



Best Practices Related to Intermediate Public Transport System

switchasia



Funded by the European Union



The Energy and Resources Institute

© Copyright 2018, The Energy and Resources Institute

Disclaimer

This publication has been produced with the assistance of the European Union. The content of this publication are sole responsibility of TERI and can in no way be taken to reflect the views of the European Union (EU).

Reviewers

Mr S Sundar, Distinguished Fellow, TERI

Mr Shri Prakash, Distinguished Fellow, TERI

Ms Akshima T Ghate, Associate Director, TERI

Authors

Ms Palak Thakur, Research Associate, TERI

Ms Smriti Bhatnagar, Research Associate, TERI

Shubam Arora, Intern

For more information

Project Monitoring Cell
T E R I, Darbari Seth Block
IHC Complex, Lodhi Road
New Delhi – 110 003

Tel: 2468 2100 or 2468 2111
E-mail: palak.thakur@teri.res.in
Web: www.teriin.org

BACKGROUND

Intermediate public transport (IPT) system is defined as, 'intermediate modes like autos taxis mini buses which are not, government-provided public transport services in the form of bus- and rail-based transport (Kumar, 2016). The intermediate public transport system, comprising both motorized (autorickshaws, Gios, TATA Magics) and non-motorized (rickshaws, pedicabs, and so on) modes of transportation, ensures last-mile connectivity. Their role varies from city to city. In the metro cities, the IPT acts as a feeder to increase the accessibility to mass transport systems and in tier-III and -IV cities, where there is a lack of adequate public transport or an absence of formal public transport, the IPT modes act as the main haul in public transportation. By meeting mobility needs and providing frequent, convenient, flexible, and affordable services that either complement the existing public transport systems or fill the gaps left by the existing public transport system, the IPT/informal/para transit modes become an integral part of transportation systems in the cities of India. In these cities, the IPT services range from three-wheeled non-motorized rickshaws to medium-capacity Tata Magics and Gios, and, further, to high-capacity four-wheeler minibuses.¹ The IPT modes provide both

individual and shared mobility services and are regulated through permits issued by the transport department.

As per the study, in Amritsar, autorickshaws comprise only 2% of the total registered vehicles. Their mode share, however, amounts to 22%. In Jaipur, too, buses and autorickshaws comprise 2% of the total registered vehicles. Their mode share is approximately 25%. In Surat, autosrickshaws alone served as the only stage carriage service for commuters before the Jawaharlal Nehru National Urban Renewal Mission buses were functional. Clearly, the role of the IPT in shouldering the transport needs of the Indian cities is immense.

The National Transport Development Policy Committee report in its sector-specific section on urban transport through its estimates from the Wilbur Smith Associates (WSA), Government of India (2008), claims that in the Indian cities with a population of 1–2 million, the modal share of autorickshaws is 8%. As per the State Transport Authority of Delhi, there are 74,151 three-seater autorickshaws with permits.

Even though autorickshaws form the essential fabric of the IPT system, the sector operates with a set of costs to the environment and public health. Autorickshaws which run on the old two-stroke engines pose a serious threat to the air quality. The

autorickshaw population surge has created congestion-related issues. Congestion on main roads, especially near metro stations has worsened due to a lack of adequate autorickshaw-halting stands. The ratio of kilometres covered by the total passengers in a vehicle to the kilometres covered by the seats in the vehicle is more than one for almost all modes of intermediate transport. From the point of view of public safety, it is desirable to regulate the autorickshaw sector.

There is an even stronger need to look at issues faced by the community of autorickshaw drivers. A lack of formal means to finance vehicles remains a key issue amongst autorickshaw drivers. The project also addresses the issues of sustainable lifestyles for the community of autorickshaws.

Globally, cities have attempted to address issues related to the informal modes of transport. This report attempts to learn from some of these cases and facilitate their adaptation in the Indian cities by bringing out some relevant examples from the Indian and global scenario. The exchange and dissemination of the best practices remain an effective way to learn, exchange, and activate synergetic collaborations. In the case of the project, the compendium on the best practices endeavours to serve as a tool amongst relevant players who have

¹ Presentation by TERI at the Urban Mobility India Conference and Expo 2016.

developed or are trying to develop sustainable, urban transportation models.

Research related to the European Union's Switch Asia project, 'Switching to a Sustainable Auto-rickshaw System: Triggering Sustainable Lifestyles and Poverty Reduction in Urban India,' conducted by TERI illustrates the best practices related to the IPT modes. The project is being implemented by the consortium of Fondoziane ACRA, ENVIU Foundation, Women Health and Development and TERI.

The project focuses on promoting clean, fuel-based autorickshaws and supports sustainable lifestyles for the autorickshaw drivers.

This benchmarking study capturing the best practices related to the intermediate transport modes has been developed as a part of the project. The project attempts to scale up a replicable and integrated model of sustainable autorickshaw transport, based on clean technologies, in a select few Indian cities. The project provides an integrated solution

where each individual component—consumer-centred service design and financial services—adds strength to the others.

The following table provides a snapshot of the issues that have been addressed by the case studies in this report. Although the cases studies have not been deemed completely successful or unsuccessful, there are aspects from each which may be adapted after customizations have been carried out to suit the local conditions.

List of Case Studies

Issues Addressed	Relevant Case Study
Enhancing safety through IPT regulations	<ul style="list-style-type: none"> ▪ Enhancing the Safety of Women Passengers: Pink Autorickshaw Pilot ▪ Pink Autorickshaws in Surat (By women, for women)
Organization of the IPT system	<ul style="list-style-type: none"> ▪ Aggregating Autorickshaws in New Delhi – Ola Autos ▪ Improving Informal Autorickshaw Services through Fleet Organization in Gujrat: G-Auto ▪ Transition to an Organized IPT in the City of Alwar – The Alwar Vahini ▪ Three Wheels United: A Social Enterprise for Addressing the Challenges Faced by Autorickshaw Drivers in Bengaluru, India
Promoting environmental sustainability in the IPT system	<ul style="list-style-type: none"> ▪ Conversion of Autorickshaws from Petrol to CNG-compliant Rickshaws in Ahmedabad ▪ Pilot Tests of Retrofitting Internal Combustion Engine (ICE)-based Autorickshaws into Electric Autos by Volta ▪ Replacement of Petrol-driven Bajaj (a Three-wheeled Taxi) by CNG Bajajis in Jakarta, Indonesia ▪ Market Transformation through the Introduction of Energy-efficient Electric Vehicles: The E-Trikes Pilot Project in Mandaluyong, the Philippines ▪ Electric Three-wheelers in Kathmandu: A Clean-fuel Technology-based Intermediate Public Transport Mode
Policy-based interventions	<ul style="list-style-type: none"> ▪ Puerto Princesa’s ‘50–50’ Traffic Scheme for Reducing City Congestions Due to Tricycles ▪ Shift System: Solving the Problem of Oversupply in Angkots in Bogor, Indonesia

Enhancing Safety Through IPT Regulations



ENHANCING THE SAFETY OF WOMEN PASSENGERS: PINK AUTORICKSHAWS PILOT

Location of intervention

Noida, India

Period of intervention

November 2016

Implementing agency

Regional Transport Office (RTO),
Noida

Issues and Challenges

The pink autorickshaw initiative addresses the security concerns of the women in Noida, Uttar Pradesh. This initiative was proposed by the Uttar Pradesh state government and was operationalized by the RTO, Noida. Pink autorickshaws are a technologically equipped, specialized fleet of autorickshaws that ensure the safety and security of women.

