transaction kung kailangan. Beep cards ang ginamit natin dito.

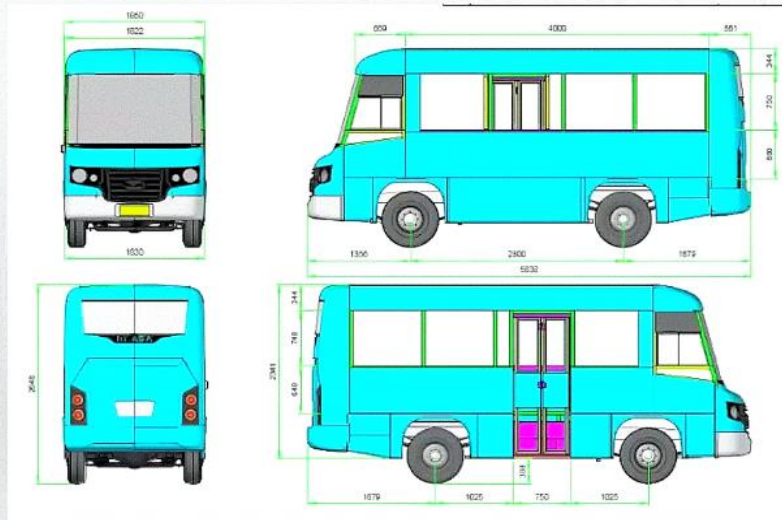
Naglagay din tayo ng CCTV para ma-monitor ang kalooban ng ating sasakyan habang bumabiyaha. We had four cameras inside, located at various locations para ma-cover ang buong loob ng ating PUV. In addition, mayroon din tayong dashcam na nakatutok sa harap at gilid para matulungan ang driver sa pagmamaneho at tingnan ang bandang labas ng ating sasakyan.

And as far as yung ating pagpara doon sa sasakyan, naglagay tayo ng stop buttons dito na kulay puti. This can be pressed kahit nakaupo ang ating pasahero. Itaas nya lang ang kamay niya, maabot na niya at makakapara na siya.

Ito ay isang special request ng isang grupo ng PWD na aming nakausap. Ang sabi nila, "pwede nyo ba kaming bigyan ng access para makasakay kami sa PUV." This is really not part of the original design but we just tried to accommodate this. So, naglagay kami ng wheelchair lift sa may likod para maiakyat at definitely maka-disembark ang wheelchair (Figure 20).

This is how the wheelchair lift functions. Ito ay assist ng driver ang pasahero nating naka-wheelchair. Bubuksan niya ang ating rear exit door. Ang wheelchair lift ay nasa ibaba ng bumper sa likod. Ideally, ang controls ay dapat nasa gilid ng sasakyan kaso hindi namin mailagay sa gilid dahil maraming tatamaan sa ilalim kaya napilitan kaming ilagay na lang sa likod. May kabigatan po ang mechanism na ito.

1. An 18-passenger Auto-LPG PUV built on an OEM vehicle platform compliant with PNS 2126:2017, PUV Class I ; Actually a bi-fuel PUV, runs on either LPG or gasoline.



Body dimensions: LxWxH, stepboard ground clearance, side and emergency doors, wheelbase, front & rear overhangs

Figure 19. Body Dimensions of the Prototype Jeepney

10. Wheelchair Lift System



Figure 20. Wheelchair Lift System of the Prototype Jeepney

It added around 150 kilograms sa total weight ng ating vehicle. Kapag naka-position na ang ating wheelchair, it can be lifted up to the level

of the floor doon sa loob ng PUV. And then, kapag tama na ang level, itutulak na lang papaloob ang wheelchair.

Afterwards, *ila-lock na ang mga gulong para stable ang position ng wheelchair habang tumatakbo ang ating sasakyan.* And of course, obviously, *kapag mayroon tayong wheelchair na nakapasok ay mayroong mga upuan sa likod na hindi magagamit.*

Further to this, *ang isa pong feature na pinagtuunan namin ng pansin ay ang ventilation system ng ating PUV.* And what we did was to respond to the need to mitigate the transmission of COVID-19. *Kapag ang ating PUV ay tumatakbo nang nakasarado ang mga bintana, that means naka-aircon ito.* We attempted to minimize the transmission of COVID-19 among passengers by redesigning the ventilation system. And we did this by installing exhaust pipes *sa ilalim ng upuan ng mga pasahero para ang hangin ay hihigupin sa baba para ilabas at saka i-process ulit sa ating air conditioning unit kaysa sa patuloy lang na umiikot sa loob ng PUV.*

Ang unang ginawa namin ay gumawa kami ng tinatawag na computer simulation using computational fluid dynamics (CFD) to visualize kung paano ang takbo ng hangin sa loob pati ang hininga ng mga tao kapag tumatakbo tayo nang naka-aircon at sarado lahat ng bintana.

Sabi namin, maglagay tayo ng exhaust fan sa dulo, sa likod ng ating PUV para doon hihigupin lahat ng hangin tapos i-recirculate sa air conditioning system bago ibalik sa loob. At kung ganoon ang gagawin natin, ito ang magiging takbo ng hangin sa loob (Figure 21). Ito pong kulay asul, iyan yung hininga na nanggagaling sa bawa't pasahero. At yung dilaw na mga linya, iyan ang direction ng hangin na nanggagaling sa ating airconditioning system. Makikita natin na yung hininga ng mga pasahero ay dumadaan doon sa katabi niya. This is what we call cross flow between adjacent passengers. At ang tingin namin ay hindi ito maganda dahil maaaring magkahawahan kung may dala-dalang virus yung hininga ng mga pasahero dahil dumadaan nga ito sa ibang pasaherong katabi niya. Ang maganda sana ay dire-diretsong pababa ito na walang dinadaan na masasagi ng pasahero.

Doon naman sa doo side, ganoon din ang hitsura. Naglagay kami ng exhaust fan sa likod. Ang hininga ng mga tao at takbo ng hangin

galing sa aircon ay pupunta sa likod. Magpapasa-pasahan talaga ang mga hininga ng mga pasahero doon sa kanyang mga katabi. Kaya ang sabi namin ay hindi ito maganda at kailangan yung hininga ng mga tao ay direktso pababa tapos lalabas na wala siyang dadaanang katabing pasahero.

Nag-install kami ng exhaust pipe sa aming design sa ilalim ng ating upuan. Naglagay kami ng mga butas para higupin ang hangin sa loob ng ating sasakyan. At noong ginawa namin ulit ang computer simulations, ganito na ang nangyari. Itong Figure 22, dalawang views iyan. Kung titingnan ang nasa kanan, makikita ang hininga ng tao (dark color) mula sa bibig at direktso na siyang pababa sa ilalim. Hindi na siya dumadaan sa gilid o katabi nyang pasahero na nakaupo. And I think this is the better way of the airflow design for the PUV cabin. Nagawa iyan dahil naglagay tayo ng exhaust pipe sa ilalim. Ginawa natin iyang magkabilaan. I think this is one of the innovations that we have implemented in the design of the PUV. Naglagay tayo ng return exhaust pipe sa ilalim at hihigupin ng hangin para hindi na magpasapasahan ang mga hininga. And then later, in-adjust ng mga technician ang mga ventilation vent at ventilation system sa air conditioning duct para magkaroon ng equal flow rates.

And so with that, *nagawa na ang prototype after the project completion. Na-test na iyan. Gusto naming itulak ang transport technology na ginagamit natin sa PUV— ang mga PUV na ang fuel ay LPG. Ito ay isang mature na technology na ginamit na sa ibang parte ng mundo. Ito ay matagal nang ginagamit at definitely mas malinis ang usok ng LPG engine kaysa sa diesel. So, wala pa tayong problema sa emissions. Ang pag-uusapan na lang natin diyan ay economics.*

And as far as the technical aspect *sa aming side, gusto namin sanang i-pursue ito. Ang mga tumatakbong PUV natin ngayon sa kalye ay maganda ba ang ventilation system? Of course, hindi na kasing grabe ngayon ang COVID-19, pero nandoon pa rin ang ibang pathogens sa hininga ng tao na nagsi-circulate sa loob ng ating mga sasakyan. We would like to look further into this at gusto sana naming magkaroon ng experimental setup para*

maayos ang ventilation system for actual PUV units running in our streets.

Ang pinakamatinding lesson na natutunan namin dito ay kung magdedesisyon tayong gumamit ng LPG na PUV, ang approach na gagamitin natin ay hindi itong ginawa namin na nag-develop from scratch. I think we should immediately look for commercially available

units to immediately reap the benefits of an LPG-PUV system.

Unfortunately, wala kaming datos para sa economics ng operation ng LPG-PUV. We will be very glad if some of our participants can share this information with us, para mas maganda ang maging usapan tungkol sa paggamit ng LPG sa PUV modernization.

