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LETTER FROM THE GLOBAL DIRECTOR

Unprecedented urban development over the past 30 years in China has led to rapid urbanization and fast motorization, polluting city air and worsening traffic conditions. One of the greatest challenges China faces is how to reduce emissions from urban transportation. Despite decades of working to improve public transportation systems, cities in China and across the world have not observed reduced congestion and transportation-related emissions. In fact, the number of private cars is increasing in Chinese cities.

To successfully reduce urban vehicle use, it is crucial to find the key balance between promoting and improving public transportation and disincentivizing use of private vehicles. This is especially important in Beijing where there are 6 million cars on the road, which account for 26 percent of carbon dioxide emissions, 31 percent of fine particulate matter and 50 percent of nitrogen oxides.

As the largest carbon dioxide emitter in the world, China plays an essential role in the battle against climate change, committing to the Paris Agreement in September 2016. To reach its goals, the country has demonstrated a willingness to experiment with new policies and approaches, and find what works best for China.

In 2014, with generous support from the Children’s Investment Fund Foundation, WRI Ross Center for Sustainable Cities committed to helping Beijing reduce transportation emissions with a package of mobility solutions, employing Low Emission Zone and Congestion Charging policies as key driving forces. WRI China conducted on-the-ground research for an emissions reduction assessment, public health impact analysis and an inventive approach to public engagement. With this support, Beijing launched China’s first ever Low Emission Zone in September 2017. This transformative policy alone is estimated to eliminate 95 metric tons of air pollutants each day and projected to reduce 2.5 million metric tons of carbon dioxide annually by 2020.

While the Congestion Charging policy is still under review, it’s important to recognize that public opinion polls show increasing support from both the government and public. Although Congestion Charging has been implemented successfully in Singapore and London, it has been difficult to replicate elsewhere. Even cities like New York struggle with effective and lasting implementation. Beijing, one of the largest cities in the emerging economy, has an opportunity to achieve successful Congestion Charging policies, which could have a significant impact on China’s 600 cities and on cities across the world.

We thank the Children’s Investment Fund Foundation, whose generous support made these ideas come to life. The Beijing Low Emission Zone project is a signature model for other cities to follow. Building on its success, we hope this report will help other cities contemplating Low Emission Zone and Congestion Charging to learn from Beijing’s effort.
OVERVIEW: PROGRESS AND PROSPECTS

- Beijing’s implementation in September 2017 of a Low Emission Zone (LEZ), with a strong assist from WRI, marked a huge milestone — not just in the Chinese capital's efforts to reduce pollution and improve the health of its residents, but in China’s overall push to curb climate change emissions.

- The LEZ, China’s first, targets heavy-duty vehicles and is expected to reduce 11 metric tons of particulate matter and nitrogen oxides each day in its first two years (*Beijing Daily* 2017), in addition to bringing a huge annual abatement of carbon dioxide and delivering significant health benefits in the short and long terms.

- The zone is part of a broader package of measures that WRI, in partnership with the Chinese central government and Beijing local government bodies, advocates under the Beijing Low Emission Zone/ Congestion Charging (CC) project launched in 2014.

- Another program milestone in 2017 was increased public awareness, as gauged by surveys conducted in Beijing by WRI, of fee-based policies such as CC. Public acceptance not only increased from 23 percent to nearly 26 percent within a year, but our surveys also noted a shift of 15 percent from those opposed to such policies to those who were neutral.

- Furthermore, after completing several rounds of deliberations in 2017, the Beijing Parking Management Regulations were enacted on May 1, 2018. They are part of the policy package to LEZ/CC advocated by WRI, integrating stricter parking management, improved public transportation and enhanced walking and cycling solutions to address pollution, traffic congestion and, ultimately, climate change.

Looking forward, WRI's push for integrated solutions is gaining increased attention from cities across China. Our top-down approach to mainstreaming the LEZ/CC concept is bearing fruit as Beijing points the way for the rest of the country on how to pursue improved local environments and, at the same time, meet China’s commitment to climate change goals.
ABOUT THE BEIJING LOW EMISSION ZONE PROJECT

Although China’s rapid urbanization and motorization trends are providing opportunities to local economies, the pace of development is exceeding the capacity of many Chinese cities to manage and mitigate the side effects. The transportation sector in China accounted for 10% to 14% of the country’s carbon dioxide emissions (about 1.2 metric gigatons) in 2016, and the share is projected to surpass 30% by 2030, with total emissions of up to 5.4 metric gigatons, under a business-as-usual scenario based on WRI’s analysis.

