An Introduction to Pune City's Mobility Ecosystem

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Executive Summary

Pune has been selected as the first Lighthouse City as part of the Urban Mobility Lab, a program initiated by the NITI Aayog and developed by Rocky Mountain Institute (RMI) to inform India's national mobility transition by supporting mobility transitions in Indian cities through identifying, integrating, implementing, scaling mobility studies and pilot projects.

As part of the Urban Mobility Lab, Pune will host a multiday Solutions Workshop in October 2018, bringing together selected project teams, government officials, and subject-matter experts with the goals of gathering a common awareness and understanding of the city's mobility ecosystem, supporting the development and implementation of a portfolio of mobility studies and pilot projects, and exploring opportunities for integration between projects and organizations.

In preparation for the Pune Solutions Workshop, RMI conducted a 'needs assessment' process to review, understand and document aspects of Pune's complex and dynamic mobility ecosystem. **This document is the result of a needs assessment for Pune city. It offers an overview of existing mobility plans, policies, and projects within and around Pune. In doing so, it supports a shared awareness and understanding of Pune's mobility ecosystem, and helps foster integration across the participants and projects of the Pune Solutions Workshop.**

The needs assessment had four steps; literature review, a workshop, ecosystem mapping, and expert interviews. Some key takeaways from the needs assessment include:

1. Public transit and non-motorized transit (NMT) have been identified as the strong backbone of Pune's transportation system, and represent the biggest opportunity for continued improvement and potential integration with new mobility solutions.

2. Pune has a portfolio of thoughtfully designed and detailed policies and plans. There is an opportunity to support the timely implementation of proposed solutions through a structured and purposeful integration framework.

3. With policies, plans, and funding existing at all levels of governance (city, state, center), there is an opportunity to improve alignment, coordination, and integration of these items both within and across each level.

4. With many plans already developed and underway in Pune, the Urban Mobility Lab has an opportunity to play a role in supporting and integrating a number of existing initiatives across various areas of the mobility ecosystem. These opportunities may fall into six integrated mobility themes: traffic and parking management, non-motorized transit (NMT), public transit, intermediate public transit, booking and payment, and electric mobility.

The Urban Mobility Lab and Pune as the First Lighthouse City

Background on the Urban Mobility Lab

Cities are on the verge of a mobility transformation. Of all energy-using sectors of the economy, urban mobility is perhaps the one that has most captured the attention of government, business, and civil society leaders around the world. Globally, transportation is the fastest-growing source of fossil-fuel consumption and carbon-dioxide emissions. Rapid urbanization has the potential to accelerate this trend.

This trend is especially important in India, where projections suggest the country's urban mobility demand could increase dramatically as the urban population soars to over 600 million by 2030. Yet India has an opportunity to meet—and even reduce—future mobility energy demand with transformative solutions that promote affordable, accessible, efficient, safe, and clean mobility.

Indian cities have the potential to act as demonstration points for India's national mobility transformation. Like all cities, however, Indian cities face challenges identifying, implementing, and scaling appropriate mobility solutions for many reasons. Two of the main challenges are adapting tried and tested solutions to local conditions and integrating them with existing agencies, plans, and projects. There is an opportunity to support cities in overcoming these challenges through greater access to global best practices, collaboration between city governments and the private sector and coordination across multiple levels of government. Rocky Mountain Institute (RMI) has developed the Urban Mobility Lab with central, state, and city government agencies in India to meet this opportunity.

The Urban Mobility Lab is a platform that supports a replicable process for identifying, integrating, and implementing mobility solutions in leading geographies, called Lighthouse Cities—a concept conceived by 75 business, civil society, and government leaders at a 2017 workshop hosted by the NITI Aayog and RMI.

The Urban Mobility Lab works with Lighthouse Cities to adapt solutions to local needs and support implementation. The experiences and lessons will be used to guide and accelerate the scaling of mobility solutions nationally and globally.

Objective

The Urban Mobility Lab supports the development and implementation of mobility solutions for Indian cities. It works with Lighthouse Cities and Scaling Partner cities* to adapt solutions to local needs and support implementation.

Approach

For each Lighthouse City, the Urban Mobility Lab:

1. Conducts a needs assessment to understand a city's transportation system
2. Recruits and selects project teams to offer solutions to support the city's mobility objectives
3. Facilitates a Solutions Workshop to collaboratively support the design, integration, and implementation of project teams' solutions
4. Supports monitoring, evaluation, learning and scaling of projects

*Scaling Partner cities will work with and learn from Lighthouse Cities; they may send representatives to a Solutions Workshop and serve as a secondary implementation geography for mobility projects, and could eventually become Lighthouse Cities.

Core components of the Urban Mobility Lab

Knowledge Building	City Analysis	Solutions Development	Implementation & Evaluation	Learning & Scaling
Tools: » Interactive online forum » City solutions handbook	**Tools:** » Needs assessment » User-friendly evaluation tool	**Tools:** » Team recruitment » Solutions workshop	**Tools:** » Implementation support » Follow-up convenings	**Tools:** » Learning mechanism » Scaling
Partners: » Central agencies such as NITI Aayog and Ministry of Housing and Urban Affairs » State government » City government	**Partners:** » City government » State government » Civil society groups	**Partners:** » City government » State government » Private-sector companies » Civil society groups	**Partners:** » City government » State government » Private-sector companies	**Partners:** » Central agencies such as NITI Aayog and Ministry of Housing and Urban Affairs » City government » State government » Private-sector companies

Pune as the first Lighthouse City for mobility solutions

In November 2017, the CEO of NITI Aayog, Amitabh Kant, announced a Grand Challenge to select India's first Lighthouse City for mobility solutions. The Grand Challenge, run jointly by NITI Aayog and RMI, received applications from Bangalore, Karnataka; Kochi, Kerala; Hyderabad, Telangana; Mumbai, Maharashtra; Pune, Maharashtra; and Visakhapatnam, Andhra Pradesh.

After a review process that involved meetings with and presentations by cities as well as the careful review of applications by independent experts, Pune has been selected as the India's first Lighthouse City for mobility solutions. Pune Municipal Corporation is the initial host of the Urban Mobility Lab.