Description of the Intervention

The Uttar Pradesh state government held a series of interactions with the RTO in 2016 about increasing the safety of women in public places. A joint decision was taken to initiate a specialized fleet of autorickshaws which would enhance the safety and security for women. Pink autorickshaws display the name and number of the driver to the commuter and have a panic button inside the autorickshaws

to be used in case of emergency. The autorickshaw are constantly monitored via the GPS by the police department.

The Assistant Regional Transport Office (ARTO) prepared to grant permits for pink autorickshaws in November 2016. Initially, permits for 340 pink autorickshaws were granted. These permits were readily obtained by autorickshaw drivers despite strict conditions, such as the autorickshaws are supposed to ply on certain designated routes with permission to carry women passengers only. Women drivers were given a priority while granting the permits. In February 2017, 318 pink autorickshaws were plying on the roads of Noida. The RTO planned to conduct a review in August 2017 (six months after the first set of pink autorickshaws started to ply on the roads), to take a decision about scaling up the pink autorickshaw initiative.

Learnings

Stakeholder Consultations - The ARTO leveraged their communication with autorickshaw drivers, autorickshaw unions, and the media to raise awareness about the pink autorickshaw initiative. While correspondence with autorickshaw drivers and unions ensured collective decision making, vernacular media was instrumental in spreading the news about the

initiative. As a result, there were about 600–700 applicants for the first batch of 340 permits planned to be given out by the ARTO. The ARTO has also been responsive to the feedback of the target beneficiaries about modifying the caged structure of pink autorickshaw. The structure of the autorickshaws invited controversy as it was perceived by some women as being claustrophobic.

Impact

The RTO decided to grant 340 permits for pink autorickshaws in November 2016. There were around 600–700 applications in the same month itself. Although there was only one application from a woman driver, a total of 318 permits were granted. As on February 2017, 318 pink autorickshaws had been plying in Noida for more than three months. As per the RTO, the pilot programme has been deemed successful by the state government and is going to be scaled up in other cities of Uttar Pradesh.



PINK AUTORICKSHAWS IN SURAT (BY WOMEN, FOR WOMEN)

Location of intervention

Surat, Gujarat, India

Period of intervention

July, 2017

Implementing agency

Surat Municipal Corporation

Issues and Challenges

The civic body of Surat in order to address increasing incidents of harassment, molestation, and sexual assaults on women passengers took an initiative called the Pink Autorickshaw Service: By women, for Women.

Description of Intervention

The Pink Autorickshaw Service is a three-wheeler rickshaw driven by women drivers, is equipped with safety features and ferries only women passengers. The Surat Municipal Corporation identified a batch of 70 woman drivers. The initiative helped these drivers to get driving license, loans at lower rate of interest for purchase of autorickshaws, and subsidies from the central government.

Surat Municipal Corporation has tied up with the Bank of Baroda (BoB) for providing loans at 7% interest to women drivers to purchase their

autorickshaws. The BoB has sanctioned Rs 84,000 loan per autorickshaw to each woman applicant with 25% subsidy for the vehicle coming from the central government scheme.

The civic body has focused the service mainly in the school areas and rural areas where the mode of transportation is scarce.

Organization of the IPT System



DK

BS4

ॐ जय माता दी

DL1 RV
06 58

RE

CNG

CSA MOTORS
INDIA LTD
22635846



AGGREGATING AUTORICKSHAWS IN NEW DELHI: OLA AUTOS

Location of intervention

New Delhi, India

Period of intervention

2016

Implementing agency

ANI Technologies Private Limited
(Ola)

Issues and Challenges

Ola Auto provides autorickshaw-based transport facilities to Indian cities. Autorickshaw users in Indian cities often face problems, such as negotiating travel fares and frequent rejection by drivers. Ola Auto endeavours to improvise autorickshaw-based transportation in favour of both commuters and drivers.

Description of intervention

Ola started as a cab aggregator in 2011 and later diversified into an autorickshaw aggregating service. The Ola Auto aggregator model allows customers to call for autos through the Ola application on their smart phones. Similar to the arrival of cabs and other related details, autorickshaw options come with GPS application installed in order to help commuters track the location and progress of the vehicle. However, Ola is only a

platform provider, and does not own any autos. The application allows for the passengers' location to be tracked at all times by an application user at the discretion of the passenger. The application also has a panic button for commuters connecting them to the police. In Delhi, the Ola business model did not go well with the non-Ola enlisted autos. The autorickshaw union led strikes opposing the Ola business model for Ola autos not needing a permit to operate in Delhi and yet charging the passenger at a rate lower than that mandated by the government.¹

Interactions with autorickshaw drivers revealed that Ola Autos receive an incentive of about Rs. 300–400 per day after enlisting as an Ola Auto. However, these incentives have reduced over time. Initially, Ola incentivized autorickshaw drivers with a daily incentive regardless of the trip length. With internal policy changes, Ola began incentivizing autorickshaw drivers on the basis of the kilometres driven in a day. This led the drivers in rejecting the short-distance rides and preferring the longer rides.

¹ <http://indiatoday.intoday.in/story/survival-of-cheapest-autorickshaw-unions-accuse-taxi-aggregators-for-disrupting-market/1/687653.html>; last accessed on April 17, 2018.

Learnings

Although some autorickshaw drivers have enlisted for Ola Auto, they have permanently logged off the application as Ola levies a penalty on the driver in case he/she rejects more than three rides in a day. This results in Ola Auto drivers not having the freedom to decide their area of operation.

Although Ola has revolutionized autorickshaw booking and enhanced comfort for passengers, the business model has been dependent on discounted rides for passengers and heavy incentives for autodrivers. Discounts cannot be indefinitely supported by the revenue stream of Ola. The amount of incentive that could be rewarded to an Ola driver is reducing as more ordinary drivers are enlisting themselves to become Ola Auto drivers.

Impact

Ola Autos has transformed the way autorickshaw drivers and passengers interact with one another. A financial model which is more organic in nature and not dependent on heavy discounts for increasing the demand and supply would lead to a long-lasting impact for Ola.



IMPROVING INFORMAL AUTORICKSHAW SERVICES THROUGH FLEET ORGANIZATION IN GUJARAT: G-AUTO¹

Location of intervention

Gujarat, India

Period of intervention

2009–ongoing

Implementing agency

Nirmal Foundation

Issues and Challenges

Nirmal Foundation is working for the social and economic upliftment of autorickshaw drivers in Gujarat by organizing autorickshaws into fleets. This specific initiative of the foundation is known by the name G-Auto. The G-Auto initiative follows a multi-stakeholder approach to promote and sustain prosperity, security, and dignity for autorickshaw drivers.