In 2014, the transportation sector alone accounted for 28.5% of the total carbon dioxide emissions in Beijing (BTEC 2015), and is expected to be the most rapidly growing source over the next 10 years. In parallel, tailpipe emissions accounted for about 45% of the local emissions of PM$_{2.5}$, the hazardous particulate matter of 2.5 microns in diameter or less (Beijing Municipal Environmental Protection Bureau 2018). Emissions from the transportation sector have imposed a high socioeconomic cost as well.

In 2012 and 2013, the Beijing Municipal Commission of Transport (BMCT) considered adopting an LEZ/CC program as a way to solve three problems: air pollution, carbon emission and traffic congestion, which are far more serious in Beijing than in most cities in the world. The Beijing LEZ/CC project aims to provide an integrated solution comprising: i) an inception study; ii) a policy cluster design; iii) public participation and communication; iv) evaluation of key performance indicators (KPIs) and an emission accounting tool; v) capacity building; vi) a scaling-up strategy; and vii) a knowledge hub.

The purpose is to assist Beijing in achieving the goals for reducing transportation emissions set out in the 2013-2017 Clean Air Action Plan.
EXTERNAL CHANGES

Beijing’s newly implemented LEZ eliminates tons of pollutants each day and promises health benefits in the short and long terms, according to WRI’s detailed analysis. In addition, our public outreach programs continue to influence Beijing residents, fostering a growing acceptance of CC.

With WRI’s on-the-ground support (assessment of emissions reduction, analysis of public health impact and a radical new approach to public engagement), Beijing launched China’s first LEZ on September 21, 2017, to control emissions beginning with freight vehicles. The LEZ is estimated to eliminate 11 metric tons of nitrogen oxides and particulate matter each day in the first two years, and is expected to reduce 95 metric tons of total air pollutants each day under stricter regulations to be enacted in 2019. In addition, the implemented LEZ will have a potential annual abatement of 2.5 million metric tons of carbon dioxide by 2020.

Based on WRI’s public health analysis, the LEZ will reduce inpatient numbers by around 514 and avoid 43 deaths each year in the short term, leading to an annual social cost savings of $42 million. The long-term benefit of the LEZ will be much more significant, however, since the long-term impact of air pollution on public health is usually 8 to 10 times that of the short term.

Meanwhile, public support is one of the key elements in implementing controversial fee-related policies like CC. Although CC has not been implemented in Beijing, WRI, through extensive public communications and education and by working with policymakers, professional organizations, the media and the public, has successfully influenced more than 1 million residents in the Chinese capital. As a result, public acceptance has increased from 23 percent to nearly 26 percent within a year, coupled with a significant shift of 15 percent from those opposed to those who were neutral in 2017, compared with 2016.
By 2020, the total NO\textsubscript{x} and PM emissions reduction from LEZ are projected to be 95 metric tons daily, with CO\textsubscript{2} reduction of 2.5 million metric tons annually.

**KEY INFLUENCE INDICATORS**

WRI’s strategy for influencing Beijing’s municipal government and China’s central government has included scientific assessment tools, the opening of communication channels, and increasing capacity through workshops and study groups. The approach is building momentum by generating interest and discussions of LEZ/CC in cities across China.

From the project’s inception in 2014 through 2017, WRI was successful in mobilizing resources to channel our research and messages to the city of Beijing and the national government. We had five major avenues (Figure 1) for intervening:

- We worked closely with the BMCT and the Beijing Environmental Protection Bureau (BEPB) on framing policy and strategy details, developing toolboxes for scientific analysis to support evidence-based decisions, designing communications measures for government-public interactions, and increasing the governmental bodies’ capacity through workshops and study tours.

- We channeled our recommendations on LEZ/CC to the Beijing municipal government directly through motions to the legislative body, write-ups in government internal references and international case-study sharing.
We worked with the Ministry of Transportation (MOT) and its think tank to include CC recommendations in the MOT’s 13th Five-Year Plan for Urban Public Transport to guide traffic congestion mitigation in cities and provided LEZ/CC recommendations to the central government through the MOT.

We reached out to the public to investigate their opinions and increase their awareness through education programs and public communications.

We facilitated discussions and feasibility studies on LEZ/CC in a number of other cities.