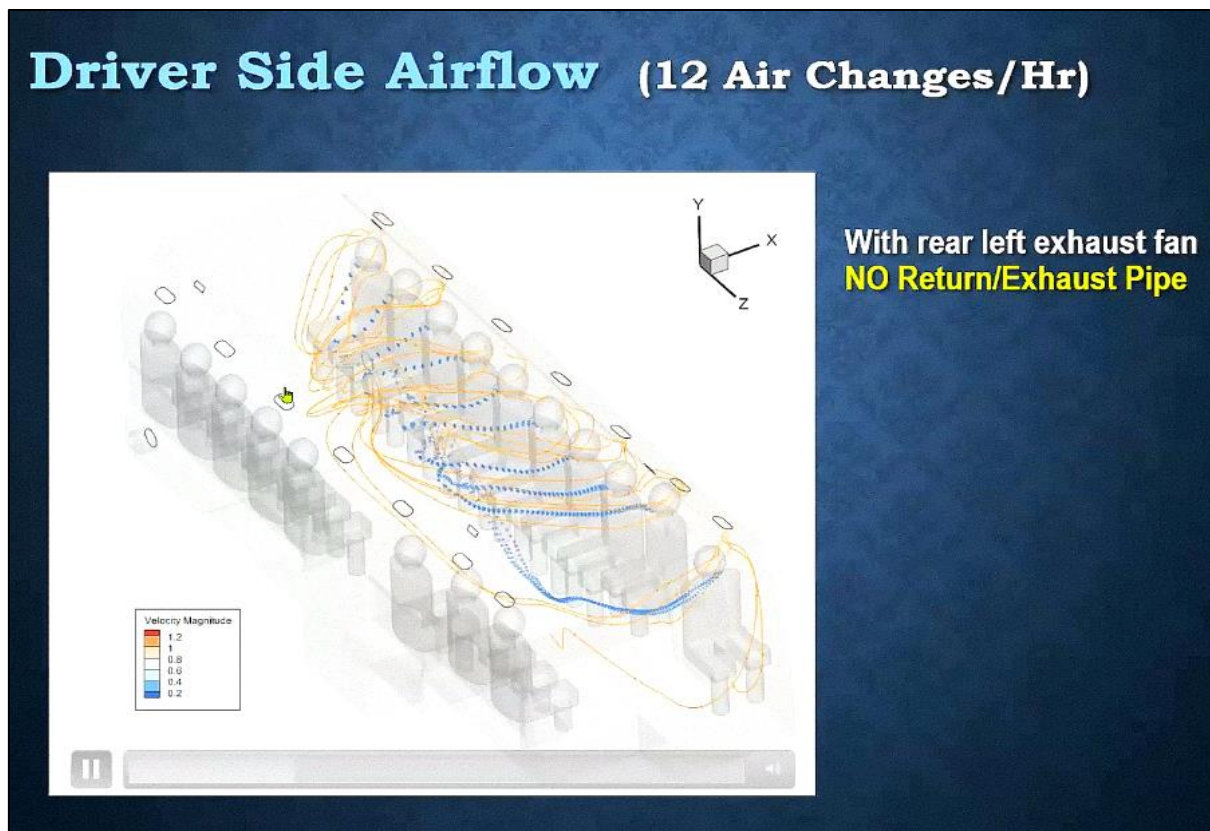
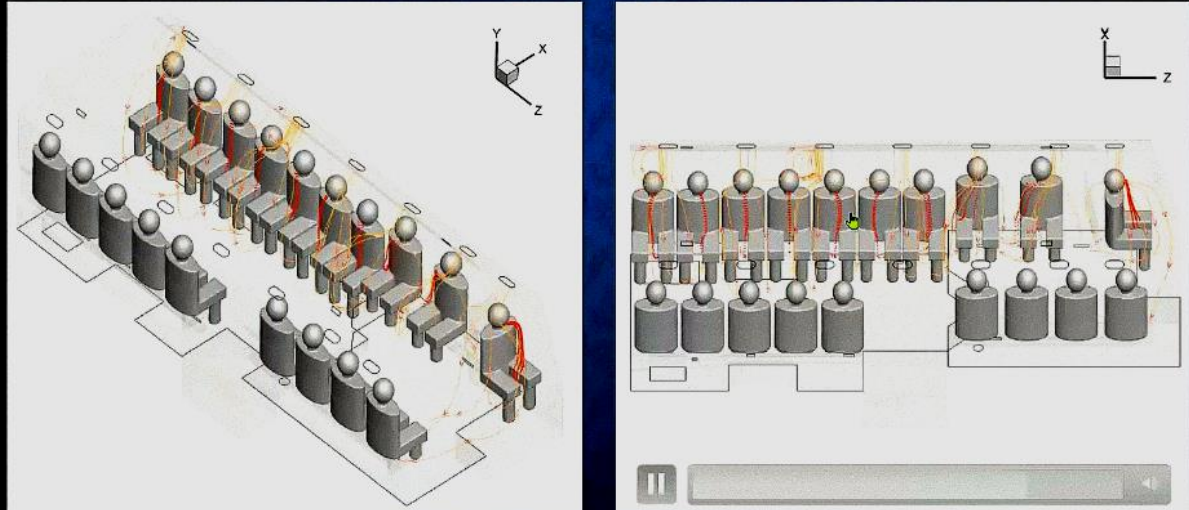


Figure 21. Airflow without Return/Exhaust Pipe

Driver Side Airflow (12 Air Changes/Hr)



With rear left exhaust fan
WITH Return/Exhaust Pipe

Figure 22. Airflow with Return/Exhaust Pipe

5 Recycling and Recyclability Index for End-of-Life Jeepneys

By Dr. Noemi Barcial-Torre

University of Asia and the Pacific

Link to presentation slides: [click here](#)

Ang research project namin ay funded by DOST bilang suporta sa programa ng DOTr na PUV Modernization Program. Ang pinag-aralan namin noong 2017 hanggang 2019, so pre-pandemic, ay nag-compute po kami ng materials na makukuha galing sa mga jeepney na hindi na pwedeng magamit o yung mga for scrappage na. Actually, isa iyan sa major components din ng programa na ito. Kase, ano ba ang gagawin doon sa mga jeepney na luma na o hindi na pwedeng patakbuhan sa kalsada natin? So, iyon actually ang in-address ng aming pag-aaral.

Sa dami nito na nasa 200,000 noong 2017 to 2019, majority ay 15 years old na o pataas. Ayon sa mga previous na pag-aaral, ang maximum age ng mga jeepney ay dapat 15 years lang. Pagkatapos noon ay kailangan ng magretiro ng jeepney dahil mayroon na siyang mga problemang kinakaharap gaya ng pagiging accident-prone nito at hindi na maganda sa kapaligiran. Hindi na rin convenient sumakay sa mga jeepney na umabot na sa 15 years old. Dahil dito, ayon sa pag-aaral ng JICA noong 2014, nasa 2.4 billion pesos ang nawawala dulot nitong mga lumang sasakyan. So, bakit ba tayo nahihirapang i-modernize ang mga jeepney?

Of course, maraming mga rason kung bakit tayo nahihirapang mag-modernize. Kahit ano namang bago, mahirap iyan sa simula. Tapos yun nga, may cultural heritage kasi kilala na tayo na kapag sinabing Philippines, ang mapi-picture ng mga taga-ibang bansa ay hitsura ng ating traditional na jeepney. Tapos, yung pagiging driver-operator, naging major source of income na ito ng mga tao dito sa atin. Isa pa, nakasanayan na natin na ganoon ang itsura ng ating mga jeepney na sinasakyan at nagkaroon na rin tayo ng emotional attachment.

Actually, dito sa pag-aaral na ito, nag-dismantle kami ng mga jeepney – isang buong jeepney. Yung pinagbilhan namin ng sasakyan, medyo attached siya sa jeepney

niya. Ipinaliwanag namin sa kanya ang gagawin doon sa jeepney, which is id-dismantle namin para ma-characterize namin yung mga pwedeng magamit or pwedeng iba pang gamit doon sa makukuha sa mga lumang jeepney, na hindi lang natin siya basta itatapon o itatambak kung saan-saan. Dito sa pag-aaral na ito, napansin din namin na ang daming nakatambak na jeepney at nabubulok lang sa office ng LTO sa Quezon Avenue. So, ano ba ang pwede nating gawin doon sa mga nabubulok na iyon? Anong mangyayari doon sa mga lumang jeepney?

Ito ang iminungkahi naming proseso kung paano gagawin itong pagmo-modernize ng mga jeepney (Figure 23). May sinusunod ditong flowchart na pwedeng gawin ng gobyerno para sa pag-modernize ng mga jeepney. So una diyen, i-classify na siya kung pwede pa ba siyang tumakbo o hindi. Of course, kung pwede pa siyang tumakbo, wala tayong problema doon, patakbuhan sa mga kalsada. Kapag hindi na siya pwedeng tumakbo, dito na pumapasok ang pag-aaral na ginawa namin. So, ano ang unang gagawin?

Unang gagawin diyen, kailangan i-deregister iyan sa LTO. Hindi na pwedeng tumakbo ang jeepney na iyon kapag pina-deregister. Isa rin ito sa mga binanggit ni Usec. Mark De Leon na kung pupwede yung mga engine na nanggaling sa mga lumang jeepney ay hindi na muling gamitin sa ibang sasakyan. Kasi parang ang practice before, ang mga lumang jeepney na hindi na pwede sa Metro Manila ay dadalhin sa probinsya. Ganoon pa rin ang nagagawang pollution at ang mga health hazard kung ililipat lang ng lugar. Kaya kailangan talaga siyang i-deregister para hindi na siya magamit pa.

Kapag na-deregister iyan, mapupunta siya sa dismantling facility. Doon sa dismantling facility, ang gusto natin ay mapakonti yung pupunta sa landfill. So ang mangyayari ay pupunta siya sa dismantling facility at doon ika-classify ang iba-ibang parte na pwede pang pwedeng magamit.