Pune was chosen for its strong government leadership, demonstrated action on key aspects of urban mobility, and progress on the Smart Cities Mission. The other five cities will also be engaged as Scaling Partners, and may become future hosts of the Urban Mobility Lab. Together, the five states involved in the Urban Mobility Lab's network represent 20% of India's population and 30% of India's economic output.
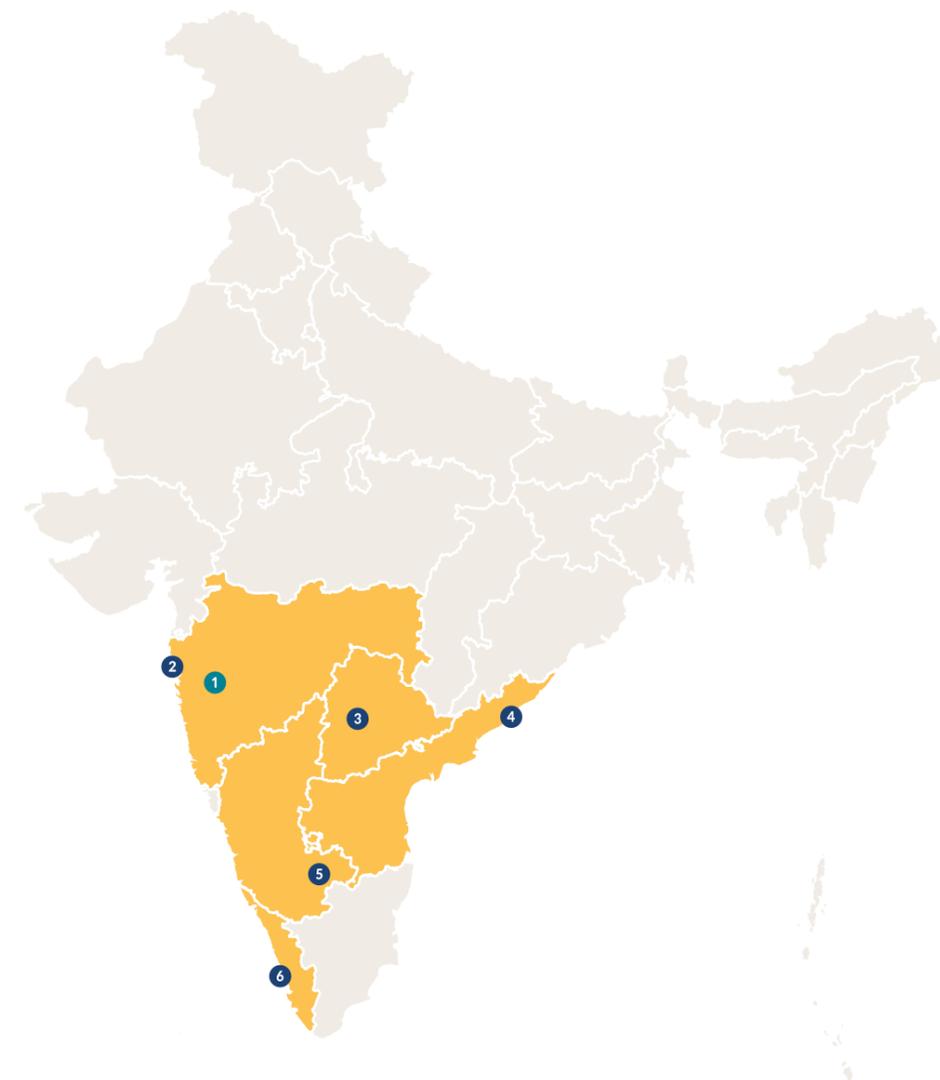
India's first Lighthouse Cities for mobility solutions:

1 Pune
2 Mumbai
3 Hyderabad
4 Visakhapatnam
5 Bangalore
6 Kochi

governing agencies and implementation bodies has resulted in a number of new mobility initiatives. This rapid pace of change and diversity of actors and activities in Pune can pose a challenge for stakeholders to stay up-to-date with relevant initiatives.

The city needs assessment is a process designed to review, understand, and document aspects of Pune's complex and dynamic mobility ecosystem. The objective of the assessment is to offer an overview of existing mobility plans, policies, and projects, within and around Pune, in order to create a shared awareness and understanding of mobility and mobility initiatives in Pune. Building a common understanding can help foster collaboration and integration across the participants and projects of the Pune Solutions Workshop. The needs assessment process was comprised of the four steps outlined below.

Pune City Needs Assessment Process and Objectives

Needs assessment: process

Pune City has long been known as the bicycle city of India, and was recently recognized as the most livable city in India by the Ministry of Housing and Urban Affairs. Pune is one of the fastest growing cities in India, driven by a growing technology sector, a thriving student population, and increasing urbanization. The proactive nature of Pune's

1 Literature review	2 Workshop	3 Ecosystem mapping	4 Expert interviews

Needs assessment: Objectives

Pune Solutions Workshop: October 2018

A primary function of the Pune needs assessment is to inform the design of the Pune Solutions Workshop. The Solutions Workshop is a facilitated, multiday event that provides an opportunity to gather a common awareness and understanding of a city's mobility ecosystem, develop a portfolio of studies and pilot projects for the city, and explore opportunities for integration between projects and organizations.

The Solutions Workshop supports project work by advising on business models, identifying and developing solutions to regulatory barriers, and customizing implementation support for individual projects.

Needs assessment: objectives

Shared understanding	Solution identification	Solutions workshop design
» Key stakeholders » Policies, plans & projects » Opportunities & challenges	» Opportunities to support existing solutions » Opportunities for new solutions and integration » Project teams and potential themes for the Solutions Workshop	» Key decision-makers to involve » Barriers to address » Agenda design

Literature review

The needs assessment process began with a review of existing papers and policies relating to mobility in Pune. Below is a list of the documents reviewed; asterisks indicate documents that are recommended for additional reading for Pune Solutions Workshop participants.

The recommended documents were selected to serve as a portfolio of documents that together offer a comprehensive, high-level overview of Pune mobility system's policies, targets, challenges, and opportunities.