Description of intervention

Nirmal Foundation has been working towards improving the informal autorickshaw services through the G-Auto initiative in five cities of Gujarat. The G-Auto initiative organizes the existing autorickshaws into a fleet-based service, operating under a common brand name and meeting a certain minimum service and performance requirements. Nirmal Foundation works with a strategic partner in each city. In Rajkot, for instance, the Rajkot Municipal Corporation and EMBARQ performed a needs assessment analysis for the organization of autos into fleets. Similarly, in Surat and Vadodara, Nirmal

Foundation is working with the Surat city police, and the Vadodara city municipal corporation, respectively.

Nirmal Foundation works towards increasing the prosperity of autorickshaw drivers by aggregating the autorickshaw ride demand of the cities and increasing the market share for the G-Auto-enlisted autos. In parallel, the foundation enhances the financial security of autorickshaw drivers by encouraging the ownership of autos in collaboration with banks. Nirmal Foundation arranged for training and capacity building for G-Auto drivers about general conduct, English proficiency, personality development, and safe driving through collaboration with non-governmental organizations. Autorickshaw drivers are considered as brand ambassadors for the G-Auto initiative. While starting the initiative, it was Nirmal Foundation's conscious decision to not involve autorickshaw unions and approach each autorickshaw as an individual entrepreneur.

Nirmal Foundation has worked towards improving the travel experience of commuters by reducing their walking distance to catch an autorickshaw. By increasing comfort for senior citizens and differently abled persons, who were unable to move out to catch an autorickshaw and by enabling the availability of autorickshaws during odd hours of the day, the foundation has improved its services. Unlike other businesses,

G-Auto does not offer discounts to the customers for using their service. G-Auto charges a convenience fee of Rs. 10 from passengers for a journey.

Learnings

Provision of social benefits, such as health and life insurance, capacity building, and support for children's education has played a crucial role for autorickshaw drivers to enlist as G-Autos.

Financial models of autorickshaw aggregators need to be sustainable, and not be dependent on discounts. The strength of the product or service is demonstrated by the fact that commuters have been ready to pay an extra amount of Rs. 10 (\$0.15)* to avail the G-Auto service. G-Auto has not relied on discount throughout its journey since 2009. The organization considers its growth to be slow, but organic and sustainable.

Impact

Nirmal Foundation's G-Auto initiative is active in the cities of Rajkot, Ahmedabad, Vadodara, Surat, and Gandhinagar in Gujarat. Cumulatively, in Gujarat, the initiative currently involves 21,000 autos. This number is growing and G-Autos are spreading to the other states of India. Nirmal Foundation signed a memorandum of understanding with the Gurgaon municipal corporation and the programme will soon start in Delhi.

¹ The case study has been adapted from the Pro Poor Mobility: Policy Guidelines and Case Studies. 2015. TERI



TRANSITION TO AN ORGANIZED IPT IN THE CITY OF ALWAR

Location of intervention

Alwar, India

Period of intervention

2011

Implementing agency

Regional Transport Office (RTO), Punjab National Bank (the lead bank), Urban Improvement Trusts of Alwar and Bhiwadi, Deputy Registrar Co-operatives, Tata Motors and Mahindra & Mahindra, and the Alwar District Administration

Issues and Challenges

The Alwar Vahini initiative provides a convenient commuting facility to the residents of Alwar, Rajasthan. The Alwar Vahini is a passenger service (comprising the Euro IV-Compliant TATA Magic and Mahindra Maxximo) which has replaced 750 polluting autos, tempos, and vikrams, earlier catering to the transport needs of Alwar.

Description of intervention

The Alwar Vahini initiative was jointly launched by the RTO, Punjab National Bank, Urban Improvement

Trusts of Alwar and Bhiwadi, Deputy Registrar Co-operatives, TATA Motors and Mahindra & Mahindra, along with the District Administration. The roles of these stakeholders were well conceived keeping in mind their respective professional capacities and strengths. While the Punjab National Bank played the role of the chief financier by reducing the interest rate to 14.25% and extending the payback period to 5 years for drivers to procure new vehicles, the RTO was responsible for allotting route permits. The Urban Improvement Trusts of Alwar and

Bhiwadi bore the costs of providing uniforms, ID cards, and group insurance to drivers. They also built support infrastructure in the form of modern bus stops, signages and traffic signals. TATA Motors and Mahindra & Mahindra offered heavy discounts on the cost of vehicles. A soft skill training (including driving etiquettes and discipline) was imparted to drivers to build their capacities by non-governmental organizations.¹

A unique aspect of the Alwar Vahini was the consideration of the Autorickshaw Union as an integral stakeholder for the initiative. As the initiative began, the autorickshaw Unions were invited by the collector of Alwar. They were presented with the scheme as envisaged by the authorities. At the first instance, the unions were resistant to the purchase of new vehicles. The compulsion to pay a monthly instalment was their major concern. To address this, incentives such as loan facilities at reduced rates from nationalized banks were used to ease the purchase of vehicles². Applications to operate the Alwar Vahini were then invited from the unemployed workforce. The Alwar Vahini was launched in December 2011 with 58 vehicles on one of the busiest routes of Alwar. This route already had around 150 old tempos and three-wheelers plying. The fare

for operation of the Alwar Vahini was the same as that of three-wheelers. The Alwar Vahini was found to be the preferred mode of transport amongst commuters than the old three-wheeler on account of enhanced comfort. The three-wheeler drivers realized they would not be able to generate profit unless they switch to the Alwar Vahini. The union then had a meeting with the collector where they agreed to phase out their old three-wheelers and replace them with Alwar Vahinis.³

The district collector and magistrate of Alwar articulates in an official Alwar Vahini video,⁴ the delicate balance that the city authorities have struck between imposing regulations and letting market forces operate with respect to the Alwar Vahini model. While strict government regulations are imposed on the fares of the Alwar Vahini (to keep them equal to the fares of old tempos and autos) and conduct of regular medical check-ups for drivers, the administration also let the market forces expand by sanctioning 44 new routes for the operation of Alwar Vahinis.

Learnings

The Alwar Vahini model displays the power of strategically chosen stakeholders in the success of an initiative. Each of the chosen stakeholders played on their strengths to make the initiative a success.

The city authority of Alwar kept the autorickshaw unions in confidence during the planning phase of the Alwar Vahini. This led to an organic buy-in by the autorickshaw drivers under the Alwar Vahini model. The decision made by autorickshaw drivers was based on the merit of the Alwar Vahini business model over traditional autorickshaws.

The Alwar Vahini model placed zero burdens on the government exchequer, thus making it independent of any monetary aid. The model has grown organically and is market driven. The city administration played a limited role of coordinating functions between the different stakeholders.⁵

Impact

The Alwar Vahini's strength has grown to 1,310 vehicles in 2013, as compared to the small number of 58 at the time of its launch in 2011. Within a short span of two years, more than 3,000 jobs were generated. The burden on the government exchequer due to the Alwar Vahini has been zero, while the revenue generated through tax on Alwar Vahini vehicles is INR 17 crore.⁶ Drivers report the driving comfort of an Alwar Vahini to be lot more than tempos and vikrams. The reliability of an Alwar Vahini is considered to be more, as breakage of suspension and break failure were frequently plaguing issues in old tempos and vikrams.