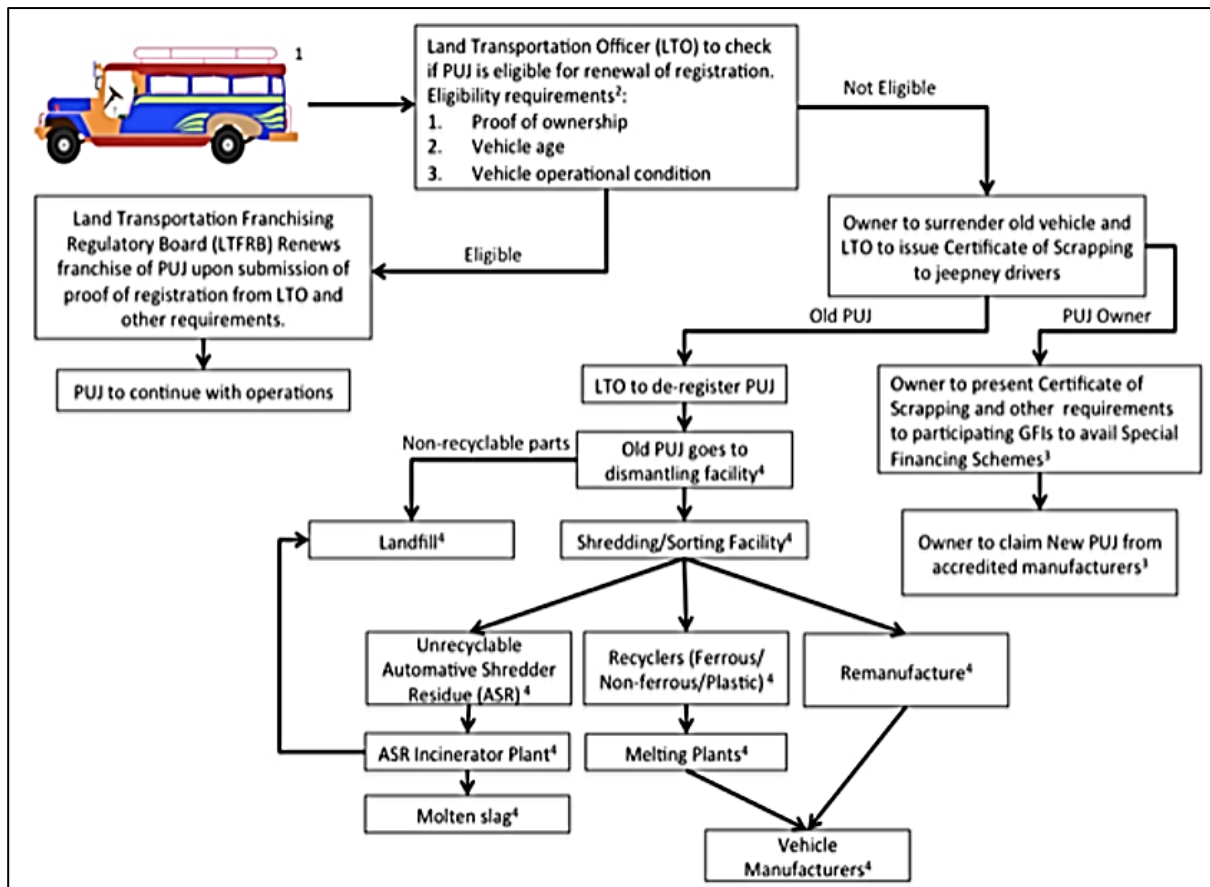


Figure 23. Proposed Framework for the End-of-Life Jeepneys

Sa mga na-dismantle naming jeepney na may average weight of 2,000 kilograms, ito po yung iba't ibang parts at materiales na nakuha namin (Table 1). Of course, majority naman ng materials diyan ay metals. Kapag kinilo-kilo natin ang mga metal na iyon, parang magkano rin lang ang aabutin. Pero ayon sa pag-aaral namin, pwedeng ibenta ang mga metal na ito sa steel companies. May gagawin silang proseso doon sa mga metal na iyon; may ihahalo silang chemicals para magamit pa bilang ibang materiales upang hindi lang siya na basta-basta lang ikikilo – mas mayroon siyang kabuluhan at mapupuntahan na gamit.

Mayroon ding lalabas diyan na mga liquid tulad ng oil at tirang gasolina. Pwede rin itong i-proseso pero hindi na parte ng pag-aaral namin kung ano ang mga gagawin doon para magamit pa ulit or para i-dispose properly upang hindi maging hazardous, kabilang ang mga non-metal, glass, plastic, rubber, wood headliners, front seat, curtain na tela at battery.

We also computed the recyclability and recoverability index ng isang jeepney. Lumalabas na mataas ang recyclability at recoverability index ng isang jeepney kase nga majority sa kanya ay metal. Binanggit kanina na sina-subsidize ng gobyerno ang mga mag-a-avail ng mga modernized jeepney, at around 160,000 pesos ang binibigay bilang tulong sa pagbili ng modernized jeepneys. Sinabi ni Usec. Mark dati na mag-come up kami ng amount or value para naman mayroon silang basis, kahit papaano, doon sa ibibigay or i-subsidize na amount sa mga operator ng modernized jeepneys.

Isa sa mga nakita namin ay pwede nating magamit yung engine pero dapat dumaan muna ito sa parang grading para magamit natin siya sa ibang bagay. Ano yung ibang bagay na pwedeng paggamitan ng engine? Pwede natin siyang magamit para sa agriculture– yung mga ginagamit natin sa pagpo-plow ng ating mga field. Pwede rin natin siyang magamit sa mga construction, para sa mga maliliit na patatakubuhin na mga makina.

Table 1. List of the Mass Values (in kilograms) of the Dismantled Parts and Components of the ELV Jeepney

PARTS	Weight (kgs)	% Weight
Ferrous Metals:		
a. Engine (with accessories)	373.40	16.50
b. Other parts (body, chassis, axles, etc.)	1,446.68	63.94
Non-Ferrous Metals:		
a. Aluminum frames	20.50	0.91
b. Automotive wirings (copper)	15.10	0.67
Non-Metals:		
a. Glass (windshield)	4.00	0.18
b. Plastic (signage, sliding panels, fan blade)	11.20	0.50
c. Rubber (Tires, hose, mudguards)	91.20	4.03
d. Wood headliners, stereo speaker console	35.20	1.56
e. Front seats (foam, cloth)	38.20	1.69
f. Passenger seats (wood, leather, abaca)	55.20	2.44
g. Curtain	3.30	0.15
h. Batteries	34.10	1.51
i. Water	15.14	0.67
j. Oil-based fluids:		
1. Diesel fuel (12L x 0.875kg/L)	10.00	0.44
2. Engine oil (6L x 0.888kg/L)	5.00	0.22
3. Tranny oil (2L x 0.865kg/L)	2.00	0.09
4. Brake fluid (1L x 1.0kg/L)	1.00	0.04
k. Others	101.38	4.48
TOTAL	2,262.60	100.00

Pwede siyang magamit doon pero of course, kailangan muna iyon i-reengine. May mga gagawin pa para talagang magamit siya sa mga purpose na iyon. Dahil doon, yung usually na ipapatimbang mo lang na magke-create siya ng around 10,000 to 15,000 pesos na amount, lalaki na ang value dahil dun sa engine ng jeepney. Pero pag hindi na pwedeng magamit ang engine, talagang medyo mababa na ang magiging value ng lumang jeepney.

Binanggit namin ang tamang pag-dismantle ng jeepney dahil parte rin ng aming pag-aaral ay ang paggawa ng feasibility study sa pagtatayo ng dismantling facility. Ngayon sa Pilipinas ay wala tayong dismantling facility para sa mga sasakyan. Kaya nag-propose kami ng halaga kung magkano aabutin ang pagtayo ng sarili nating dismantling facility – aabutin iyon ng mga 500 million pesos. At dahil sa medyo mataas ang kapital, ang naisip ng DOTr ay magbuo na lang ng mga consortium. Nag-a-approve ang DOTr ng mga scrapping facility para sa mga jeepney. Ang grupo namin ay actually part of the Technical Working Group na nag-a-approve ng mga scrapping facility.

Sabi nga kanina, last week lang ay mayroon ng na-approve na isa doon sa dalawa, yung isa ay may konting pending na document lang na kailangan.

Kapag na-remove na yung fluids, kailangan ng i-dismantel at i-classify ang mga part ng jeepney. Pwedeng i-shred ang mga metal, while the rest of the materials doon sa jeepney ay mapupunta na sa landfill. Ang kabuuan ng mga detalye sa pag-dismantel ng lumang jeepney ay makikita sa manual na ginawa namin.

Isa sa mga nakita naming parte ng jeepney na posibleng magamit ay ang gulong na made of rubber. Pwede itong magamit na gravel substitute. Pwede rin siyang magamit as crumb rubber, landfill medium and wastewater filter. Itong mga nabanggit ay mayroon ng gumagawa sa ibang bansa na pwede sana nating ma-adopt dito sa atin para hindi lang basta-basta nating maaksaya o maitapon ang pwede pang magamit.

Isa pa, yung abaka na usually nasa upuan ng mga traditional na jeepney ay pwedeng magamit sa furniture, handycraft, textile at fishing net. Ayon sa pag-aaral ng DOST noong 2013, pwede rin itong gamitin sa pag-manufacture ng mga sasakyan katulad ng paggamit sa pag-fill ng mga bolster, bilang interim trim parts at pag-reinforce sa mga plastic component ng sasakyan.

Ang mga windshield naman ay pwedeng gawing tabletops at ang mga plastic ay pwedeng i-proseso para makabuo ng bagong plastic products.

Para sa engine, ang nabanggit dito ay para sa mga sasakyan na pandagat. Nguni't noong nagkaroon kami ng meeting kasama ang MARINA, hindi ito masyadong feasible dahil sa safety. Yung mga engine na galing sa jeepney at gagamitin bilang makina ng mga bangka ay medyo questionable ang safety. So hindi actually namin ito pinu-push para gamitin sa mga bangka.

Pero ito yung pinu-push namin sa project. Ang engine ay pwedeng maging farm harvester at generator. Makakatulong din ito sa Department of Agriculture bilang suporta sa mga magsasaka natin.

Ito yung nabanggit ko kanina na actually mas tataas ang salvage value ng jeepney kapag pwedeng magamit yung engine (Table 2). Please take note, ginawa namin itong mga pag-aaral na ito noong 2019 pa. So hindi lang ako sigurado kung ito pa rin ang updated na price ngayon. Malamang ay medyo tumaas na. Makikita nyo na mas mataas ang value ng parts ng jeepney kapag pwedeng magamit ang engine – ₱58,000 kumpara sa ₱28,000.

Bukod doon, gusto ko lang banggitin na ang naging direction ng gobyerno ay hindi magtayo ng sariling dismantling facility kasi medyo mataas ang capital na kakailanganin. So ang naging move ay magbuo na lang ng mga consortium ng scrapping facilities.

Table 2. Estimates of the Economic Value of the ELV Jeepney Parts

Parts / Components	Weight (Kilograms)	Volume (Liter)	Quantity (Unit)	Price Per			Total Amount	
				Kilogram	Liter	Unit	All parts for recycling	All parts for recycling except for the Engine
Jeepney body and chasis	940.80			13.00			12,230.40	12,230.40
Rear axle	83.80			13.00			1,089.40	1,089.40
Rear leaf springs	93.10			13.00			1,210.30	1,210.30
Front I-beam	41.90			13.00			544.70	544.70
Front leaf springs	32.40			13.00			421.20	421.20
Rear differential mechanism	41.10			13.00			534.30	534.30
Front brake drums	42.30			13.00			549.90	549.90
Shock absorbers	15.80			13.00			205.40	205.40
Drum brakes mechanism	10.40			13.00			135.20	135.20
Fuel tank with holder	19.20			13.00			249.60	249.60
Manual steering gear box	16.80			13.00			218.40	218.40
Wheel rims (5 units)	73.00			13.00			949.00	949.00
Hood	15.60			13.00			202.80	202.80
Muffler	13.20			13.00			171.60	171.60
Center console box	4.40			13.00			57.20	57.20
Tires (5 units)	80.50		5			5.00	25.00	25.00
Batteries (2 units)	34.10			11.50			392.15	392.15
Tire wrench and Jack	0.50			13.00			6.50	6.50
Hand holder bars	6.00			13.00			78.00	78.00
Engine oil	5.00	6.00			9.00		54.00	54.00
Diesel fuel	10.00	12.00			43.00		516.00	516.00
Tranny oil	2.00	2.00			550.00		1,100.00	1,100.00
Brake Fluid	1.00	1.00			500.00		500.00	500.00
Plastic parts	8.50			13.00			110.50	110.50
Windshield	4.00			5.00			20.00	20.00
Automotive wires (copper)	5.00			300.00			1,500.00	1,500.00
Window frames (aluminum)	20.50			40.00			820.00	820.00
Engine: Engine block	124.50			13.00			1,618.50	1,618.50
Internal engine parts	123.70			13.00			1,608.10	1,608.10
External engine parts	22.50			13.00			292.50	292.50
Transmission assembly	87.30			13.00			1,134.90	1,134.90
Diesel engine air filter	2.00			13.00			26.00	26.00
Radiator tank	10.80			13.00			140.40	140.40
Gear shifter mechanism	2.60			13.00			33.80	33.80
Brake and clutch system	14.90			13.00			193.70	193.70
Working engine (estimate only)*						30,000.00	0.00	30,000.00
						Php	28,939.45	58,939.45

Short Talk: Issues and Challenges in Manufacturing Modern PUVs

By Mr. Conrad Almazora

Almazora Motors

Let me brief you on Almazora. We have been in the industry for quite some time. We started with horse-drawn carriages. We never make the horse. We only make the carriage. Until today, we try to maintain that business model. We always partner with what we call horse or the horsepower. But of course, getting into the new technology of the future will be the electronic vehicles (EVs). We always have partners. This is our way of doing business. We always partnered with foreign manufacturers or brand owners like Japanese and European.