Document name	Year	Link
Comprehensive mobility plan—PMRDA, interim report, July 2018	2018	To be sent out to Solutions Workshop participants
Sustainable urban transport*	2018	To be sent out to Solutions Workshop participants
Pune mobility presentation*	2018	To be sent out to Solutions Workshop participants
EVSE post-workshop report	2018	To be sent out to Solutions Workshop participants
Parking policy for Pune city	2017	To be sent out to Solutions Workshop participants
Pune cycle plan	2017	www.punecycleplan.wordpress.com/
Urban street design guidelines	2016	www.itdp.in/wp-content/uploads/2016/07/Urban-street-design-guidelines.pdf
Walk smart: policy for pedestrian facilities and safety in Pune city	2016	www.smartcities.gov.in/upload/development/5a9009c9843cdPolicy%20for%20Pedestrian%20Facilities%20and%20Safety%20in%20Pune%20City.pdf
Pune smart city proposal	2015	www.pmc.gov.in/en/smart-city-proposal
City development plan	2012	www.pmc.gov.in/sites/default/files/project-glimpses/Draft_City_Development_Plan_for_Pune_City_2041_Vol-1.pdf
Comprehensive mobility plan for Pune city	2008	www.wricitieshub.org/sites/default/files/Comprehensive%20Mobility%20Plan%20for%20Pune%20City.pdf

Charging infrastructure workshop

The Government of Maharashtra (GoM), Pune Municipal Corporation (PMC), and Rocky Mountain Institute (RMI) co-hosted a roundtable discussion on electric vehicle (EV) charging infrastructure for Pune and Maharashtra at the Municipal Commissioner's Office in Pune on 14 June 2018. The workshop and resulting report specifically addressed transportation electrification in Pune. While this was an important discussion and has implications for future EV and charging infrastructure deployment in Maharashtra, it is important to note that electrification is one part of urban mobility in India. The Workshop supported an understanding of the appropriate role for electric mobility within the broader mobility ecosystem and helped inform the design of the Pune Needs assessment in terms of relevant stakeholders in the area of electric mobility. The objectives of the roundtable discussion were to:

1. Gather insights on local conditions and plans for EV charging infrastructure buildout to inform potential pilot projects on electric mobility as one part of the Urban Mobility Lab in Pune.

2. Provide support to the Government of Maharashtra in soliciting feedback and input from local stakeholders on barriers and opportunities to deploy EV charging infrastructure in Pune, as well as the rest of Maharashtra.

3. Share global best practices for EV charging infrastructure planning and deployment.

4. Foster connections and collaboration across a broad network of relevant stakeholders and decision makers that will shape the future of EV infrastructure in Pune and Maharashtra.

Ecosystem mapping

PMC and RMI collaboratively identified a list of key public agencies and non-profit organizations within the Pune Metropolitan Region that are involved in decision-making for Pune's urban mobility system. The key agencies, projects and solutions providers are listed in the Ecosystem Mapping section of this report. The mapping exercise attempts to club agencies into categories in order to distill the complex and dynamic nature of Pune's mobility ecosystem into an easy-to-understand form. This mapping exercise is not comprehensive or exhaustive. It offers an initial assessment of agencies and projects relevant to the Urban Mobility Lab in Pune and its participants.

Expert interviews

To supplement the literature review of policy documents and reports, interviews were conducted with a number of key stakeholders and experts that were identified in the stakeholder mapping process. The objective of the interviews was to understand perspectives on the challenges and opportunities in Pune's mobility system. Interviews included representatives from the following organizations:

1. Pune Municipal Corporation (PMC):
   » Projects » Roads » Vehicle Depot » Environmental » IT
   » Cycle » Electrical

2. Pune Metropolitan Regional Development Authority (PMRDA)

3. Regional Transport Office (RTO)

4. Deputy Commissioner Police—Traffic

5. Central Institute of Road Transport (CIRT)

6. Maharashtra State Road Transport Corporation (MSRTC)

7. Automotive Research Association of India (ARAI)

8. Pune Mahanagar Parivahan Mahamandal Limited (PMPML)

9. Maha Metro

10. Pune Smart City SPV

11. The Institute for Transportation and Development Policy (ITDP)

12. 100 Resilient Cities (100RC)

13. Center for Environment Education (CEE)

14. Parisar

Pune city is the primary subject of this needs assessment process. To fully understand Pune's mobility ecosystem, it is important to include some detail on the surrounding areas—such as Pimpri-Chinchwad—as well as the state- and national-level.

Pune's Mobility Stakeholder Ecosystem

04

Mobility planning is conducted within three geographic areas

Pune City has a complex network of stakeholders in the mobility sector, including government agencies, planning bodies, special purpose vehicles (SPVs), Central Statistics Offices (CSOs)/Non-government Organizations (NGOs), and multi-city mobility initiatives. There are government agencies at the central, state, and city level that oversee different aspects of policy, planning, design, implementation, and financing.

This section gives an overview of the primary government, government-owned (i.e., SPVs), and non-profit actors in Pune's mobility space. It also discusses existing public transit infrastructure, as well as plans for future development and expansion. The goal of this stakeholder mapping is to provide a common understanding of the stakeholders in Pune's mobility ecosystem. Mapping the private-sector players was not part of this exercise. A similar exercise for the private sector would complement this exercise and could be considered in the future.
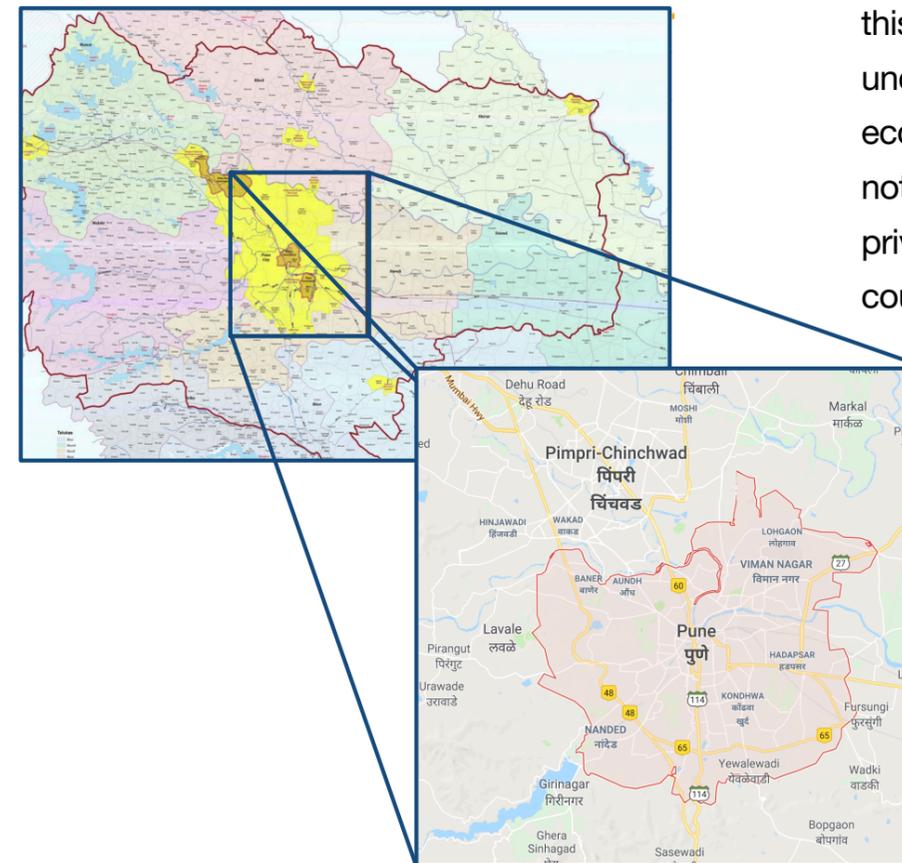
Above:
Pune Metropolitan Region
(outlined in red)