¹ The case Study has been adapted from the Pro Poor Mobility: Policy Guidelines and Case Studies, TERI

² PEARL Compendium of Good Practices by NIU; http://pearl.niu.org/sites/default/files/books/GP-IN1_UT.pdf; last accessed on April 17, 2018.

³ <http://www.itpi.org.in/uploads/journalfiles/journal-oct-dec.pdf>; last accessed on April 17, 2018.

⁴ <https://www.youtube.com/watch?v=SehENNZagvE>; last accessed on April 17, 2018.

⁵ <https://www.youtube.com/watch?v=SehENNZagvE>; last accessed on April 17, 2018.

⁶ http://moud.gov.in/upload/uploadfiles/files/Advisory_Follow_Alwar_Vahini.pdf; last accessed on April 17, 2018.



THREE WHEELS UNITED: A SOCIAL ENTERPRISE FOR ADDRESSING THE CHALLENGES FACED BY AUTORICKSHAW DRIVERS IN BENGALURU, INDIA

Location of intervention

Bengaluru, India

Implementing agency

Three Wheels United India Services Private Limited (TWUISPL), Bengaluru, India

Issues and Challenges

There are about 120,000 autorickshaws in Bengaluru. The earnings of the autorickshaw drivers, who mainly rent these vehicles, are typically between Rs 100–150 (i.e., USD 1.83–2.761) per day and certain groups (mafias)

control the ownership of the vehicles. The economic and social conditions of the autorickshaw drivers are poor. These drivers have no means to access formal financial options from banks, and hence are led into the exploitive hands of the private money lenders.

They live with low self-esteem and have no social security. Another major concern is the noise and air pollution that is caused by these vehicles.

In order to tackle some of these issues, a private company called the Three Wheels United India Services Private Limited (TWUISPL) was established in Bengaluru (as a subsidiary of a Dutch entity called the TWU B.V).

Description of intervention

The main focus of the TWUISPL is to improve the lives of autorickshaw drivers through financial inclusion generating alternate channels of revenue and making them environmentally and socially responsible.

To improve the working conditions and the quality of life of the autorickshaw drivers, the TWUISPL actively involves the participation of the drivers in deciding how to solve the challenges faced by them. Three main strategic interventions of the TWUISPL include:

- Providing financial services to the autorickshaw drivers in order to help them own autorickshaws.
- Providing additional means of revenue for the autorickshaw drivers.
- Reducing environmental pollution through promoting or adoption of cleaner technologies by autorickshaw drivers.

The financial services provided by the enterprise for the poor drivers include financing ownership of four-stroke vehicles, helping them open savings bank accounts and providing them with life and health insurances.

The bank contributes 90% of the vehicle cost and the drivers are expected to contribute 10%. The TWUISPL gives 15% of the vehicle cost as a guarantee. The drivers are then expected to repay the amount in daily instalments for 26 days a month for 60 months. In cases of non-compliance, the autorickshaw is seized back.

The TWUISPL has recognized some additional revenue generation means for the drivers. These include revenue generation through advertisements in autorickshaws, micro franchise schemes, such as mobile recharging and increased ridership through mobile-based applications. The advertisement revenue has provided for life insurance for the drivers and the franchise scheme has helped drivers take up entrepreneurial roles.

The clean technology approach includes replacing the two-stroke autorickshaw engines with four-stroke engines. This has resulted in a positive impact on the environment and has also helped in creating higher incomes for the drivers.

Alongside the financial and environmental objectives, the

TWUISPL also focuses on community development amongst the drivers and their families. With the help of the NGOs and co-operatives, the drivers form self-help groups (SHGs). The presence of such community and peer groups ensures the payment of loans on time.

There is also a compliance team to ensure timely repayments. The compliance team includes the drivers themselves so that a peer pressure is built and accountability is raised. In future, the drivers associated with the TWUISPL, will be also given 10% of the equity shares of the company to build a sense of ownership, once the company group has over 200 drivers.

Impact

The TWUISPL aims to improve earnings for the autorickshaw drivers by over 70%, reduce harmful emissions by 30%, and improve the living conditions of the rickshaw drivers. The organization with its mission to improve the lives of 1 million autorickshaw drivers in India has been successful in reaching out to 2,500 plus autorickshaw drivers in Bengaluru and over 100 plus drivers in the surrounding rural areas. The initiatives have helped the poor autorickshaw drivers in Bengaluru to have a better lifestyle and also serve the city in a better way.

Promoting Environmental Sustainability in the IPT System



CONVERSION OF AUTORICKSHAWS FROM PETROL TO CNG-COMPLIANT RICKSHAWS IN AHMEDABAD¹

Location of intervention

Ahmedabad, Gujarat

Period of intervention

2002

Implementing agency

Gujarat State Government

Issues and Challenges

In 2001, as per a survey done by the Central Pollution Control Board (CPCB) under the National Ambient Monitoring Programme, Ahmedabad was declared as the

fourth most-polluted city amongst the 85 cities in India. Vehicular pollution was estimated to be the primary source contributing to about 50%–70% of the air pollution. The Gujarat Pollution Control Board had

¹ The case study has been adapted from the Pro Poor Mobility: Policy Guidelines and Case Studies, TERI

identified autorickshaws as one of the major contributors to air pollution on account of the transportation activities. The Government of Gujarat prepared Air Quality Improvement Plans for Ahmedabad, Vadodara, Bharuch, Surat, Rajkot, Jamnagar, Vapi, and Gandhinagar in 2002. A key recommendation in these plans by the Gujarat Pollution Control Board was the conversion of all the autorickshaws to CNG.

Description of intervention

The implementation of shifting from petrol to CNG in the autorickshaw sector in Ahmedabad faced stiff opposition from transport operators as well as suppliers. The shift to CNG required technological changes at both the suppliers' and consumers' ends. The main areas of concern were the lack of infrastructure for refilling (stations or outlets, pipeline network, etc.), existing incompatible vehicles, and the lack of availability of conversion kits. The state government worked on ensuring an adequate CNG supply, adequate supply stations, and outlets to avoid long queues and also adequate availability of conversion kits in order to plan for an easy delivery of CNG to the customers. A total of 45 CNG stations were set up in the city on a public private partnership model. The Gujarat Pollution Control Board also gave the autorickshaw drivers an incentive of INR 10,000 per autorickshaw for the conversion. State, district, and local administration

helped in the procurement of loans. Banks offered soft loans to the first 1,000 autorickshaw owners who approached them for the installation of kits. All autorickshaws registered before 1991 were phased out and a new fleet was introduced on roads to reduce the emission levels. At the same time, significant attention was given to provide proper training and awareness to all the stakeholders.