Over the past, before the PUV modernization, we were really involved in buses. That is our main line. We practically supplied most of the buses of our local operators here in the Philippines. So, we are quite familiar with their routes and the development that is needed in creating the proper vehicle because, as we know, different areas of the Philippines have varying geographies. We have areas that are mountainous. We have areas at the seaside. We have areas that demand higher ground clearances. We have areas that have different costs in trying to recover the cost of the vehicle. So, we have to check all of those.

When this PUV modernization came up around 2016, 2017, we said, why not? Technology is available. So why don't we make use of it? We have continuous research and development of technology. And we said, why don't we also help, not just as a business, but also try to come up with a modern jeepney? In 2010, we already tried. We had some proposals. At that time, we called it the "beep" – a bus slash jeep. We tried to come up with that as early as 2009. But of course, policies were not ready. The question at that time was, "*Saan ba ipaparada 'yan? Ano ba prangkisa niyan? Jeep ba 'yan o bus?*" So, it did not materialize. But when we developed the modern PUV after almost 6 to 7 years, we made use of what we have learned over that period, over that time of the "beep". We tried to make use of that. We did a presentation together with our engine suppliers or what we call platform supplier – Isuzu, Mitsubishi, amongst a few. We tried to come up with using the technology of the bus. All we did

was to scale it down to conform with the PNS standards of the jeepney program. That is how we started.

At that time, as already mentioned by the other speakers prior to me, the PUV Modernization Program is an interesting program. Until today. It is one of the biggest non-infrastructure projects of the government. We had Build Build Build, and now Build Better More. After we build, we have to build more. It is time to cascade the units *para magamit naman ng mga kababayan natin*. But as mentioned by the other speakers, the program involves not only the vehicle. It was very aggressive and very demanding for all sectors: the government, private sector, even foreign partners get involved in this *kasi malaki siya*. You have got to build a factory. You have got to change the business practices. *Para sa mga kababayan nating jeepney operator*, it is something new getting into this program. So, it is quite shocking when you hear all these stories.

And then you have the route rationalization. We all know that the franchise was stopped way back in this program. *Walang* franchise available. We have to rationalize – which is the right way to study if there will be an excess of vehicles in one area. That was also a challenge. Of course, if we are a manufacturer, *pag-iisipan na namin lahat iyon* – the market, the policies we have to be part of. *Siyempre yun yung environment na bebentahan natin*. Being a businessman at the same time, we have to also make the operators be able to recover the cost of the vehicle. That is not easy. So again, those are challenges.

Then of course, bank financing, there is that 5-6-7 scheme of the government. For a manufacturer, for foreign investors, it is a little scary or challenging. But nevertheless, it is not only the business side we want to look at. Of course, it is important to continue. But also, how do we really modernize this sector? Prior to the jeepneys, we have been modernizing the buses. We came up with the low entry buses which, together with our foreign partners, we were able to develop locally. '*Yung nakikita*

natin sa mga carousel and all that, we already made that locally. So, how do we get to this sector of the jeepney, which we know has not enough funds compared to the bus operators? Iba ang kliyente natin. Iba ang kliyente natin diyan sa jeepney.

Basically, those are the thoughts. But again, we continued. We are happy to say we are the first to introduce the vehicle in the market. So that shows our commitment to do it. What is difficult for the manufacturer is we have to provide the vehicle first before everything works next. So that means the investment will come in first. *'Yan ang mga nakikita namin.* We have to invest. That is something that we have to do. And then, of course, we have to come up with the inventory. Coming up with the inventory is cost-related. How do we make the product reasonable? We have to come up with the numbers. We have to come up with not one, not two, but several. We have to transform our thinking into a demand point of view, what we call a forecasting method, which was another challenge because we all know there was route rationalization ongoing and then we have to get the bank financing approval. So, *sino magsisimula? Yung sasakyan ba o yung side ng market?* It took a while before that was able to be smooth sailing. But those are the challenges. To be able to reduce the cost, we have to have the volume. Remember that there is no jeepney elsewhere – there is only jeepney in the Philippines. It is very particular to our country. In terms of dimensions and all that, it is not off-the-shelf. So, we really have to develop. These are the obvious challenges of any manufacturer: the cost; the quality has to be reliable; we have to make sure that it will last the 5-6-7 scheme; and then along the way, there should be a continuous supply of spare parts. Everything needs to have what you call replacement parts for normal wear and tear. That is very important. So being in the Philippines, being local, we can address those demands and those concerns in the market. *'Yan ang mga nakikita natin.*

I think for us Filipinos – well, in our case, I cannot speak for all the other manufacturers – moving forward, our value added should not only be our labor force. Our labor force can be challenged by other countries. We can lose good labor with the pay scale they have abroad. Our aim should be we should be

innovative. We should have innovations similar to that of Dr. Quiros and all these improvements. We have to have innovation here in the Philippines and have proprietary rights over what we build. And then have technology partners to complement the growing improvement of the product. Let us keep it here. Let us keep the research and development here. Let us not just focus on, *“Okay dito kasi yung labor natin competitive.”* No, not that. With the labor scale out there in other countries, it is easy to be sent over there. So, *mawawalan tayo ng labor dito.* We have to be able to complement labor with good research and development. After research and development, *mag-research and duplicate na rin tayo.* After we develop, then we duplicate it locally to thousands and hundreds to be able to reduce the cost. In that way, we can get cheaper supply of materials, cheaper economies of scaling. If we have a good volume, I am sure foreign investors and foreign suppliers would want to sell to us. And then we can demand a better price. At the moment, it is hard for us to demand because we are very small in terms of the global requirement.

Those are just the basic challenges that we are encountering. I am always keen on focusing on development because *'yan, hindi nabibili, simpleng bagay.* We have to continue to innovate, continue to develop, and also challenge the local to come up with new ideas. Very interesting *'yung mga napakita kanina.* That is just quite a few of the improvements that we have here. As for us, we are willing to accept all of these things into our vehicles and do testing together. I encourage everyone who has good ideas, please come up. We can help mass scale it and help try to bring it to the market in terms of scaling up the production.

And of course, moving forward, electric vehicles are another matter. For that, we really need a technology partner. If we get them here, then there is going to be continuous growth. Get not just supply, but get them here and develop them together to improve over and over. Because manufacturing is a continuous improvement. We should not stop. That is what we always say. Technology is always moving. We cannot stop. These are the things that I could share being in the industry.

In terms of prices of the units, Class 2 and 3 range from 2.7 to 2.9 million pesos. This is

together with our engine and air conditioning. All of these are branded. And then for Class 1, it ranges from 1.6 to 1.7 million pesos. These are all Euro 4-compliant.

And at the same time, of course, when we talk about manufacturing, we do not only talk about quality, cost and delivery. We also talk about safety. Safety is number one concern. And of course, environment is another key.

So, 'yan ang basic manufacturing ideas namin. 'Yan lang po ang matutulong ko. But I would gladly meet all our participants here that are interested in the PUV modernization. It is challenging. It is interesting. And it is something that, you know, to do something like that is sort of a legacy. If we used to do *karitela* before, I could say that we have gone into another type of vehicle from buses, *karitela*, and now this jeepney.

Addressing Technology and Organizational Confidence in Pilot Electric PUV Operation in Baguio City and Iloilo City

By Mr. Mark Angelo Y. Tacderas

SafeTravelPH Mobility Innovations Organization, Inc.

Link to presentation slides: [click here](#)

Our organization's vision is for a sustainable and just transportation system through the promotion of open data systems, integration of science-based policies, and collaboration with diverse stakeholders. Our work covers various areas, such as data science applications, intelligent transport systems, open data framework and crowdsourcing, and something that we definitely advocate for – collaborative governance. And of course we do a lot of research focusing on public transport and active transportation.

The focus of my presentation is on what public transport electrification is. Why are we espousing for electrification in public transport? I will go through quickly the EV policy and planning landscape, some barriers that we are trying to address, and leading to why we are having EV test runs supported by our funder. What were the results? For now, we only have snippets because the project that funded our research is still ongoing. So, I would like to subject further communication and working with the respective funding agency and partners which I will introduce. Then I would like to, of course, highlight key lessons answering them and highlight not only technical aspects, but also the social aspects in the work that we have done on electric cars for electric public transport research. Just to acknowledge, our project, as mentioned, is funded by and supported by the UNDP and DOTr.

This is the Promotion of Low Carbon Urban Transport Systems Project, which I have supported since 2019. Very recently, we were approached by the DOTr to oversee the potential testing. Initially in Baguio City, because of the constraints and the interest in this respected city, and then it was extended to another pilot city for the project which is Iloilo City. We collaborated with Dr. Lew Tria of EEEI in UP, alongside his colleagues in charge.

Just to set the context, what is the objective of electrification? For the government, of course, we have our commitments to reduce fossil fuel dependence. We are a net importing country for fossil fuel and that corresponds to high fuel costs in the country. We also have commitments in reduction of GHG in carbon emissions. What is more relevant to society is the attainment of economical benefits. To be more specific: health benefits, reducing air pollution, improving generally speaking the service quality of public transport.