Left:
Pune Municipal Corporation area (outlined in red)
Pimpri-Chinchwad Municipal Corporation area to the northwest

Pune's mobility ecosystem: key agencies

Central Government Agencies

NITI Aayog
Ministry of Housing and Urban Affairs
Ministry of Power
Ministry of Road Transport and Highways

State Government

Government of Maharashtra

Distribution Company (DISCOM)

Maharashtra State Electricity Distribution Co. Ltd. (MSEDCL)

Research and Regulatory

Association of State Road Transport Undertakings (ASRTU)
Regional Transport Office (RTO)
Central Institute of Road Transport (CIRT)
Automotive Research Association of India (ARAI)

City Government Agencies

Pune Muncipal Corporation (PMC)
Pune City Traffic Police
Pune Metropolitan Regional Development Authority (PMRDA)
Pimpri-Chinchwad Municipal Corporation (PCMC)
Pune Smart City Development Corporation Ltd. (PSCDCL)

Transit Agencies

Pune Mahanagar Parivahan Mahamandal Ltd. (PMPML)
Maharashtra State Road Transport Corporation (MSRTC)
Pune Metro

CSO/NGO

The Institute for Transportation and Development Policy (ITDP)
Parisar
Center for Environment Education (CEE)

Multicity Initiatives

Smart City
Rocky Mountain Institute (RMI), Urban Mobility Lab
Rockefeller 100 Resilient Cities

Pune's mobility ecosystem: projects and providers

Transit Infrastructure Plans

MI card (payment card)

Pune Metro

PMRDA Ring Road

BRT expansion

Cycle track

Parking policy

Electric bus tender

Pune Smart City area-based development

Aundh-Baner-Balewadi (ABB)

Cycle Ecosystem

Yulu

Mobike

Pedl by Zoomcar

Pune Cycle Plan

Cycle track

Intermediate Transit Ecosystem

Private bus operators

Auto rickshaws

Uber

Ola

Pune's mobility ecosystem: infrastructure and mode share

Existing infrastructure:

» Cycle track—50 kilometers

» BRT—16 kilometers

» Bus fleet—2000 (CNG and diesel)

Planned infrastructure:

» BRT Expansion—68.8 kilometers total in Pune; 90 kilometers total in Pune Metropolitan Area

» Cycle track—824 kilometers

» Pune Metro (Maha Metro)—31 kilometers

» PMRDA Metro—23 kilometers

» Bus fleet—500 electric & 450 CNG
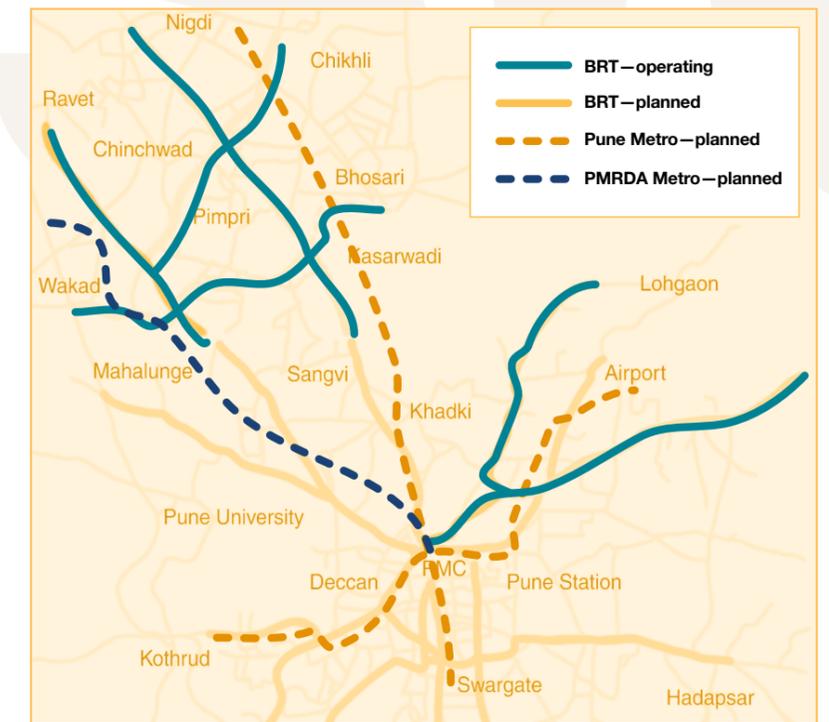
Pune's mode share (2018)
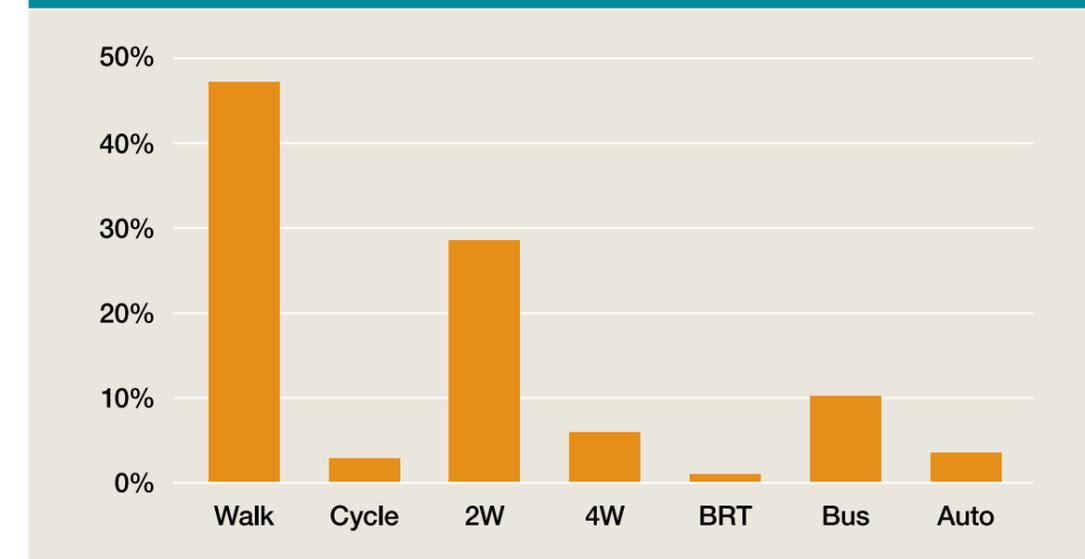
Pune's stakeholder ecosystem: Pune Municipal Corporation