The shift to CNG not only had an impact in terms of reduced emission levels, it was also estimated that the conversion to CNG would lead to an average saving of INR 100 per day per vehicle. This saving, however, came along with an initial investment of INR 20,000 per autorickshaw as autorickshaws required installation of CNG conversion kits. The vehicles were able to operate on both CNG as well as petrol as per the requirement and convenience of the owners after the installation. At present, CNG autorickshaws are mandatory in Ahmedabad.

Learning

Gujarat played on its strength of easy availability of gas in a usable and compressed state. The government also built a strong, financially viable model around the CNG transition, to ensure fair compensation for autorickshaw drivers. Awareness about the financial recovery of the CNG kit cost (which was 2 years) was spread amongst autorickshaw

drivers. The municipal commissioner of Ahmedabad city², started a series of meetings with autorickshaw manufacturers, spare parts suppliers, and banks to give loans and convince autorickshaw drivers to buy new autos. Stakeholder engagement was given due importance at an early stage of the new initiative. Policies and schemes were devised keeping the beneficiaries in mind.

Impact

A study³ conducted by the Central Pollution Control Board in 2015, gave insights into the level of absorption of the CNG as fuel for the vehicles of various cities. According to this study, 86% of three wheelers in Ahmedabad use CNG as fuel. This was the highest amongst the cities compared in this study. The Indian Automotive Industry—a report published by KPMG in 2010 indicates the avid support for CNG vehicles in Indian cities. The number of CNG vehicles in India have increased from 10,000 in 2000 to 2,22,400 in 2005 to 9,35,000 in 2009.⁴

² The case study has been adapted from the Pro Poor Mobility: Policy Guidelines and Case Studies, TERI <http://www.dnaindia.com/india/interview-ip-gautam-made-ahmedabad-a-cleaner-city-1492201>; last accessed on April 17, 2018.

³ http://cpcb.nic.in/upload/NewItems/NewItem_215_Report_Status_RoadTransport_SixCities.pdf; last accessed on April 17, 2018.

⁴ https://www.kpmg.de/docs/Auto_survey.pdf; last accessed on April 17, 2018.



PILOT TESTS OF RETROFITTING ICE-BASED AUTO RICKSHAWS INTO ELECTRIC AUTOS BY VOLTA¹

Location of intervention

Bangalore, India

Period of intervention

October 2015 to January 2016

Implementing agency

Volta Automotive India Pvt Ltd

Issues and Challenges

To bring down pollution levels, the Karnataka High Court ordered the phasing out of two-stroke autos from Bengaluru in April 2015. The team at Volta Automotive believed that two-

stroke autos will not get scrapped in the Indian social setting. Instead, they will be reused after being refurbished. Continual addition of new autos on the roads, and negligible scrapping of old ones, would not only lead

¹ Interview on February 14, 2017 with Mr Madan, CEO, at Volta Motor Corp.

to road congestion, but also cause excessive exhausts from inefficient two-stroke autorickshaw engines. Volta Automotive India saw this as an opportunity to retrofit ICE-powered autos to electricity-powered autos. This technology would facilitate the replacement of inefficient two-stroke engines to cleaner, electricity-powered engines, without generating scrap from old autos.²

Description of intervention

In October 2015, Volta Automotive India started with the pilot test of their retrofitted autos. Along with Bengaluru, the pilot tests were done in the cities of Delhi, Nagpur, and Colombo (Sri Lanka). During these tests, the autos completed more than 1,60,000 km of run in the above-mentioned cities. The technology has passed the necessary tests of the Automotive Research Association of India to be certified for conversion from combustion engine autos to electric autos.

While technology is expected to play a major role in transforming the landscape of the autorickshaw industry, Volta Automotive India recognized the social barriers which would slow down the desired transformation. The company designed initiatives around these barriers to speed up their programme. Autorickshaw drivers in India are most often plagued by daily rentals to be paid for driving the auto. This heavily

reduces their financial take back from a day's activity. Volta Automotive is designing initiatives to ensure the programme is beneficial to the autorickshaw drivers and, ultimately, leads them to own vehicles instead of paying daily rents to autorickshaw aggregators indefinitely. Assuming that an autorickshaw driver spends his own resources to get the vehicle retrofitted to an electricity-powered vehicle, the upfront cost was considered to be a lot. Volta Automotive is designing support initiatives to ensure that the programme leads to the driver owning the autorickshaw. Volta Automotive is in discussion with Indian banks, such as Canara Bank and Punjab National Bank for a prospective collaboration for provision of loans to autorickshaw drivers for retrofitting their autos. The break-even period is estimated to be a maximum of three years if an autorickshaw driver drives a 100 km per day and pays the daily instalment towards the repayment of the loan.

Volta Automotive India is not only addressing the concerns of autorickshaw drivers. The company recognizes the reluctance of banks to grant loans to individual autorickshaw drivers. Autorickshaw drivers are seldom committed to paying daily instalments towards loan repayment. The mechanism for the accountability of autorickshaw drivers to banks is not structured. Volta Automotive has developed a unique approach to provide financial security to lenders. Their technology installs a GPS-based mechanism to track the whereabouts of the autorickshaw drivers. The speed of autos can be reduced, in case the

daily instalments are not paid for a fixed number of consecutive days.

The pilot tests established that an autorickshaw driver would earn an additional amount of INR 250 per day (\$3.84) than what he saved while running the internal combustion-powered auto. Additional streams of revenue would be generated through advertisements on the autos. Apart from financial savings, this technology also contributes positively to the mental and physical well-being of autorickshaw drivers as there is less noise. The drive is less strenuous, due to the absence of gear and clutch mechanism. To address the safety concerns of passengers, the Volta Automotive retrofit model has installed an SOS button in the auto. This button can lead to speed reduction through the GPS-based centralized software in case of an emergency.

Learnings

Stakeholder management – Volta Automobile India displayed the strength of addressing the issues of both primary and secondary stakeholders for the successful implementation of their programme. While autodrivers as a stakeholder group were the primary beneficiaries, in this case, attention had also been paid to protect the lenders.

Impact

The pilot tests have been successful across India and Sri Lanka. Autorickshaw drivers have been approaching Volta Automotive India for a formal launch of the retrofit model for their autos.

² <http://www.autocarpro.in/news-national/karnataka-ban-polluting-stroke-autos-bangalore-8141>; last accessed on April 17, 2018.



REPLACEMENT OF PETROL-DRIVEN BAJAJ (A THREE-WHEELED TAXI) BY CNG BAJAJIS IN JAKARTA, INDONESIA

Location of intervention

Jakarta, Indonesia

Period of implementation

2006–present (ongoing)

Issues and Challenges

Replacement of two-stroke autos by CNG-powered four-stroke autos in Jakarta, Indonesia

Description of intervention

Bajaj Auto has been exporting three-wheeler autorickshaws to Indonesia

since the 1970s. These autorickshaws were four-seater (including the driver) orange-coloured vehicles, commonly known by the name of Bajaj. Bajajs were popular due to their small size and a high level of manoeuvrability on narrow streets. They used highly inefficient two-stroke engines and ran on a mixture

of petrol and oil, thereby producing a thick white smoke.