Now, on the service provider's side, what are their objectives in this endeavour? Of course, primarily, compliance to the regulations. They are interested in a lot of our stakeholders and speakers have already mentioned that by modernizing and transitioning to alternatives, they are meeting or reducing their fuel costs and attaining a lot of savings, enabling them to scale up in their services. Of course, they also want to improve their service quality, but that is subject to their capacity to meet the requirements of the government. So, these dynamics pose challenges in our electrification targets.

Now, very briefly, we have two broad national policies that are contributing or at least highlighting the need for modernizing or transitioning to alternatives. These are the Nationally Determined Contributions which we have committed when reported to the UN Framework Convention on Climate Change. *Mayroon tayong commitment dito*. At the same time, we have a clear statement in our National Transport Policy that we will promote the adoption of energy efficient and clean technologies for public transport.

However, a huge criticism or I guess a question for these targets is where precisely does transportation come in and how do we translate that to the local level? How do we bring that down to local level adoption and

implementation? These are challenges to the targets. And based on the research of International Council on Clean Transportation, electrification or a purely battery electric vehicle based on lifecycle cost emissions is the technology that can produce the largest benefits in terms of climate change mitigation. That is why globally a lot of funding and investments are being channeled to these alternatives *kasi mayroon nga siyang* cycle benefits *pero* of course, at the local level in our country, *maraming* corresponding challenges, which has already been mentioned in the previous presentations.

Now, certainly there are barriers to the market-to-market entry. In the demand side, high capital requirements, technology confidence, which we are to address in this presentation, institutional constituents as well, limited options in the market, policy and institutional capacity limitations. Similarly, in the supply side, there is lack of infrastructure particularly EV charging infrastructure which is currently being studied to determine the feasibility to put up public charging infrastructure to support the entry of electric PUVs. Of course, there are also gaps in our standards and testing, not only in the technical aspect, but also in the general capacity to do so. High cost of market entry, but low demand.

So, these are the issues on investment on the supplier side. Similarly, there are policy and institutional capacity limitations. There is even a discussion on how we have somewhat weak targets in terms of electrification at the moment. I will not go too deeply into the policies *kasi medyo mahaba*. I would like to go straight to the salient points that are covered by our Electric Vehicle Industry Development Act and the Comprehensive Roadmap for the Electric Vehicle Industry. *Magkadikit ito*. And there are salient points that we are trying to address. In particular, there are needs for standards and research and development that are still being addressed by these law and policy. In other words, electrification of the public sector is still at the initial stage. *At mayroon din tayong* standards. *Ang* key message *ko ng pagpa-flash ko nito ay marami tayong* standards, but the question is, are we having established sufficient protocols and skills to implement these standards and what are needed? Or what are in need? What type

of information are needed? What type of skills do we need to build to implement or enforce these standards that we have in our policy landscape?

Now, aside from having those standards being overseen by the DTI, we also have corresponding standards from the energy side, particularly on the energy standards in labeling from the DOE. In fact, the DOE is one of the major leaders in the electrification of vehicles, alongside DOTr and DTI. *Ito nga, mayroon tayong ganitong* type of standards *na nandoon sa* side. In other words, DOE has a huge role when it comes to this. So, *may* dynamics *talaga*. *May* political dynamics *pagdating dito*.

Mayroon din tayong LPTRP. By now we all know the processes in LPTRP and how it influences our current public transport planning process. We have some salient points on the green routes. They are in the process of developing and enhancing guidelines and standards for identifying green routes and a lot of inputs, technical inputs, and work are being put into this. And, if I understand correctly, it is ongoing.

Going back to a broader ecosystem, we have a large electric mobility ecosystem that all play a role into enabling set the sectoral electrification of public transport in the long term. The question is, how do we address the barriers and build capacity? Now, the testing we are doing for UNDP, this is just a small part in addressing the issues and barriers. Our goal really was to demonstrate EV technology and measure performance of electric vehicles of public transport routes, in the hopes of producing data for succeeding analyses and to inform our capacity planning. Of course, given the constraints and limitations of the project, we also want to encourage continuous succeeding data collection, research and development, and fully funded testing of electric PUVs. There are still a lot of gaps and one of the messages here is there is no one size fits all solution or technology for all our targets.

I just like to put some insights as well on why there is trust and apprehensions when it comes to this. The reason is, to give more context on the financial perspective, there are material risks, corporate risks, when it comes to

adapting electric vehicles. For example, first and foremost is the compliance risks in carbon and emissions. There are requirements that put a lot of risks, such as material and financial risks, for our operators, that affect their long-term viability. There are also issues on public and occupational health and safety issues, when we compare how we design our public EVs. When it comes to adopting new electric vehicles, how do we improve?

Na-mention din kanina yung huge risk talaga for the sector, in terms of labor management and human capital development. Electrification exacerbates this risk because of the need for new skills to operate electric vehicles. Of course, likewise, there are also risks on service, safety, and quality. In fact, our SafeTravelPH Team has extensive research on this on public transport quality and there are real world risks that translate to public transport operations.

And then, bringing back *yung mga na-mention din ng ating mga kasama ngayong hapon na operators, ano ba yung jargon na ginagamit natin?* These are the corporate governance risks. For example, corporate structures and leadership capacity, corporatization, cooperative culture, how do we encourage these to our entities, to our operators? The need for building skills on risk management, financial management. How capable are they? Financial and accounting risks, insolvency, and high capital requirements. All those posts risks for the viability and potential adoption of electric vehicle.

Again, for our project, we only did testing. Our goal really was to increase confidence in the technology by producing science-based data and encouraging collaboration among the stakeholders.

This is the context for Baguio City and Iloilo City (Figure 24). Aside from being the target pilot cities of the UNDP LCT project, this is the current situation for these two cities. In Baguio City, there are really terrain and elevation constraints. We had an initial demonstration in this city and we immediately knew how to learn from that experience. At the moment, there were no existing public EVs in Baguio City. And there are limited options in the market from which we sampled. At that time, LPTRP was

work in progress. There are a lot of discussions on the inclusion of these green routes in the Baguio City LPTRP. But at the same time there is high interest. It has been the advocacy of the leadership, the champions in the city, to address the air quality concerns and public transport in general ng city.

On the other end, in Iloilo City, there is one operator that has already invested in 10 electric vehicles although those are apparently secondhand. We received information from the operator that, even though supposedly brand new *pagdating sa kanila, mayroon na siyang operations sa Metro Manila pagdating sa kanila*. It had some clear implications on their energy efficiency. Their current operations are based on battery swapping. It is a mixture of direct charging and battery swapping. We did see *na mayroon talagang implications sa operations cycle nila kapag battery swap, lalo na mabigat yung mga battery*. But unlike in Baguio City, there are no terrain constraints in Iloilo. It is ahead in terms of the deployment viability. It already had the approved revisions in its LPTRP.

So going into state of what we have done for this project. With the support of UNDP and DOTr, we conducted performance tests. This is unlike that of Dr. Quiros. It is not for engineering design, but hopefully it informs design. It is about demonstrating technology, producing data and getting baseline performance. Again, we did this alongside experts from UP EEI (University of the Philippines Electrical and Electronics Engineering Institute), since they have experience in energy modeling of EVs as well as access to dynamometer facility in UP. They had also done laboratory tests for EVs prior to our project.

Now, in doing this project, in doing the test run, we have four phases (Figure 25). First phase is the route characterization and demand characterization. Phase two is technology matching. Phase three is analysis and phase four, of course, is policy advice. And the timeframes of which are included in the slide. I think, partners with DOTr and our pilot cities have seen this presentation slide. Our design is just monitoring from baseline. We monitored a set of parameters, including battery to wheel, and wall to wheel mileage, in terms of

Baguio City	Iloilo City
<ul style="list-style-type: none"> • Terrain and elevation constraints • NO existing Public EVs at the time • Limited technology in the market • LPTRP WIP • High interest in PUV EVs to address air quality and transport woes 	<ul style="list-style-type: none"> • One operator with 10 EV units • Battery swapping • NO terrain constraints • Approved revisions in LPTRP • Varying interest in EVs

Figure 24. Context in Baguio City and Iloilo City

General Phases of the Test Run			
Phase 1	Phase 2	Phase 3	Phase 4
<p>Route and Demand Characterization</p> <ul style="list-style-type: none"> • Technical characterization of the routes through on-road survey. • Identification of passenger demand per route. 	<p>Technology Matching</p> <ul style="list-style-type: none"> • Simulation of route power requirements based on on-road data. • Identification of passenger seating capacity for target vehicle. • Electric vehicle selection based on the abovementioned criteria. 	<p>Test Runs, Data Collection & Analysis, Cost-Benefit Analysis</p> <ul style="list-style-type: none"> • Actual test runs of electric vehicles on selected routes. • Data collection of EV performance, energy requirements, and passenger demand during actual runs. 	<p>Assistance on Policy and Planning for Transportation</p> <ul style="list-style-type: none"> • Crafting of recommendations for the sustainable adoption and operations of LCTs.
<p>Timeframe: 2 Weeks planning preparation 1 Day data collection per route 1 Week data quality checking 1 Analysis</p>	<p>Timeframe: 1 Week simulation (energy requirements) 1 Week validation with manufacturers</p>	<p>Timeframe: Depends on data collection needs and funding, including number of vehicles to be tested</p>	<p>Timeframe: Depends on scope of study and policy needs</p>

Figure 25. Four Phases of the Test Run

kilometers per kilowatt hour. This is of the new electric vehicles that we were able to acquire, or the technology providers were able to provide us. The standard travel and mobility parameters that include actual passenger load factors during the monitoring period. We gathered that and we did some analysis on how it influences the potential performance of the vehicles during the monitoring period.

This is where why we have this application comes in. It is mobile based, which we use for real time data collection of vehicle location data

gamit ang mobile GPS. We are able to get passenger boarding and alighting information as well. This entails working with the operator during the monitoring periods. We matched that with logs. Challenges doon sa current technologies will be discussed later. And then we also have submeter readings, para doon sa charging ng mga vehicles.

Of course, we have gone through a lot of consultation prior to deployment and performance tests. Part of trust-building and confidence-building is to be transparent with

our methodology and consult with our stakeholders. And we have a large stakeholder

from these cities alone, and that includes our technology service provider and technology provider. We had to ensure that, in anything that we were going to do during the period of data collection, we are transparent in how we do it. And we also allow participation of our partners and stakeholders.

Now, going into the route characterization components. We had to characterize the routes. We think it is standard demand for any testing. Prior to deployment, we had to ensure that we have enough information, and this is essentially important in Baguio City given the terrain constraints of the city. We collected route length, average speed, and included here is elevation. We got information on the proposed stops in terminals available for the routes that we are going to test on. And through this route characterization, we did some observations and got information on the route including elevation. This was going to be used for energy simulation, which is within the expertise of UP EEEL. We were going to use the information on the elevation for peak power requirements *para doon sa vehicle kasi hindi kami magde-deploy*. We had to ensure that the technology that we were going to invite for the testing would be viable.