| Agency	Description
Pune Municipal Corporation (PMC)	The Pune Municipal Corporation (PMC) is the civic body that governs Pune. It is in charge of the civic needs and infrastructure of the metropolis, which covers an area of 331 square kilometers and has 3.4 million residents (2011 census).
PMC—Chief Engineer (Projects)	The projects department is working towards achieving Pune city's mobility goal "to focus on moving people safely and economically by emphasizing sustainable modes of travel like public transport and non-motorized transport." The department aims to "move people, not vehicles" by emphasizing the pre-eminence of public transport and non-motorized transport.
PMC—Roads	The Roads Department is responsible for the construction and maintenance of all the roads that fall within the limits of PMC.
PMC—Vehicle Department	The Vehicle Department is responsible for provision of vehicles and equipment within the PMC. The departmenthas a total fleet of 1,080 vehicles, of which 555 vehicles are for the Solid Waste Department for the collection, transportation, and disposal of dry and wet garbage.
PMC—I.T.	The Information Technology Department is responsible for creating and implementing digital solutions for PMC departments. They are also a channel for community engagement and communication via social media platforms and their citizen engagement platform, Citizen Assistance Response and Engagement (C.A.R.E.)
PMC—Bicycles	The Cycle Department is a newly formed department tasked with implementing the Pune Cycle Plan. The plan is part of the PMC's initiatives to transform transportation in the city. The Pune Cycle Plan was prepared in 2016 to help make Pune cycle-friendly.
PMC—Encroachment	The Encroachment Department is an independent department of the PMC, which is under the control of the Additional Municipal Commissioner (Estate). There are 15 Encroachment departmental offices in 15 ward offices which report to the main Encroachment Department.

Pune's stakeholder ecosystem: Agencies

Agency	Description
Pimpri-Chinchwad Municipal Corporation (PCMC)	City government: Pimpri-Chinchwad Municipal Corporation is the civic body that governs Pimpri-Chinchwad. As of the 2011 census, Pimpri-Chinchwad had a population of 1.72 million and an area of 181 square kilometer.
Pune Metropolitan Regional Development Authority (PMRDA)	Planning body: Pune Metropolitan Region Development Authority is the Planning and Development Authority for the Pune Metro Region with an outlook towards channelizing growth in a strategic and orderly manner.
Regional Transport Office (RTO)	State government: The Regional Transport Office is an organization of the Government of India responsible for maintaining a database of drivers and vehicles, issuing driving licenses and collecting vehicle registration duties. The RTO is also responsible for inspecting vehicles' insurance and overseeing pollution and safety tests.
Deputy Commissioner of Police (DCP) —Traffic	City and state government: The DCP is a branch of the Pune City Police Department. Pune City Police is the law enforcement agency with jurisdiction over Pune and Pimpri-Chinchwad. The city police is division of the State Police Department of Maharashtra.
PMPML	SPV: Pune Mahanagar Parivahan Mahamandal Ltd. is the public transport bus service provider for the twin cities of Pune and Pimpri-Chinchwad in the Pune Metropolitan Region and is jointly owned by PMC and PCMC at a 60:40 split.
Maha Metro	SPV: Maharashtra Metro Rail Corporation Limited is a 50:50 jointly owned company of Government of India and Government of Maharashtra responsible for the implementation of all metro projects in the State of Maharashtra outside Mumbai Metropolitan Region. Pune Metro is a metro rail-based rapid transit system that is currently under construction to serve the city of Pune and its industrial sister city, Pimpri-Chinchwad.

Pune's stakeholder ecosystem: Organizations

Organization	Description
Maharashtra State Road Transport Corporation (MSRTC)	State government: The Maharashtra State Road Transport Corporation is the state-run bus service of Maharashtra, and provides intra-state and inter-state bus services. MSRTC has 16,500 buses that carry 7 million passengers per day.
Parisar	NGO: Parisar is a civil-society organization working on lobbying and advocacy for sustainable development. In the transport sector, they focus on walking and cycling facilities and reliable, affordable public transport. It has an active engagement with the PMC, and has played an important role in supporting certain schemes and policies that further the cause of sustainable transport.
Institute for Transportation and Development Policy (ITDP)	NGO: ITDP is a global nonprofit that provides technical expertise to accelerate the growth of sustainable transport and urban development around the world. ITDP has offices in Brazil, China, India, Indonesia, Kenya, Mexico, and the United States.
Center for Environment Education (CEE)	NGO: CEE is a national institution, headquartered in Ahmedabad, with a mandate to promote environmental awareness nationwide. CEE develops innovative programsand educational material, and builds capacity in the field of education and communication for sustainable development.
Association of State Road Transport Undertakings (ASTRU)	Government organization: ASRTU brings together all the state road transport undertakings on a common platform with the aim of pooling their resources and knowledge to tackle common challenges and improve performance. ASRTU is an apex coordinating body working under the aegis of Ministry of Road Transport & Highways. ASRTU has 62 members who collectively operate 150,000 buses and serve 70 million passenger per day.
Maharashtra State Electricity Distribution Company Ltd. (MSEDCL)	DISCOM: MSEDCL, also known as Mahavitaran, distributes electricity to consumers across the state of Maharashtra, with the exception of Mumbai.