The Indonesian Minister of Environment issued a declaration in 2003 to control the air pollution sourced from motor vehicle exhaust emissions. The declaration put strict regulations on gas emission limits, procedures and test methods for testing exhaust emissions from vehicles. The regulation required new two- and three-wheeled vehicle types to meet Euro 2 standards beginning January 1, 2005 and current production vehicles with four- and two-stroke engines to meet Euro 2 standards beginning July 1, 2006 and January 1, 2007, respectively.¹

Bajaj Auto planned to replace the Orange Bajaj with the CNG-powered blue-coloured Bajajs and established a 95% owned joint venture in Indonesia with the local dealership partner PT Abdi Raharja in 2006/07.² The vehicles were supplied in semi-knocked-down condition from the Aurangabad plant. The final assembly and inspection were done in Indonesia. The company launched the three-wheeler (RE-4S [CNG]), in Jakarta in August 2006 to introduce a comfortable, fuel-efficient, environment-friendly, and low-cost public transportation vehicle in the country. By March 2017, more than 10,000 CNG-powered Bajajs had been

exported to Indonesia. The business in the initial years was slow due to the low level of acceptance of the new concept. The scarce availability of CNG also limited the growth.

The purchase of Bajaj autos by the dealer, inculcated faith amongst autorickshaw drivers with regards to this new technology. Bajaj worked with the local dealer to encourage ownership of autos. Loans were facilitated and daily, weekly, and monthly repayment schemes were developed. Training and capacity building was done for operating and maintaining the new Bajaj Autos and new service stations were built. The scarcity of CNG-fuel stations was a significant deterrent to the speedy replacement of the old, two-stroke Bajajs. However, the government worked on fixing this problem and development in infrastructure took place as demand for CNG increased.

As of 2012, the city had eight CNG-fuel stations and planned to build 35 more, although it was reported in 2014 that only six of the then ten existing stations were in operation.³ The Asian NGV Journal in the February 2015-issue³ mentions there are fewer than two dozen CNG stations in Jakarta.

³ http://www.theicct.org/sites/default/files/publications/ICCT_Jakarta-briefing_20141210.pdf; last accessed on April 17, 2018. This case study was developed in consultation with Mr Sampath Kumar at Bajaj Auto, Pune, who was primarily taking care of the Indonesian market of Bajaj Autos.

¹ <http://jdih.menlh.go.id/pdf/ind/IND-PUU-7-2003-Kepmen%20NO%20141%20Th%202003.pdf>; last accessed on April 17, 2018.

² http://www.bajajauto.com/report/AR_2006-07.pdf; last accessed on April 17, 2018.

Learnings

Bajaj worked with Indonesians on every aspect to win their faith with regards to the new CNG Bajajs autos. The case study highlights the importance of working in an all-encompassing way to take over an established market with a new product. As a manufacturing company, Bajaj could have chosen to limit its involvement in only pushing their new product onto the Indonesian market. However, they considered it necessary to create not just a market, but a sustainable market that takes care of a customer in aspects of customers' ability to purchase and maintain the product.

The case study also highlights the importance of the environment in which a business operates. However strong a business model be, the political climate always plays an important role in the success or failure of the business. In the case of Indonesia, although Bajaj left no stone unturned in creating a sustainable business model for CNG autorickshaws, the lack of CNG-fuel stations was a deterrent in the market picking up.

Impact

Other than the last approximate count of 1,500 Orange Bajaj, all other orange vehicles have been replaced. These 1,500 units have now stopped plying on the roads. These could not be replaced as they did not have complete documentation. Possibly, the owners were not interested in business continuity.



MARKET TRANSFORMATION THROUGH THE INTRODUCTION OF ENERGY-EFFICIENT ELECTRIC VEHICLES: THE E-TRIKES PILOT PROJECT IN MANDALUYONG, THE PHILIPPINES

Location of intervention

Mandaluyong, The Philippines

Period of implementation

April 2011

Implementing agency

Asian Development Bank (ADB) and Department of Energy, Republic of the Philippines

Issues and Challenges

The E-Trikes pilot project in Mandaluyong considerably reduced

fuel imports by the drastically reducing dependence of urban transport on fossil fuels. Additionally, the initiative has also contributed to greenhouse gas reduction.

Description of intervention

Currently, the main form of transport across cities in the Philippines is the ICE-based tricycle which runs on imported gasoline. In the Philippines, there are approximately 3.5 million¹ conventional combustion engine tricycles and motorcycles. These

¹ <https://www.doe.gov.ph/e-trike-project>; last accessed on April 17, 2018.

vehicles have a negative impact on the air quality, affecting many aspects of life in the country, ranging from national health to increased exposure to climate change risks.

The E-Trikes project endeavours to completely replace the inefficient ICE-based tricycles with a basic form of electric tricycle (E-Trike). The project is funded by the ADB and jointly implemented by the ADB and the Department of Energy, Philippines. As a pilot, 20 electric tricycles (e-Trikes) were introduced in the City of Mandaluyong, Philippines. The ADB worked with the Local Government

Units (LGUs) to develop finance mechanisms for financing E-Trikes. Landbank,² the national development bank of the Philippines disbursed the loan amount received from the ADB to the LGUs based in cities (in this case, Mandaluyong). The LGU may itself function as the E-Trike office or involve a private agency (or an NGO) to do the same. The primary task of the E-Trike office is to collect the daily payment (boundary) from the drivers and use the collected fund to repay the Landbank loan.³ EV Wealth Incorporated, a subsidiary of the Guevent Investments Development Corporation has been involved in the E-Trike pilot programme by the city of Mandaluyong LGU to finance the manufacturing and assembly of electric tricycles (E-trikes) in Mandaluyong.⁴

EV Wealth, Inc. provides an-end-to-end solution, assisting owners to obtain an E-Trike packaged with a registration, financing, and insurance (for the vehicle and the family). It also equips them with the know-how through regular training, seminars on operations, maintenance, road safety and courtesy, basic entrepreneurship, and finance management.⁶ According to Palermo Soriano, Jr., Chief Operating Officer of Guevent 'Previous attempts at phasing in electric tricycles were unsuccessful because their business models relied on government subsidies. Financing was an area of concern in that arrangement and

² <https://www.landbank.com/about>; last accessed on April 17, 2018.

³ https://www-cif.climateinvestmentfunds.org/sites/default/files/meeting-documents/philippines_eeevs_project_document_0.pdf; last accessed on April 17, 2018.

⁴ <https://www.devbnkphl.com/news.php?id=283>; last accessed on April 17, 2018.

that is where the business model of E-Trike is different.' The financing converts the driver's daily 'boundary' (the daily rental of operating the vehicle) into the amortization to pay for the E-trike daily operation. At the end of the loan period, the driver ends up owning the vehicle. A typical tricycle driver uses approximately \$520 worth (5 L) of gasoline to drive 100 km per day but can save about \$4 per day by switching to an electric tricycle, which consumes 5 kWh of power costing \$121.⁵ E-Trike can accommodate six people as compared to the old tricycles which could only accommodate three and increases the pocket earning of the driver.