For the route characterization, *pinatakbo lang namin sila sa mga ruta na pino-propose ng LGU*. Then we simulated the requirements. This was based on the characteristics of the route, *iyon yung naging input sa ginawa naming technology matching*. So, *yung sa technology matching na part, mayroong load power computation na ginawa doon sa simulation using the information doon sa routes*. And *ito ngayun yung naging inputs para doon sa simulation para ma-determine yung power requirements ng vehicle para pwedeng makapag-deploy sa Baguio City* in particular. And at that time these were only the handful of technologies that we were looking into. I did not put here the complete information but information is publicly available. But the key information that we had to get were on the energy capabilities of the vehicles in terms of engine, horsepower, range. Our questions were what is the rated power capacity of these technologies which we had to match with the

requirements and routes? In the simulation that we did, these are the resulting power requirements. Peak power requirements are important to be able to operate in the respective routes proposed at that time.

Based on our simulations, our finding was only one technology in the market met the power requirements. We are not espousing any particular brand. *Pero ang nag-meet talaga ng power requirement at this time was the COMET 3*. *Ito ngayon yung pumasa doon sa simulations para makapag-deploy sa Baguio City*. This was then the vehicle that we used for Baguio City test and demonstration. Thus, we were able to deploy and gather data. This is what we monitored for the period of two weeks over two routes.

We mapped out using our data analytics the boarding and alighting locations, passenger load profiles, and we also did this in Iloilo City. We also analyzed performance and correlated them with a lot of other indicators such as the average load factors during the monitoring periods and the speeds. We saw strong correlation – I think this is for Baguio City – in terms of load factor and energy efficiencies. Likewise, there is also correlation with speed. In terms of ensuring or optimizing the technology, that speed management will contribute to the optimal use. Speed management can be in terms of fleet management or it can be through the provision of dedicated lanes. Load capacity aside, these are the possible policies and measures that can help ensure, that technology will meet its peak performance. So, *iyon yung key message nito*.

Again, for details, you can approach us or you can approach UNDP and DOTr. We measured and we monitored for a period of time the performance of the vehicles in the two routes. For Baguio City's case, part of our finding was that there were certainly variations in mileages over the monitoring periods *itong mga drivers na ito* like load factors and speed. And the important note here is that based on the specifications of COMET C3 – 1.85 kilometers per kilowatt-hour – we observed certain deviations within various factors in their

mileages. Regardless, we reckon that there is definitely potential given this mileage. Given our estimates of the charging costs and passenger revenue potential based on boarding and alighting, there is a net positive given our conservative assumptions. This was only in 2022. Estimates are shown here.

Likewise, we did a similar testing using intermittent aircon for the technology that we were testing. We saw that by managing the air conditioning of the technology that we were testing, which was COMET, mileage was kept close to 1.85 kilometers per kilowatt-hour. We found close readings doon sa average electricity consumption of the vehicle. *Nasa 1.8 kilometers per kilowatt-hour ang average na nakita naming doon sa intermittent use of aircon.*

For Iloilo City, we were testing Star 8. This was the only available na technology when we were testing. Our baseline for this in terms of kilometers per kilowatt-hour was slightly higher compared with COMET. The reason is this vehicle we are testing in Iloilo City is smaller. The key difference here is it was not lithium ion. Lead acid battery *yung sasakyan na ginagamit ng operator* which was Aerostar. And we had the base line. This was collected around September last year. From then until our tests in February, we saw a huge deviation from the mileage that we got from baseline. There can be a lot of factors. We were able to validate the data. The operator is claiming that compared to their acquired vehicles, *medyo umikli na yung mga number of route trips na nagagawa nila doon sa kanilang route* in operating these EVs. However, our conservative estimation is still showing net positive revenues from operations given the charging cost and mileage performance. And this was also validated with net revenues of the operators which I am not presenting here for confidentiality reasons. But regardless, in comparing the various technologies, you are already finding that electric vehicles were showing. The values below are operational costs based on energy lap. This doesn't include yet the other aspects, other costs. In terms of just energy costs, there is clear advantage with electric jeeps compared to diesel alternatives. And this is the case for Iloilo City. We think we saw the same, *hindi ko na na-include dito kasi maikli na din yung time*, for

Baguio City. For Iloilo City, we benchmark comparative basis in terms of EVs versus actual modern jeeps. Whereas for Baguio City the EVs are relatively new. The key message here is that there really is savings or reduced costs, energy costs, when it comes to electric vehicles.

Now, some challenges and limitations that we had when doing the tests. We had limited project time and resources. So as mentioned the testing run for two weeks. We think we could use more time to monitor, to get more data information, and to get more attribution in the driver's performance. We were using a lot of crowdsourcing data and real time data collection. In doing so, while we still think that it is the most cost-effective approach to data collection, crowdsourcing and mobile GPS has its limitations when internet connectivity is at play. This has to be mitigated. There is another challenge that we had when testing. Our idea initially was we wanted to collect data on the road of actual consumption real time, alongside the collection of vehicle location, which was real-time. Unfortunately, we were not allowed to connect to the batteries, *kaya hindi namin makolekta yung consumption on demand of the batteries using OBD data sana.* And future researchers can address this by maybe forming an agreement with a technology provider or acquiring your own test units. Of course, that is costly. *Anyway, wala ding OBD yung current*, so access to OBD is very limited, *na pwede sana na USB-based na lang* but we had to resort to charging. So, we used submeter reading. Except, we cannot obtain the up time on the route. And lastly, the limited units have limited technology. We were constrained to testing two models. This was primarily because of our timing issues and availability of our partnering technology service providers. I just wanted to highlight this for future improvements to study.

Now, here are some lessons that I would like to present. Key lesson one is there is a need to understand local context (Figure 26). Immediate case in point is Baguio City. They have limitations in terms of testing and deployment, and this has implications on the potential performance, environmental limitations and route constraints, capacity constraints, etc. But at the same time, we encourage activities like this and that is why we

appreciate that UNDP and DOTr for pursuing this activity to demonstrate this technology. This was an opportunity not only to test and get data on the technologies, but also to work with key stakeholders and base the discussion among stakeholders. This is the collaborative research espoused by SafeTravelPH.

There are social, economic, and political dynamics at play. Resistance not only because of politics and technology apprehensions but also tribal conflicts. These are something that are not necessarily part of the study, but have influenced the acceptability of the technology. On the other end, when it comes to Iloilo City, their problem is vastly different. They do not have the technology constraint *pero nakapasok na lang yung* secondhand. They were using secondhand vehicles and they were using lead acid battery that has clear effects on their operational viability. So, the performance of the vehicles is degraded. When we look at the baseline compared to our monitoring data, at the same time, there is operational impact. That we did not necessarily measure but based on the feedback, *yung mahirap, mag-handle ng* battery swapping. I think because of the heavy weight of the batteries, it was taking away at least 20 minutes per charging cycle *sa kanila para makapag-operate*. These are some things that you find out by working directly with the operators and service providers. This was key for the success of this activity and to inform future studies.

Reiterating *yung sa* partnership (Figure 27), our stakeholders, collaborative governance and the importance of partners, co-production of data between regulatory, service providers, researchers, and institutions can build some confidence. We definitely access especially in Baguio City the academic consortium. We thank them a lot for participating and giving interest in actually understanding the technology and learning how to improve all the methodology given our own constraints. We think we gave them enough ideas to improve on our methodology and they were very interested. We had students and professors who were working with us in Baguio City in collecting data and learning technology. And it is important note that the local context is best understood by locals. And if the local expertise

can be built and empowered, this encourages a more sustainable approach in the study.

This is a form of cost sharing among stakeholders who may benefit from the adoption of new technology. *Ibig sabihin, hindi lang siya nagiging kita, hindi lang siya* for corporate interests, but it is for all societal interests by collaborating in this endeavor. I think another important thing here I would like to reiterate is on the replicability. By working with stakeholders, it mitigates some costs and ideas arise from the work that we do with the stakeholders. While we – SafeTravelPH and UP EEEI – is a small team, we had from national government to research institutions contribute to the success of this study.

There are also clear policy capacity gaps, which I highlight on this slide (Figure 28), such as the development of standards, *yung viable* technology, that captures in local constraints, especially for Baguio City. We are happy that we gave the tools to Baguio City in discussing and negotiating with technology providers in order to have investment and enable them to know what policies they have to pursue in order to support the transitions. We still need to strengthen our EV testing protocols. And then build national and local capacities as well to implement these. For example, *yung methods* namin and technology matching and how that leads *yung sa* planning. Kailangan ma-strengthen and ma-institutionalize. There has to be data available and again, our organization espouses for open data, making data available to researchers in order to have replication.

Lastly, on understanding of commuter needs (Figure 29). We did get the feedback of commuters highlighting that they are definitely happy with the adoption of such technologies. *Kasi nga malinis*. It is more comfortable than traditional options, more spacious, there is space for PWDs. They are actually hoping that it can be expanded to inner towns. Definitely, there is public clamor for better transportation and there is definitely benefit in the adoption of EVs.

Key Lesson 1: Need to Understand Local Context of the Public Transport Issues

- There is no one-size fits all in modernization
- The technology needs to be demonstrated at local level and data needs to be produced
- There are socio-economic and socio-political dynamics at play



Figure 26. Key Lesson 1

Key Lesson 2: Stakeholders, Collaborative Governance, and the Importance of Partnerships

- Co-production of data between regulator, service provider, and research institution/s can build some confidence and trust between stakeholders (because transportation is both hard and social science)
- May aid in replicability of studies especially at local levels



Figure 27. Key Lesson 2

Key Lesson 3: Policy Capacity Gaps (and why EV Test and Demonstration Runs are important)

- **Development of standards** that for viable EV technology to enter the market based on local requirements (i.e., for Baguio City)
- **EV Testing protocols** (from laboratory to field testing)
- **National capacity** for standards testing and validation
- **Local capacity** for technology matching
- **Data availability** for EV route and technology planning
- **Data availability** of baseline performance information
- **Data for financial institutions** (i.e., understanding material risks)
- **Integration of testing with policy agenda** (e.g., with climate mitigation targets)

Figure 28. Key Lesson 3

Key Lesson 4: Incorporate, Understand Commuter Needs

Commuter Feedback*

- “It is comfortable to ride the vehicle, and there is no noise which is nice.”
- “The view from inside the vehicle is nice and allows us to see Baguio’s sites better.”
- “We can stand more comfortably because it is spacious.”
- “We appreciate that the vehicle has no emissions.”
- “It is good that there is space for PWD, including wheelchair access.”
- “We hope this can serve the inner towns. There is limited public transport access to those areas.”