Agency	Description
Automotive Research Association of India (ARAI)	Government research institute: ARAI is a research association of the Automotive Industry with the Ministry of Heavy Industries and Public Enterprises. ARAI provides technical expertise in R&D, testing, certification, homologation, and framing of vehicle regulations.
Central Institute of Road Transport (CIRT)	Government research institute: CIRT offers management development programs covering general management, transport operations, and maintenance engineering. Additionally, CIRT undertakes consulting and research projects related to transport policy, transportation planning, traffic management, maintenance management, materials management, human resource management, and management information systems. CIRT was established in 1967 as a joint initiative between the Ministry of Shipping & Transport and the Association of State Road Undertakings.

Multi-city initiatives that relate to mobility

Organization	Description
100 Resilient Cities (100RC)	100RC supports the adoption and incorporation of a view of resilience that includes shocks—earthquakes, fires, floods, etc.—and stresses that weaken the fabric of a city on a day-to-day or cyclical basis across 100 cities globally.
India's Smart City Mission	The Smart Cities Mission is an urban renewal and retrofitting program by the Government of India with the mission to develop 100 cities across the country as citizen friendly and sustainable. Pune Smart City Development Corporation Limited (PSDCL) is a Special Purpose Vehicle (SPV) of the PMC responsible for the implementation of Smart City Projects in Pune. There is a governing board to manage the affairs of the SPV, which is supported by various committees and the Chief Executive Officer.
Urban Mobility Lab	The Urban Mobility Lab is a platform that supports a replicable process for identifying, integrating, and implementing mobility solutions in leading geographies, called Lighthouse Cities. The Urban Mobility Lab works with Lighthouse Cities to adapt solutions to local needs and support implementation. The experiences and lessons will be used to guide and accelerate the scaling of mobility solutions nationally and globally.

Policy context and existing transportation initiatives

The following pages outline clean mobility policies at the central and state government levels, and the main transportation policies and existing initiatives at the city level in Pune. A shared awareness and understanding of relevant policies and ongoing initiatives is critical to identifying, integrating, and implementing mobility studies and pilot projects that support the current mobility ecosystem.

05

Overview of Existing Policies and Projects

Central government's clean mobility policies and plans		
Name	**Overview**	**Goal**
National Urban Transport Policy (2014)	Aims to provide improved mobility and sustainability by focusing on the movement of people, not vehicles. This policy takes a comprehensive approach to mobility, including urban transport planning, infrastructure design,public transport, non-motorized transport, traffic management, financing, governance, and capacity building. The policy was developed by the Ministry of Housing and Urban Affairs (MoHUA).	To ensure safe, affordable, quick, comfortable, reliable and sustainable access for the growing number of city residents to jobs, education, recreation and such other needs within Indian cities.
National Electric Mobility Mission Plan 2020 (2013)	Promotes the shift to electric and hybrid vehicles throughout the country through a variety of policy levers such as demand-side incentives, supply-side incentives, supporting the development of charging infrastructure, and promoting R&D for electric vehicle components.	To achieve a vehicle population of about 6–7 million electric/hybrid vehicles in India by the year 2020.
Faster Adoption and Manufacturing of Hybrid & Electric Vehicles (FAME) 1.0 (2015) and 2.0 (to come)	Provides financial incentives for the adoption of and market creation (i.e., charging infrastructure) for electric and hybrid vehicles. FAME 1.0 is in effect through September 30, 2018; FAME 2.0 will likely focus on new energy vehicles for public transport, commercial purposes and high-speed two-wheelers. Implemented by the Department of Heavy Industry.	To support the National Electric Mobility Mission Plan (NEMPP) 2020 with the goal of reaching 6–7 million electric/hybrid vehicles in India by 2020.
Green Mobility Scheme (in development)	Provides funding to selected cities for implementing clean transportation plans. The policy—which is not yet in effect, and still being drafted—was initially proposed by MoHUA in November 2017. Cities will be selected through a Green Mobility Challenge (GMC), which will require cities to submit a Green Mobility Plan.	To address infrastructure for bus-based transport; to bring in private entrepreneurial spirit in operations; to promote Non-motorized Transport (NMT) and last-mile connectivity; to promote alternate fuels and electric mobility; to focus on Urban Freight and address high fatalities of pedestrians.

Name	Overview	Goal
Motor Vehicles Amendment Bill (not yet passed)	Amends the Motor Vehicles Act of 1988, which regulates all aspect of road transport vehicles. The amendment includes a number of elements designed to make roads safer and cleaner, such as increasing fines for breaking road rules, instituting fines for car manufacturers whose vehicles are found to be causing harm to the environment or are declared unsafe, and granting the central government the power to recall vehicles for any defect that may cause harm to the environment, driver, occupants, or other road users. The bill has been cleared by Lok Sabha but has not yet gone into effect.	To make Indian roads safer and cleaner.

There are a number of active initiatives in Pune in support of advancing the mobility ecosystem. The table below provides a brief overview of some of the primary activities and plans. The following pages provide more detail on specific initiatives.

State of Maharashtra's clean mobility policies

Name	Overview	Goal
Electric Vehicle and Related Infrastructure Policy (2018)	Focuses on promoting the manufacturing ecosystem for EVs in the state. Additionally, it has also proposed subsidies ranging from 5,000–100,000 rupees (US$78–1563) per vehicle for the first 100,000 vehicles (10,000 cars, 20,000 three-wheelers and 70,000 two-wheelers). The policy also recommends that electricity consumed to charge EVs will be billed at domestic tariffs instead of commercial tariffs.	To establish the state as a globally competitive destination for electric vehicles and component manufacturing, and to increase the number of registered EVs in the state to 500,000 and create 100,000 jobs.
Maharashtra State Urban Transport Policy (in development)	Calls for measures such as user charges to discourage personal motor vehicles, high parking fees, reducing the overall supply of parking, transit-oriented development and prioritizing funds for sustainable non-motorized transport projects. It is still in draft form and open to the public for suggestions and objections.	To discourage private vehicle ownership and lay more emphasis on public transport.