Fast E-Trike charging stations installed in the city were expected to fully charge the E-Trike battery within 30 minutes. These chargers functioned well, as had been expected initially. However, later on, the batteries started getting heated more than the prescribed temperatures. A few even exhibited early loss of capacity because of excessive heating due to fast charging.⁶ Thus it can also be established that a vibrant support economy comprising skilled technicians and repair services are required for an initiative like this one to succeed.⁷

Learnings

While there is a sound business model for incentivizing drivers/owners to ultimately own E-Trikes, the

⁵ https://www-cif.climateinvestmentfunds.org/sites/default/files/meeting-documents/philippines_eeevs_project_document_0.pdf; last accessed on April 17, 2018.

⁶ <https://www.adb.org/sites/default/files/linked-documents/43207-013-phi-oth-01.pdf>; last accessed on April 17, 2018.

⁷ <https://www.treasury.gov/FOIA/Documents/2012-08-054%20FOIA%20Production%20of%20N.pdf>; last accessed on April 17, 2018.

accountability of non-performance of batteries and the related infrastructure were not addressed. As support infrastructure around a new technology can have grave financial implications for primary stakeholders (In this case the E-Trike owners/drivers), it is important to have an accountable and sound system of operations, maintenance, and repair of the main product and related technology. A vibrant local industry that will provide skilled technicians, repair and support services, and spare parts is an essential prerequisite for a change in technology.

Financial sustainability of key stakeholders was given due importance in the E-Trike pilot in Mandaluyong. In this case, the cost of insurance and training/capacity building built in the 'boundary' or amortization fee of the driver/owner played a huge role in the increased acceptance of E-Trikes by the drivers.

Impact

In the city of Mandaluyong, Philippines, EV Wealth has successfully deployed more than 100 units in under six months of its implementation (by March 2016).⁸ Rommel Juan, president of the Electric Vehicle Association of the Philippines (EVAP) says that EVAP is happy with the success of EV Wealth, 'and we see that the program really does help the Mandaluyong tricycle drivers because their income has tripled! We need more adoptions of this successful system nationwide.'⁹

⁸ <http://malaya.com.ph/business-news/special-features/mandaluyong-electric-tricycle-system-country%E2%80%99s-most-effective>; last accessed on April 17, 2018.

⁹ <http://jamesdeakin.ph/mandaluyong-boasts-of-having-most-effective-etrike-system-in-the-country/>; last accessed on April 17, 2018.



ELECTRIC THREE-WHEELERS IN KATHMANDU: A CLEAN-FUEL TECHNOLOGY BASED INTERMEDIATE PUBLIC TRANSPORT MODE

Location of intervention

Kathmandu, Nepal

Period of intervention

1993

Implementing agency

Ministry of Environment, Department of Transportation Management, Ministry of Finance and Valley Traffic Police, Government of Nepal

Issues and Challenges

The problem of air pollution in the valley of Kathmandu was escalating at an alarming rate and the concentration of pollutants was above the levels set by the World Health Organization. The reason for this pollution was largely attributed to motor vehicles and, specifically, the privately run three-wheelers that were running on diesel fuel. These vehicles with a seating capacity of 10 persons had become popular in Kathmandu

during 1989/92. To address the problem of air pollution generated by these vehicles, in 1992 the government banned the registration of new three wheelers and established the emission standards in 1994.

Description of intervention

The government could not entirely ban these vehicles from the roads due to various political and local economic reasons. To solve such issues, the government with the help of the

private sector and the civil society promoted the use of electric three wheelers in 1993 to fill the supply gap, until the diesel-operated three wheelers were completely banned by 1999.

The objective of the stakeholders involved in this project was to stop the use of polluting three wheelers run on diesel and to promote a cleaner transportation system. The initial efforts of the government were not successful, but in 1999, owing to the public involvement against these polluting vehicles, the government in its budget allotted incentives for owners of the three wheelers to replace their vehicles. This incentive was in the form of a 75% discount on customs duty on imports of 12–14-seater public transportation vehicles. Subsequently, the government passed a ban on the operation of diesel three wheelers in the valley.

Kathmandu Metropolitan Corporation with the support of USAID and the US-Asia Environmental Partnership Program started a pilot project under

the Global Resources Institute (a US-based NGO). The pilot programme included designing and converting diesel three wheelers to electric three wheelers and demonstrating that these vehicles were economically feasible. As part of the programme, eight electric three wheelers were introduced and test run for six months. This step by the city corporation succeeded in creating awareness, encouraged acceptance of the stakeholders, and brought them together to take forward the initiative.

Following this, the private sector expanded the fleet size of the electric vehicles, and, by 2002, sold over 600 electric vehicles. The manufacturing, sales, charging station operations, and operation of these new vehicles were in the hands of the private sector and were represented by the Electric Vehicle Association of Nepal. The electric vehicle manufacturing industry in Nepal now enjoys a 50% discount from taxable income to promote electric vehicles.

There were more than 600 electric three wheelers in Kathmandu in 2003

and they operate on 17 routes in the city, serving 120,000 passengers daily. The electricity used for charging the batteries is sourced from hydropower and hence has zero emissions. In addition, the battery is charged during the off-peak hours using the unutilized energy. The battery-leasing scheme has been introduced for the operators, where 50% is paid initially and the rest 50% is paid in installments at 7% interest.

Impact

There is zero local emissions and since the electricity is generated from the locally available hydropower, there are low generation emissions.

Also, since the electric vehicles are manufactured locally, there has been considerable employment generation. The introduction of electric three wheelers also saw women entering the sector to work as drivers.

Therefore, overall, this programme has provided environmental benefits, social benefits, and economic benefits to the people of Kathmandu.

Policy-based Interventions



PUERTO PRINCESA'S '50-50' TRAFFIC SCHEME FOR REDUCING CITY CONGESTION DUE TO TRICYCLES

Location of intervention

Puerto Princesa, Palawan, the Philippines

Period of intervention

2004

Implementing agency

Puerto Princesa City Authorities & the Asian Development Bank (ADB)

Issues and Challenges

The '50-50' traffic scheme was implemented to improve traffic conditions and air quality in the city of Puerto Princesa. The scheme was designed to halve the number of tricycles plying in the city streets.

Description of intervention

Transport plays an important role in the economy of the Philippines.

The National Quickstat published in February 2017 by the Philippines Statistics Authority, reports transport equipment to be the second most imported product category in the Philippines. Palawan is the largest province in the Philippines. Puerto Princesa, the capital city of Palawan is highly urbanized. Informal public transport plays an important role in the city of Puerto Princesa. Out

of the total tricycles plying in the district of Palawan, 70% are registered in the city of Puerto Princesa as per the Ombudsman report.¹ Attractive financing schemes are available for the conversion of a purchased motorcycle into a tricycle in the city. Despite the health and environmental hazards that tricycles bring², the city continues to experience increases in tricycle population due to high unemployment and absence of alternative livelihood.