Figure 2 demonstrates our achievements over the past three years gauged by the following four key influence indicators:

**Figure 1 | Major Avenues of Influence**

<table>
<thead>
<tr>
<th>The Public</th>
<th>Media</th>
<th>BMCT, BEPB</th>
<th>Beijing Municipal Government</th>
<th>MOT</th>
<th>Other Local Governments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public communication, knowledge hub</td>
<td>Public communication</td>
<td>Inception, policy cluster, KPIs, capacity building, public communication, knowledge hub</td>
<td>Scaling up, capacity building</td>
<td>Scaling up, capacity building</td>
<td>Inception, scaling up, capacity building, knowledge hub</td>
</tr>
</tbody>
</table>

**Figure 2 | Timeline of major achievements of Beijing LEZ/CC Project**

- **2015.12**: Motion on LEZ/CC reached Mayor Wang
- **2016.1**: Communication brochure on LEZ/CC reached BJMPC and BJMPPCC representatives
- **2016.4**: Recommendations on congestion mitigation and air quality improvements submitted to Premier Li Keqiang through CATS
- **2016.6**: BMCT initiated radio program to discuss solutions with public on congestion mitigation
- **2016.7**: Shanghai placed LEZ and Nanjing placed CC on their respective government working agendas
- **2016.8**: Vice-Minister of MOT commented on CC public survey results and asked the Beijing mayor and BMCT to review them
- **2016.9**: BMCT and BTMB initiated public consultation on congestion mitigation measures
- **2016.10**: Shenzhen proposed LEZ in government working agenda
- **2017.5**: MOT’s 13th Five-Year Plan for Urban Public Transport included CC as one of the key measures
- **2017.9**: Beijing TV Station’s Public Education Program on CC
- **2018.12**: Parking Management Regulations submitted for BJMPC approval
- **2019.12**: LEZ targeting heavy duty vehicles is initiated

Note: BJMPC: Beijing Municipal People’s Congress; BJMPPCC: Beijing Municipal People’s Political Consultative Conference; BTMB: Beijing Traffic Management Bureau; CATS: China Academy of Transportation Sciences
SUPPORT FOR POLICYMAKING

Through sophisticated assessment tools for gauging emissions reduction and analyzing health impacts, and by providing international case studies and recommendations on integrated solutions for reducing congestion, WRI has given the city of Beijing and China's MOT valuable assistance in formulating policy.

The city of Beijing officially kicked off the LEZ targeting heavy duty freight vehicles with high emissions on September 21, 2017. WRI's on-the-ground support included assessment of emissions reduction, analysis of the public health impact and development of evaluation indicators. In May 2017, the Beijing municipal government called for soliciting public opinion on the draft Parking Management Regulations and preparing a feasibility study for parking legislation, for which WRI provided international case studies, developed parking management plans and conducted a cost-benefit analysis. The Parking Management Regulations, enacted on May 1, 2018, incorporated WRI's suggestions on stricter enforcement, differentiated parking fees, and a shared parking mechanism. In addition, in July 2016, the MOT issued the 13th Five-Year Plan for Urban Public Transport to guide Chinese cities in applying CC as an effective measure for reducing congestion. The MOT had invited WRI to provide recommendations for a package of integrated congestion mitigation solutions and to investigate the potential for cross-ministry collaborations on urban congestion management. From the package, 40% of the recommendations were adopted in the MOT's 13th Five-Year Plan.
WRI's expertise in preparing motions, educational materials, reference documents and communication strategies has helped to influence and expedite policy decisions regarding congestion mitigation, and has assisted in shaping public perception regarding such measures.

In January 2016, WRI prepared and submitted the motion on LEZ/CC to the Beijing Municipal People's Political Consultative Conference (BJMPPCC), the municipality's political advisory entity, urging implementation and public consultation. The motion reached then-Mayor Wang Anshun as well. In addition, at the 2016 annual “two sessions” of the Beijing Municipal People's Congress (BJMPC) and the BJMPPCC, the educational brochure developed by WRI on LEZ/CC and the parking measures reached 387 BJMPC representatives and 207 BJMPPCC representatives. In May 2016, WRI prepared an internal reference document with a holistic set of CC-centered congestion mitigation and emission reduction measures and sent it to Premier Li Keqiang through our partner the China Academy of Transportation Sciences (CATS).
ENHANCING PUBLIC COMMUNICATIONS

To promote and increase public awareness of LEZ/CC, we supported a public outreach program by the Beijing municipal government that included a weekly radio program on congestion management, television and social media programs, and public opinion surveys.

With WRI’s support on framing communication strategies, the BMCT, together with the Beijing Traffic Management Bureau (BTMB), initiated public consultation on congestion-mitigation measures in December 2015 and started a weekly radio program to interact with the public on congestion management measures. In addition, WRI conducted two rounds of public opinion surveys with over 10,000 respondents in 2016 and 2017, and worked with Beijing TV and social media on educational programs to promote and increase public awareness of the LEZ/CC plan. The survey results showed a trend of increased support for the policies, which also drew the attention of the vice-minister of the MOT.