Pune's ten focus areas for transforming its mobility system

Theme	Current highlights	Key plans for improvement
Public transport enhancement	Common mobility (MI) card; 2000+ buses enabled with GPS; transport command-and-control center	Tender for 500 electric buses and 450 CNG buses under formulation
Bus rapid transit (BRT)	Rainbow BRT: 16 km of existing corridor in operation in Pune; additional routes are operational in Pimpri-Chinchwad	Rainbow BRT: An additional 52.8 kilometers under various stages of planning and implementation in Pune; total network will be more than 90 kilometers in the Pune Metropolitan Region once completed
Urban street design	Pilot program that covers about 30 kilometers of road	400 km of street to be re-designed for walkability
Pedestrian policy	Approved by PMC; aims for better street design and traffic calming to make roads safer for pedestrians	Plans to create pedestrian-only zones across the city
Cycle plan	Public bicycle policy was approved by PMC; currently working with three private vendors operating in Pune	» Goal to achieve 25% of trips by bicycle » Plan to create 824 kilometers of dedicated bicycle track
Transit-oriented development (TOD)	Pune city recently demarcated a TOD Zone in its Development Plan	Work initiated for 10 acres of TOD
Parking policy	Approved by PMC; implementation in progress	Tender pending
High capacity mass transit route (HCMTR)	Not yet operational	Planning for total length of 37.2 kilometer; currently in the process of acquiring land
Metro network	» Maha Metro: Phase 1 approved and under construction » PMRDA Metro: Approved and likely to start construction in October	» Maha Metro: 31 km across two metro lines to be completed by 2021 (Phase 1) » PMRDA metro: 23.3 kilometers have been approved for construction
Enforcement	The PMC is building capacity to enforce traffic and parking laws	Investigating new resources to help simplify traffic enforcement and collection of fines

Pune's existing policies and projects

Name	Overview	Goal
Comprehensive Mobility Plan (2008)	Addresses traffic growth of all modes of transportation and suggests a direction for the multi-modal transport system of Pune, emphasizing sustainable transport modes.	To develop a transportation vision for Pune and identify specific strategies and measures to address traffic growth.
Urban Street Design Guidelines (2016)	Gives an overview of various elements of best practices for urban street design in India to make them universally accessible, and provides standard templates for different sizes and uses of streets.	To provide a mechanism for establishing the street system in a way that will accommodate growth, provide transportation choices, and keep the city liveable.
Public Parking Policy (2018)	Sets up the vision to discourage the use of private vehicles while increasing the use of sustainable modes of transport. The city-wide parking policy will set minimum parking fees for 2-wheelers and 4-wheelers vehicles using a zone-based system utilizing digital enforcement mechanisms.	To achieve 80% of motorized trips by public transit by 2031; to achieve at least 50% reduction in total VKT; to transform at least 10% on-street parking spaces to public open spaces or NMT infrastructure.
"Walk Smart"— Policy for Pedestrian Safety & Comfort (2016)	Lays out a number of design principles for footpaths, walkways, road crossings, etc. with the intention of making the city more pedestrian-friendly.	To make Pune a pedestrian-friendly city with dignity for pedestrians and care for their safety and well-being.
Guidelines for Trenching Activity	Adopts "Trenchless Technology" so that digging the roads for laying utilities can be minimised. A new trenching-free technology will be made compulsory barring exceptional cases.	To provide citizens with the highest level of infrastructure facilities.
Transit-oriented Development	Demarcates a Transit Oriented Development (TOD) Zone in Pune's Development Plan, along its Metro Rail and BRTS corridor. Special development regulations have been formulated for an integrated and inclusive development of this zone.	To adopt a sustainable urban development approach to creating more liveable cities.
Integrated Transport Management System	Pune has commissioned a transportation command and control center and launched the Common Mobility Card (MI Card), India's first 'Interoperable Smart Card' which is designed to be a single payment card for various modes of transportation across the city.	To enable real-time tracking of all the 2,000 buses fitted with GPS and seamless payment across modes of transport.

Name	Overview	Goal
Multi-modal Transport Integration	Aims to integrate various modes of transport, including Metro Rail (MRTS), suburban rail, BRTS, city and intercity buses, and public bicycle sharing system. Maha Metro has allocated funds for developing city bus terminals and facilitating its integration with the MRTS system. The city has also planned a multi-modal transit hub with state-of-the-art facilities at; this plan is currently in the design stage.	To facilitate a seamless, efficient mobility experience.
Pune Cycle Plan	Provides proposals and provisions for the development, maintenance, and management of cycle-friendly infrastructure.	To increase cycling in Pune to 25% of mode share by 2031.
"Rainbow" Bus Rapid Transit	Pune's BRT system is currently under construction, with 16 km already operational.	To develop 68.8 km of dedicated BRT corridors by 2019.
Fleet Augmentation	PMC is in the process of procuring 1,000 buses for public transport enhancement including the development of Bus Depot and Terminals by PMPML.	To improve the ability of the public transport system to meet transit demand.
Electric rickshaws	Pune is aiming to deploy electric rickshaws to improve last-mile connectivity, under the Smart Cities Mission.	To deploy 4,000 electric rickshaws.
High Capacity Mass Transit Route (HCMTR)	HCMTR will be an elevated, 37.2 kilometer-long corridor consisting of 6 lanes with 2 dedicated BRTS lanes and the remaining 4 for other public and private vehicles. The project is currently undergoing a feasibility study.	To de-congest the existing situation and increase the speed of vehicular traffic.
Maha Metro	The Maha Metro is a metro rail-based rapid transit system under construction to serve the city of Pune and its industrial twin, Pimpri-Chinchwad. Phase 1 (31 kilometers) has been approved and is under construction.	To reduce traffic congestion and provide connectivity to commuters; to support an estimated daily ridership of 6 lakh in 2021.