To control the traffic congestion problem and improve air quality, the “50–50 traffic scheme” was initiated in 2005 by the Puerto Princesa city authority with support from the ADB. The then mayor played a significant role in implementing this scheme. This scheme segregated the tricycles plying in Puerto Princesa city in two distinctly identifiable groups. The segregation was initially done as a number-coding system. It later got converted into a colour-coding scheme. Two groups of tricycles, one group painted blue and the other painted white operated on alternate days of the week. The white-coloured tricycles plied on Monday, Wednesday, and Friday while the blue ones plied on Tuesday, Thursday, and Saturday. All tricycles were allowed to ply on Sundays. This scheme effectively

halved the number of tricycles plying the city streets and reduced air and noise pollution.

Fearing a decline in income, tricycle drivers and operators opposed the 50–50 scheme when the core group raised the idea in a public consultation in early March 2004. The core group proposed that a two-week experiment be held to determine the proposed measure’s impact. The tricycle drivers and operators agreed, with the caveat that the scheme be discontinued once proven to yield negative results. After a day, drivers/operators observed that the scheme had doubled their day’s income from an average of P400 to P800. The drivers were able to maintain their weekly income despite being operational only for four days.

After another series of consultations, the tricycle drivers and operators agreed to the 50–50 scheme provided that the local government would explore possible alternative livelihood opportunities for their families to lessen their economic dependence on the tricycles. Having obtained the consensus, the city council passed City Ordinance No. 271 in November, 2004 formally adopting the 50–50 scheme. The scheme was implemented by the City Traffic Management Office, under the office of the City Mayor. The ADB provided funding to drivers affected by the scheme through a lending mechanism and establishment of the Tricycle Drivers and Operators Cooperative. Technical training on the preventive maintenance for tricycles

was given to mechanics, and hence established an alternate revenue source amongst the drivers.

Learnings

- Broader stakeholder participation and dialogue is crucial. Tricycle drivers and their organizations were highly critical of the programme at the start, fearing economic dislocation. But through extensive consultations and exchange, issues and recommendations (e.g., economic impact of traffic volume reduction, alternative livelihood opportunities, and health impacts) were clarified. Eventually, a consensus to forge ahead with the programme emerged.
- Political will and skill of the city’s political leadership is important. The 50–50 scheme was launched a month before the May election. The Mayor pushed through with the programme using the two-week 50–50 experiment as a way to gauge the impact of the programme and reach out to its critics. And when the positive initial results surfaced, he pressed ahead to achieve consensus by personally conducting extensive dialogues with tricycle drivers and other stakeholders.

Impact

Out of the 5,000 cycles plying in Puerto Princesa, only 2,500 ply in a day. This has reduced traffic dramatically. Days on which drivers are unable to drive, they are not involved in any other industry.

¹ <http://www.ombudsman.gov.ph/UNDP4/wp-content/uploads/2012/12/Chap-07.-Urban-Transport-30Nov06-UPF.pdf>; last accessed on April 17, 2018.

² Cases on the Diffusion and Adoption of Sustainable Development Practices; last accessed on April 17, 2018.



03

PERKOTAAN

05

PERKOTAAN

112

112

PERKOTAAN



SHIFT SYSTEM: SOLVING THE PROBLEM OF OVERSUPPLY IN ANGKOTS IN BOGOR, INDONESIA

Location of intervention

Bogor, Indonesia

Period of intervention

2009

Implementing agency

Bogor City Angkot Association and Bogor City Government

Issues and Challenges

Angkots, 10–12-seat minivans, are a dominant public transport mode in Bogor, Indonesia. This informal transport system, while meeting the mobility needs of the city, has led to serious traffic problems in the city of Bogor. There are more than 8,000 Angkot vehicles that are licensed to operate in Bogor. A large number of Angkot vehicles lead to competition amongst the drivers to increase their patronage and thus their revenue. As a result of the declining patronage of Angkots, the drivers have resorted to unsafe driving practices, which lead to congestion and safety problems. They cause congestion in the limited road space and create unsafe road conditions due to fast-driving practices.

Description of intervention

To solve this problem, the Bogor City Angkot Association and the government of Bogor city took a decisive step in the year 2009 to introduce a shift system for its operations. Under this system, shifts were introduced; the Angkot vehicle could operate only in one of the shifts, either A or B or, sometimes, a third shift C, depending upon the number of Angkot vehicles operational on a given route. The A-shift vehicles operated on certain days and B-shift vehicles operated on the other days. Such a system has reduced the number of Angkot vehicles operating on the roads to half and has offered multiple advantages to the operators, passengers, and the city administration. The first advantage is the reduction in congestion as the number of vehicles has reduced by half. The Angkot operators have benefitted as they are able to earn the same revenue doing half the shift. The competitive driving practices are no longer adopted by the Angkot drivers, thus addressing the safety issues. The passengers are also satisfied with safer operations and are unaffected by

the reduction in service frequency of the Angkots as there is unnoticeable increase in their waiting time. In case of A, B, and C shift system; two of the three shifts are allowed to operate at any point of time. A three-shift system is adopted for only those routes where the demand is too high to be catered by a two-shift system.

Impact

By 2011, the shift system had been implemented in 11 of the 23 Angkot routes in the city. This system has been immensely successful, as it has reduced almost 8% of the vehicles from the city streets. The most appreciable aspect of the whole system is that there are almost zero adverse impacts. Urban traffic condition in Bogor city has improved; congestion has reduced, safety has increased, while, at the same time, there has been no loss of income to the Angkot drivers. The shift system has truly offered a win-win situation for all the stakeholders.

CONCLUSION

The case studies present solutions to a wide range of issues (including safety concerns, lack of fleet organization, environmental and congestion related concerns and lack of infrastructure plaguing the auto-rickshaw sector. One or even more than one case study may not provide a solution in its entirety to make the auto-rickshaw system sustainable. However, common knowledge more than one cases may be adapted and customised as per city physical, social and economic settings to improve the auto-rickshaw system in the city.

The set of case studies in this compendium, are mostly imparting case based knowledge about specific cities. While this learning may vary from city and city and be highly dependent on the city's political, economic and social climate, there are some lessons which are more general in nature. The case of Alwar Vahini for

instance, exemplifies the management co-ordination between different organizations operating in the same city to make an Intermediate public transport system successful. While the players operating in a city may vary, the fact that these players will have to play on their respective strengths, thereby complementing each other is an important lesson that cannot be taken away from any city.

While regulations play a major role in determining the quality and supply of intermediate public transport in the city, initiatives like G-Auto in the cities of Gujarat are playing a huge role in supplementing the public transport system. A few case studies in this report highlight instances where individuals or private players have instrumented movements to revolutionise intermediate public transport.

Discussion with auto-rickshaw drivers also brought to light the way in which cab aggregator models are affecting the earnings of the auto rickshaw drivers. Various interviews in the cities of New Delhi, Bangalore and Chennai revealed that businesses of auto rickshaw drivers has been drastically hit due to the low cost of operation of cab aggregators which is being passed on to the consumer. This is a unique example more than one services (offered by the same company) which competing against each other in the market. From there, emanates a need for regulating the supply of intermediate public transport services in cities.

The case studies in this compendium clearly bring out the role that auto rickshaws and intermediate public transport play in cities.