Over 10,000 residents participated in public opinion surveys in 2016 and 2017.
SCALING UP

Our promotion of LEZ/CC policies is generating interest across China, with cities ranging from Shanghai to Shenzhen requesting information and/or support from WRI on formulating or implementing their own such policies.

With WRI’s promotion of LEZ/CC and wide dissemination of related research products, a number of other cities in China have taken note of LEZ/CC policies by seeking information and/or support in developing related policies. In the draft version for public consultation of the Shenzhen Air Pollution Prevention Regulations, LEZ was proposed as one of the important measures for tackling tailpipe emissions. Suzhou’s Road Transportation Congestion Mitigation Work Plan 2017 requested completion of research on the Suzhou Old Town CC Schemes by July 2017. WRI was invited as experts to the consultation meetings to provide comments on the plans. During the development of the Nanjing Transportation Development White Paper, WRI was consulted on international practices, as well as our work in Beijing, as resources for the White Paper, which was sent out for public consultation with CC underlined as one of the transportation demand management measures. Hebei Province released “Opinions on Promoting the Comprehensive Treatment of Air Pollution” and 18 special implementation plans for air pollution control work in April 2017, which required cities in the province to study CC policy and to gradually implement traffic restrictions on highly polluting vehicles. In addition, through workshops, training, study tours and meetings organized by WRI, many other cities, including Shanghai, Chengdu, Qingdao, Wuhan and Jinan, showed great interest in LEZ/CC and began discussions of and research into such policies.
One city with deep engagement –

Beijing

Two cities with targeted engagement –

Shenzhen and Suzhou

Six cities with catalytic engagement –

Shanghai, Chengdu, Qingdao, Nanjing, Wuhan, and Jinan
PROJECT ACTIVITIES AND OUTPUTS

INCEPTION STUDY

Because there were no precedents for LEZ/CC in China, WRI gathered information from international cities with such policies, organized study tours to several of these cities, conducted interviews with experts and held international brainstorming workshops. Subsequent reports on international practices have been a valuable resource for policymaking, particularly in the development of a motion on CC that was submitted to Beijing’s municipal political advisory entity.
The Challenge
In 2012-2013, the Beijing Municipal Commission of Transport (BMCT) considered adopting the LEZ/CC measures to solve three problems: air pollution, carbon emission and traffic congestion, which are far more serious in the Chinese capital than in most cities around the world. Since there were no previous LEZ/CC cases in China, no existing practices in a China context could be followed. Questions raised by decision-makers and transportation professionals alike called attention to the need for thorough investigation and collection of information from international cities where LEZ/CC policies have been implemented to bridge the know-how gap.

The Solution
WRI collected more than 100 questions for further investigation from BMCT and other institutions from the perspectives of enabling conditions, policy design, technology selection, public communications, institutional setups and system performance. From 2014 to 2017, WRI organized six study tours to London, Singapore, Stockholm and Hong Kong for more than 20 people — decision-makers, transportation professionals and reporters — to explore the answers to these questions and find solutions in a China context. WRI also interviewed more than 50 LEZ/CC implementers or experts, in person or by telephone, and hosted seven international workshops for brainstorming and exchanges of information.

Based on the insights collected from the study tours, interviews and workshops, WRI extended the research on international practices to more countries and cities by exploring not only the successful experiences, but also the cases of failure where the causes provided valuable insights. Two reports were developed to summarize the practices of more than 10 cities in Europe, Asia and the United States covering different political, economic and cultural backgrounds.

“Since the 1970s, Singapore has had congestion charge and it worked perfectly. It is just politicians in other cities that would be too scared to do it. ... There really wasn’t any great challenge. We had seen this working for 30 years in Singapore.”

Mr. Ken Livingstone
Former Mayor of London
The Impact

The lessons of LEZ/CC implementation practices and the benefits resulting from congestion mitigation and environmental protection have drawn the attention of political leaders. During the 2015 annual session of the Beijing Municipal People’s Congress, LEZ/CC was brought up for debate and put on top of the Beijing municipal government’s agenda list.

A feasibility study on LEZ/CC has also been brought forward, and more than 200 program scenarios have been modeled and analyzed since 2014. Apart from the scientific analysis, in 2015 the BMCT allocated RMB 50 million (around $7.9 million) to start the Demonstration Project of Technical Research and Application for an LEZ/CC Policy. A testing field for charging, monitoring and operating technologies was set up in north-western Beijing.