*Non-verbatim



Figure 29. Key Lesson 4

TRANSCRIPTION OF THE PANEL DISCUSSION

Comments regarding the presentations:

Engr. Villarete: There's a lot of information that has been shared and I cannot start to think of a particular discussion that was presented. But maybe I'll just have to ask questions as part of my discussion. The question is, do we really need jeepneys? We would modernize the jeepneys but we look around Manila, we look at other cities around the Philippines, and then we go to Hong Kong, or Singapore – do we have similar denomination? When we talk about transportation as denominations, we refer to buses, mini buses, our trains and our jeepneys. It's the same thing as the denomination such as five pesos, or two pesos, but do we need some of these denominations? Are we trying to modernize something just simply because it has existed from the past? In other words, why can't we just replace everything— every jeepney operation with mini buses and things like that? That's just a question that I'd like to throw to our speakers.

Dr. Regidor: Can we perhaps solicit an answer from our DOTr representative, Ms. Joyce? How would the DOTr see the jeepney as part of the bigger picture among the different modes of transport that are available to us right now. *Saan ba ang kanyang* place or opposition among the various modes of public transport that we have?

Ms. Rivera: *Alam naman ng lahat na* most of our units are jeepneys. We term them as “The King of the Roads”. And technically, we have the route planning process to determine the appropriate mode. There are actually high demand routes or corridors that will necessitate upgrades. So, in those cases, we need to check what is the current status *doon sa mga ruta na iyon*. Have they modernized already? What will be the proper transitory strategies? Should we allow this first or that so it's part of the social impact planning and transition planning after we have approved the LPTRP and before we implement the LPTRPs? So for long term, yes – we are really looking into having higher modes, because technically we are envisioning a shift from private car users to public transport or commuting. *Pero* as of now, I think we are looking into transitioning *itong mga jeepney muna*, to upgrading into at least modern jeepneys before they upgrade to higher capacity modes.

Engr. Villarete: Yes, we are transitioning into higher modes, and we are transitioning into modernization. So if we modernize now, and replace the existing jeepneys, why not replace with the higher modes since we are replacing them anyway? We know that our ridership is rising, our population is rising. And that's just posing the question: do we compare ourselves with other cities around the region? Do they have the same kind of denomination as what we have now? Or are we extending this simply because “*nandiyan na iyan, 1940s nandiyan na iyan*”? So, if we're transitioning *naman* the kind of jeepney that we have, why not just transition also the capacity?

Dr. Regidor: Thank you for that, Paul. Hold that thought *muna*. Let's shift to another one of our panelists this afternoon. Yuri, your thoughts regarding the topic that we're discussing this afternoon?

Mr. Sarmiento: Well, *napakaraming* issues *ngayon*. *Napakaraming problema ng* transport sector *at napakaraming dapat ayusin*. *Pero* one thing is clear: *ang* modernization is not about changing vehicles, it's about changing mindsets. I've been telling a lot of people before, *inuuna natin i-modernize ang* transport groups. *Pero ang* LTFRB *at ang* DOTr, *nag-modernize na ba? Kung nagmo-modernize ang* LTFRB *at DOTr*, then *ang* mindset should also be changed from a regulatory point of view – *dapat mayroon silang* point of view *na isang* innovator. So, *iyon yung mga* challenge. The challenges on the transport groups like Chairman Eboy, Chairman Sello, *ito yung mga* operational issue *na madali namang masolusyunan*. *Maraming problema, maraming birth pangs*, but then again these are birth pangs *na may solusyon and iyon ang maganda rito*. *Nakikita natin ang solusyon*. *Kailangan ba mag-modernize ng jeepney?* I think so. *Kailangan mag-modernize ang jeepney*, but we cannot modernize using the Omnibus Franchising Guidelines (OFG), or the PUVMP as it is right now. *Marami tayong dapat gawin na calibrations*. *Nakita natin iyan* in the last six years. *Anong mga problema at kailangan natin gawan ng* solution from the financing, to the LPTRPs. So, *nakikita ko ang* movement, *mabagal ang* movement. Meanwhile, *marami pang pwedeng gawin para ma-improve ang programa para ma-modernize natin, nang sabay-sabay tayong lahat makikinabang*.

Dr. Regidor: Thank you for that, Yuri. Actually, *maganda yung nabanggit mo* regarding LPTRP. From what we understand from the comments that we gathered from our participants this afternoon, *paulit-ulit ngang nababanggit ang implementation ng LPTRP*. Of course, we're all curious at this stage *kung ilan na yung mga LGU na nakapag-submit ng LPTRP. Hindi lang yung submission, pati yung implementation ng LPTRP. Siguro, interesado din tayong malaman iyan*. But before I call on some of our panelists to try to answer and respond to these or react to these questions, may I also call one of our panelists Dr. Edwin Quiros, to make some comments or perhaps poll some questions regarding modernization, even rationalization of public transportation.

Dr. Quiros: With my very limited knowledge and understanding of PUVMP, I'm taking the point of view of the *ordinaryong pasahero*. With all these programs that everybody is putting into place, *ano ba ang ganansya ng ordinaryong pasahero? Kung ako ang pasahero na sumasakay ng jeep, lalo na diyan sa bandang Bagong Silang dahil taga-Novaliches ako, ang tanong ko lang naman ay, makakasakay ba ako sa oras na kinakailangan kong makasakay*, and this is practically rush hour. The next thing is *yung masasakyan ko ba ay kaya akong dalhin doon sa place of work within one hour or one and a half hours? And then my next question is, iyon bang pamasaher na ibabayad ko ay affordable in the sense, it's not going to take a big chunk of my salary for the day? Ganoon ko susukatin ang performance ng transport system instead of all these. Masaya akong naririnig na yung mga cooperative ay mukhang kumikita na yata ngayon at saka doon sa binabanggit ninyong service contracting noong pandemic. Buti pa kayo kumita. Marami sa amin ay hindi*. So how is the overall program viewed from this perspective of the ordinary guy on the street?

Dr. Regidor: Siguro, we can ask Mark again. Mark, *ano ba yung feedback doon sa mga city na napuntahan ninyo doon sa study ninyo? Positive ba, in general, yung pagtanggap nila doon sa modern jeepney? May violent reactions ba?*

Mr. Tacderas: Highly varied. I guess I'll focus on the operators sa Iloilo City *saka yung feedback. Yung operators sa Iloilo City, we're finding positive collections. And in fact, ang general feedback ay they are able to provide for regular salaries ng mga tao nila*. Labor is definitely a key issue sa sector and *nire-require na ngayong mag-transition towards providing more regular salary doon sa staff and drivers in particular. And I think by adopting EVs, ang mga nakuha nilang savings compared to diesel ay translated into regular salaries na gusto nilang i-provide. So, generally positive, except the apprehension of the technology that they were able to acquire – nagde-decrease nang konti yung confidence nila. Dahil naman doon sa nakita nilang degrading performance compared to acquisition ng lead acid, ngayon ay nag-acquire sila ng alternatives. They were interested in transitioning to lithium ion. Maybe there could be better feedback than my own. Ito ay baka lang, ang sinasabi lang nila allegedly ay they might achieve better performance kapag nag-transition sila. We never said anything about assuming them in that. Pero, net positive para sa coop nila. Pagdating naman sa Baguio City, wala pa kasing nag-a-adopt doon. And definitely bilang nasa early stages pa lang sa Baguio City, marami talagang questions and in fact, dito pa lang sa question and answer, ang question ay kaya ba ng vehicle? Kaya naman talaga. May technology talaga na kayang mag-meet ng requirements except limited right now. And yung limitations na iyon na supply can only be addressed if we are to improve the barriers that are discussed like economic barriers in acquisition, supply, etc. Although, we think that there is a huge factor sa leadership doon sa Baguio City that they're really supporting the transition and they're really finding ways para ma-enable yung acceptability ng technology doon sa city nila.*

On challenges of modernization:

Dr. Regidor: Balik ako kay Yuri. Yuri, you've been helping coops and organizations regarding their issues and concerns *dito sa mga barrier na ito*. So, can you share with us, *paano ba talaga natin ma-ko-convince, for example, yung mga tao to modernize?*

Mr. Sarmiento: Just to be clear, I'm for modernization. *Pero, kung may problema ang isang programa, wouldn't you suggest na kainin natin lahat?* There are problems right now in the program and I think we better take note of all the things *na kailangan nating baguhin. Anong examples ang kailangang baguhin? Maraming transport groups na tumatakbo na nag-modernize na at may utang pero sinasabayan ng mga traditional jeepney ngayon, sinasabayan ng mga colorum. So, ang revenues nila ay bumabagsak to pre-pandemic level, around PhP3,000-PhP4,000. Meanwhile, ang utang nila sa bangko ay patuloy pa rin. Second is financing issue – may mga nag-consolidate na gusto nang kumuha ng modernized units pero ang unang problema, walang bank financing. Bakit, dahil ba sa LPTRP? Nagkaroon ng Certificate of Alternative Compliance (CAC) pero hindi pa rin ganoon kalawak ang edukasyon. Another issue ay ang pag-acquire ng modern jeepneys. Noong magsimula tayo six years ago, the price of the modern jeepneys was 1.6 million pesos. Ngayon, tatakbo na ito ng 2.6 million to around 3 million pesos. And in the case of electric vehicles, it costs more. Nasa 3 million to as high as 4.8 million pesos na nakikita ko. So, ang daming issues muna na kailangan nating ayusin, from the route planning, all the way to the price and costing of the vehicles. I don't know with Almazora kung ano bang cost implications niyan. Another issue is the impending increase in salary and in wages. Remember, part of the components of the PUVMP is dapat ang mga driver natin ay naka-fixed salary. So, kung magkaroon ng price increase in the salaries, ano ang cost implications nito sa mga transport group? As of now, 30% to 40% ng transport groups ay may salary. Marami tayong kailangang pag-usapan and I think yung mga participant natin dito ay may napakarami ring tanong.*

Engr. Villarete: We're talking about cost. The way I look at it, I think *nakita ko yung problema.* Normally, the government is trying to look at how much this really costs. And then the owners will say this cost, that their new unit will cost like this, and the cost of old unit is going to be this. They have to shoulder this cost to be replaced by a new one. Why would I shoulder the costs for modernizing my unit? It's the government's desire to change, to improve, and to upgrade. So personally, and I came from NEDA, I believe that the government should spend money for replacing this. *Hindi naman lahat, but subsidize to a certain extent. This has been done many times all over the world, and in fact yung ginamit ko na example was when Egypt or Cairo replaced all its taxis. It was funded by World Bank Loan. And this is quite easy. You just apply for whatever financing we have. It's either Philippine Government Financing or Official Development Assistance (ODA) financing. You just ask approval from NEDA because NEDA will not look at the financials. NEDA will always look at the economic benefits. It's always the economic evaluation, which determines whether a project is good or bad. Now, even if it's financially not viable, but if it's economically viable, papasa yan sa NEDA at papasa iyan sa COA. So, why not just do some calisthenics, do some discussions, and come up with a good replacement cost for old jeepneys. You know it's good for the operator para hindi na problema sa government. Kasi ngayon, iyon yung tinitingnan nila – ang mura lang. So why would they replace my unit?*

Dr. Regidor: Thank you, Paul. I'm just trying to read from the Q&A box. There are many reactions here regarding, of course, the modernization and *siguro magandang maitanong natin sa ating mga panelist ngayon dito.* Perhaps someone can answer regarding the experience of the coop. Perhaps in your experience, how do you consolidate and try to cover the costs incurred *dito sa modernization and perhaps even route rationalization?* Anyone from the coop who can answer that question?