While there are many common transportation challenges across Indian cities, each city's situation is unique. It is critical to understand these unique considerations to adapt new solutions to local needs and integrate them with existing plans, policies, and projects. The following summarizes the key challenges in Pune's mobility system that RMI identified during the needs assessment process. They can be grouped into five categories: planning and implementation, public transit, intermediate public transit, traffic and parking management, and road safety and enforcement.

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Challenges in Pune's mobility system

Identifying challenges in Pune's mobility ecosystem

Key challenges in Pune's current mobility system

Planning and implementation

1. Opportunities exist to enhance the planning process and coordination between key agencies to create a holistic and integrated environment for new and improved mobility options.

2. Data sharing between private sector mobility providers and public agencies is limited.

3. Gaps between planning and implementation can occasionally result in delays in the execution of well-designed plans.

4. Regular shifts in leadership can cause challenges with continuity in vision and planning.

Public transit

1. Demand for buses and bus depots has outpaced supply growth, with a particular need for more frequent and smaller buses.

2. Limited availability of land for PMPML to park buses can result in buses parking on streets overnight, decreasing available road space and thus contributing to congestion.

3. Some the current PMPML buses are aging and thus facing challenges with frequent maintenance needs and occasional breakdowns during operation.

4. There is a strong public desire for increased predictability, reliability, communication, and improved data collection and utilization as well as more clear demarcations on the older bus fleet.

Intermediate public transit

1. There is an opportunity for advanced technology and data use to improve first- and last-mile connectivity to create a better environment for multi-modal mobility, specifically around route planning, booking, and payment.

2. As the city boundaries expand as a result of population growth, it is challenging to adequately serve the peripheries of the city.

Traffic and parking management

1. Congestion is increasing, with average traffic speeds of 18 km/hour in 2013 projected to slow to 9 km/hour in 2031 if current trends continue. Nearly 1,000 vehicles are registered in Pune each day, with a majority being two-wheelers.

2. Drivers often do not abide by traffic laws and available resources are insufficient for properly enforcing rules and penalizing violators. There is an opportunity to adopt new automated and digital enforcement solutions.

Road safety and enforcement

1. Pedestrian infrastructure and road design is inconsistent across the city, with some areas lacking safe footpaths.

2. Challenges exist across all areas of enforcement, including speed limits, helmet laws and riding etiquette for two-wheelers, parking, etc.

3. Traffic police tend to focus on vehicles, not pedestrians, which causes challenges with efficient non-motorized transport. Traffic police would benefit from additional capacity building in the area of new urban mobility that addresses a multi-modal traffic approach in addition to vehicular flow.

Opportunities for the Urban Mobility Lab to Support Projects in Pune

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With many plans already developed and underway, the Urban Mobility Lab has an opportunity to play a role in supporting and integrating some existing initiatives across various areas of Pune's mobility ecosystem. Six overarching themes have been identified during the needs assessment process as areas where the Urban Mobility Lab could support mobility in Pune: management and enforcement of traffic and parking, NMT, public transit, intermediate public transit, booking and payment, and electric mobility. These areas of opportunity informed the team selection process for the Pune Solutions Workshop; teams generally fit into one of these six categories. For the Pune Solutions Workshop, grouping teams by a common theme will encourage collaboration & integration across projects, maximize the use of common resources, and enable whole-systems solutions.

Defining project themes

Theme	Definition	Role
Management & enforcement of traffic & parking	Hardware & software for managing, optimizing, & enforcing traffic flow & parking policies	Integrate a new solution with existing plans and projects
NMT	Non-motorized transit, i.e., walking and cycling	Design NMT infrastructure that supports multiple project teams
Public transit	Publicly operated mass-transport services, i.e., bus (and metro)	Support existing PMPML improvement plans and capacity building (e.g., route rationalization, data analytics, e-buses)
Intermediate public transit	Feeders and other services that augment public transit	Offer complementary services in collaboration with PMPML and Maha Metro
Booking and payment	Planning, booking, and paying for multi-modal trips	Support development & integration of common payment card for integrated booking and payment
Electric mobility	Electric vehicle fleets that offer Mobility-as-a-Service (MaaS)	Offer commuter and on-demand mobility services

Findings From Expert Interviews

Most common responses to primary interview questions

In speaking with stakeholders in organizations representing all aspects of Pune's transportation system, a few common themes emerged. This section outlines some of the most frequent responses we heard to our core interview questions.

Q: What are the biggest challenges in Pune's transportation system?

» Huge number of new vehicles registered each day: growing rate of private vehicle ownership and rapidly increasing number of two-wheelers, leading to an increase in congestion.

» Demand for public transportation has outpaced the growth in supply of bus fleets and services.

» First- and last- mile challenges, especially as the population on the outskirts of Pune expands.

» Transportation agencies largely operate in silos; limited integration between projects and organizations.

Q: What are the bottlenecks or pain points in your own (transport-focused) work?

» Enforcement of policies

» Implementation of plans

» Limited capacity building

» Encroachment on parking spaces, NMT infrastructure, and dedicated lanes

Q: What is your vision for the future of Pune's transportation system?

» Robust public transit network

» Robust NMT network, leading to an increase in cycling and walking

» Safe, disciplined, free-flowing traffic

Q: What is needed to achieve this vision?

» Focus on improving public transit and NMT

» Common communication strategy across all entities working in the mobility ecosystem

» Increased public awareness, education,& engagement

» Capacity-building

About Rocky Mountain Institute (RMI)

Rocky Mountain Institute (RMI) is an independent, apolitical, nonprofit think-and-do tank that transforms global energy use to create a clean, prosperous, and secure future. For more than three decades, RMI's work in the transportation sector has described and helped to concretely advance solutions that are both visionary and pragmatic, ranging from advanced vehicle designs to new mobility-services concepts. RMI's staff of scientists, engineers, and business leaders has helped governments, utilities, large corporations, innovative startups, and communities understand and benefit from the new energy economy with the imaginative application of rigorous technical and economic analysis.

RMI published India Leaps Ahead: Transformative Mobility Solutions for All with NITI Aayog in May 2017, and works with NITI Aayog and and Ministry of Housing and Urban Affairs to support India's transition to clean, shared, and connected mobility. Cofounded by Amory Lovins in 1982, RMI has been a leader in energy efficiency and renewable energy for 35 years.