Mr. Dela Cruz: *Sa aming karanasan sa Basicano dito po sa ruta namin, ang unang istorya po talaga ng mga PUJ noong araw na kundoktor pa lang ako ay yung gaya ng sinabi ni Dr. Quiros, "Anong oras ba kami dadating doon sa aming pupuntahan?" Kami po sa Basicano, nangarap po kami na dapat talaga ang oras ng pagdating natin sa pupuntahan ay alam na natin. Noong araw po, ang ruta namin dito ay nakakalabing anim na at eskiyerda pa lang po iyon. Labing anim na eskiyerda – ibig sabihin ay wala pa po kaming pila. Alas kwatro ng madaling araw hanggang alas otso ng umaga, naka labing anim na eskiyerda na po kami. Sa panahon ngayon, anim na round-trips lang po ang nagagawa namin at hanggang gabi na po iyon. Isa po iyon sa resulta ng malalang traffic. Ibig pong sabihin, noong araw na wala pang traffic ay mabilis kaming nakakarating sa pupuntahan. Tapos ay nakakarami pa kami ng ikot. Sa ngayon po, dumami nang dumami ang mga sasakyan at ng mga*

pampublikong jeep dahil doon po sa naging mindset. Sabi nga ni Mr. Yuri Sarmiento, yung mindset po talaga ng mga operator ay isa sa dapat mabago. Isa po kasi sa ugat ng problema ay ang naging mindset ng mga operator na kanya-kanyang pamamahala. Kung kanya-kanyang pamamahala ang mangyari pag bumiyaha si operator, halimbawa po si operator ay bumabiyaha bilang driver din, pag kumita na siya ng tapat para sa pamilya ay umuuwi na. Ang naihatid niya sa trabaho na mananakay ay hindi na po niya nasusundo pagdating ng gabi. Kaya po ang gobyerno natin tulad ng DOTr at LTFRB, nakita na kulang ang mga sasakyan kaya nagdagdag nang nagdagdag ng prangkisa. Ito na po ang dahilan kung bakit dumami ang kompetensiya dahil hindi talaga naituro sa mga Pilipino ang isang pamamahala. Kanya-kanyang pamamahala, kanya-kanyang diskarte, kanya-kanya ring labas, kanya-kanyang oras ng dispatch, at wala pong nagma-manage na katulad samon ngayon. Ang sistema po ng modernization ay fleet management na. Ang route rationalization na lang po talaga ang problema. Siguro kung mabibilang ang number ng mga sasakyan sa isang ruta, baka po yung sinasabi ni Dr. Edwin Quiros na ang oras na pagsakay at pagdating doon sa ruta, magagawa po iyon kung made-decongest ang mga sasakyan na sobra-sobra po talaga sa isang ruta. Iyon po dapat ang matapos ng gobyerno, ang route rationalization.

Top recommendation for the government:

Dr. Regidor: Thank you, Sir Eboy. I think na-capture niya yung malaking concern. First, we have a lot of problems, a lot of issues, a lot of barriers to progress. And yes, *tinitingnan ko rin yung mga recommendation sa ating chatbox and Q&A. Key talaga ang route rationalization in order for us to be able to identify what modes are most suitable para sa mga ruta. Apektado niya ang mga operation, apektado niya ang mga deployment ng mga sasakyan. Apektado niya pati ang travel time siguro. Pati yung traffic apektado niya kasi, may mga komento dito na madalas ay parang sinisisi natin yung jeepney, for example, para sa traffic. Pero the vehicle itself, it's not the problem. Perhaps the operations, the behavior, hindi lang ng mga driver natin, pati siguro behavior ng mga pasahero kasama na doon sa mix na tinatawag natin.* We're running out of time, but maybe I would like to ask our panelists. If you can recommend something to our DOTr, to our government, ano ang top recommendation na lang siguro. Mahirap pero ano ang top recommendation natin para sa ating mga ahensya ng gobyerno para dito sa modernization. Siguro ihalo ninyo na rin ang route rationalization.

Mr. Sarmiento: Tama ang sinabi ni Chairman Eboy about route rationalization o tamang pagpapalano. Siguro, ang maisa-suggest ko dito, bakit hindi tingnan ng gobyerno na instead of vehicle financing, gawin nating vehicle leasing. Walang utang ang mga coop. Tayo'y magrerenta lamang sa gobyerno. Ang gobyerno ang bumili ng sasakyan. Sila ang mag-maintain kung gusto nila. Kung kailangan palitan ng electric vehicles ay palitan nila. Sila rin ang magtayo ng charging stations. Pero ang existing transport groups sa area ang mag-ooperate. Tignan natin iyon. Para alam natin na mas maganda kung mapapatakbo natin. Kasi sa ngayon ay may 180,000 jeepneys nationwide pero pitong libo pa lang ang namo-modernize. Bakit? Kasi may imbudo. Nakaipit tayo lahat sa financing. Nakakabit ngayon sa profitability ang mga bawat ruta at ang profitability ay naka-depende ngayon sa route rationalization.

Engr. Villarete: Two things: one is route rationalization. I think, we really have to ask LTFRB and DOTr to look into what really needs to be adjusted. We cannot just rationalize the route and say everything stays as is. There are some routes that require higher modes of transport and higher capacities. We really have to make the decision to upgrade to higher capacities, if needed. That way, the government has to come in. Second, in terms of financing again, we cannot expect our jeepney operators and jeepney owners to modernize if they cannot afford it. Sometimes modernization needs to have inputs from the government. And it's not something which is just a dole out— it is something that has to be studied in terms of economic viability because we are looking here with economic benefits. We're not talking about financial benefits. We upgrade the jeepneys and we upgrade the roads because it's economically viable for us, for everybody. And that's why it's possible to use government money to do this, instead of just, you know, *bili na kayo ng bago*. You expect them, like doon sa sinasabi sa chatbox, to buy a new vehicle for 2 million pesos and expect them to pay for it

for the next five years. See, *ang hirap naman*. There has to be some studies done by the government to see how much subsidy can be given to them because this is done in other countries. This is a carbon issue. We are preventing emissions and that's why it's actually economically viable to subsidize and there has to be studies done so that people will modernize. Otherwise, they will not modernize.

Dr. Quiros: My recommendation is irrationalization. I am taking cue from the comments of Sir Eboy and Sir Yuri. Apparently, what I get from what they were talking about earlier is in the case *nitong ating mga cooperative dito na gumanda na raw ang management at operation* because of fleet management. And this was greatly aided by the help of Sir Yuri. So, fleet management overall, etc. And I think, *itong cooperatives na ito* is the result of consolidation *na tinatawag na PUVMP*. So, *ang aking take ay kung gumaganda dahil sa pagko-consolidate, bakit hindi na natin itodo ang consolidation na* instead of so many hundreds *na iba-ibang* separate groups, *gawin na lang nating isa*. Para yung overall fleet management *ay isa lang ang nagmamando, lahat ay sumasabay at lahat ay sumusunod doon*. Pag hindi ka kasama doon sa *nag-iisang* consolidated *na* transport entity, *hindi ka pwedeng bumiyahen*. Ganoon lang ka-simple. And *kung iisa na lang ang entity, iisa lang imamanage mo at lahat ay susunod*. Hindi ba mas simple? And in terms of the financial cost, *kung ano man iyan na involved sa operation, mayroon ka na ngayong* economy of scale. So, I think in that sense, I'm irrational. *Kumbaga, ang sinasabi ko lang ay bakit hindi na lang natin gawing isang utility company ang buong transport na mag-operate parang Meralco? Para ang regulatory agencies ay isa lang ang kausap, isa lang ang sisihin at isa lang ang imamando*. Tapos, *lahat ng operators at drivers ay mga empleyado na sumusweldo at may schedule ang mga shifting*. Tingnan ninyo, *kagaya ng sinasabi ni Mr. Dela Cruz, mayroon kayong mga mekaniko, support staff, etc*. Diba mas arranged ang operation *na ganoon kaysa yung watak-watak na cooperatives?* You know what I mean? *Tapos magkokompetensya rin kayo pagdating sa kalye*. Bakit pa kayo magkokompetensya kung pwede naman kayong iisa. So, in that sense, I would say that's an irrational thought.

Conclusion:

Dr. Regidor: Very radical *naman ang proposal ni* Dr. Quiros. I think we opened up the Pandora's box of ideas in a very chaotic, very intriguing, and very radical way this afternoon. To wrap up the panel discussion, I think there are so many ideas and so many recommendations coming from people from different backgrounds. Of course, *may mga engineer tayo dito*. *Nakita kong may mga EnP at may mga architect din tayo* and I think this is something *na* open for discussion and we, of course, would welcome ideas and recommendations from everyone. *Sabi nga nila, siguro lahat tayo nagko-commute*. *Lahat tayo na-experience na itong mga challenge na ito*. *Iba-ibang mga perspective nga lang syempre*, but in the end everybody wants solutions. Everybody wants good public transportation for everyone's benefit. To wrap up the panel discussion, I would just like to thank our panelists for their thoughts, for their ideas, for their questions. We'd also like to thank our speakers for their presentations, for sharing their ideas, and for sharing their time with us this afternoon.