The international practices reports have provided reliable resources for policymaking. At the request of the Beijing municipal government, WRI drafted internal references on congestion and air pollution management for circulation among municipal leaders. At the 2016 annual session of the Beijing Municipal People’s Political Consultative Conference (BJMPPCC), WRI, in partnership with one of the BJMPPCC members, developed and submitted a motion on CC to the municipal political advisory entity.

Study tours and research activities organized by WRI and CIFF (the Children’s Investment Fund Foundation) were of great help in the study of relevant policies and technical programs in Beijing.

Madam Xiaosong Li
Former Deputy Director of BMCT
POLICY CLUSTER DESIGN

Although encountering institutional, social and other barriers, WRI pushed forward efforts to implement LEZ/CC at the Beijing municipal and central government levels. We worked to influence the legislative process on CC and parking measures, and recommended integrated traffic congestion solutions — many of which were adopted in the MOT’s 13th Five-Year Plan for Urban Public Transport. In addition, WRI was invited to help develop suggestions for cross-ministry collaboration on congestion management.

The Challenge

Beijing has almost 6 million vehicles, and traffic congestion and tailpipe emissions remain the leading challenges as the city develops. The implementation of LEZ/CC has faced legal, institutional, social and economic development challenges. Booming vehicle consumption markets, the legalization of charging for road usage, the institutional setup for collaborative management and public acceptance all present barriers that complicate policymaking.

The Solution

To influence the legislative process on CC and complementary parking measures, WRI worked with representatives from the Beijing municipal government’s legislative entity, providing international common practices, evidence-based cost-benefit analysis, guidelines for implementation, frameworks to identify enabling conditions, and a road map for implementing CC in a China context. Icebreaking discussion of legislation on road charging and parking management was brought up at the 2015 Beijing municipal government’s “two sessions” of the BJMPC and the BJMPPCC. WRI’s motion on CC was submitted to the “two sessions” in 2016, suggesting establishment of a dedicated working group led by the mayor or vice-mayor to enhance cross-departmental collaboration, as well as a feasibility study on and implementation of CC.

WRI also worked with the central government and the MOT on policy development, with the aim to provide national enabling conditions. We submitted recommendations to “Promote Urban Sustainable and Green Travel to Mitigate Traffic Congestion and Improve Air Quality” to Premier Li Keqiang as internal references to the State Council to promote a package of congestion mitigation solutions with CC as a key economic driver in management and to advocate cross-departmental collaboration on urban traffic congestion management.
The Impact

The Beijing municipal government debuted its official legislative process on parking management in early 2017 as a steppingstone for legitimizing road-use charging. WRI’s joint work on a Parking Management Plan with the Beijing Transport Institute (BTI) contributed directly to the Beijing Municipal Government Work Report in the bill deliberation processes for the legislation.

The MOT issued the 13th Five-Year Plan for Urban Public Transport in July 2016 to guide Chinese cities in applying CC as an effective measure to reduce urban congestion. Of the recommendations in the package of integrated congestion-mitigation solutions provided by WRI, 40% were adopted in the 13th Five-Year Plan. The ministry also invited WRI to work with its affiliated think tank, the CATS, to develop directive suggestions for cross-ministry collaborations on urban congestion management.

Directed by the overall framework of the Beijing 13th Five-Year Plan and the Beijing Congestion Mitigation Master Plan (2016-2020), WRI worked with BTI to propose strategies and measures to improve the non-motorized transportation (NMT) system and streamline green travel, which contributed to the 13th Five-Year Transportation Technology Development Plan (Intelligent Transportation, Road Engineering and Green Transportation), in order to achieve the target of a 75% share for the green transportation mode within the urbanized area. Recommendations like designing an evaluation system to assess the development of infrastructure for walking and cycling and accessibility to the transit system were accepted by BMCT.

WRI, as an international think tank dedicated to sustainable development, has provided us with great support. In addition to sharing international best practices with us, they have been undertaking lots of basic research and data analysis to support our policymaking on congestion mitigation and emission reduction.”

Mr. Yu Ge
Head of Science & Technology Division, BMCT
You find small groups of people and they are often quite small with very strong views tending to dominate the debate. It is very important to understand those are only ever often a small minority of views and there may be a much larger number of people who are ... supportive of the policy but just don’t feel a need to say they are supportive.”

Mr. Luke Blair
London Public Policy Public Communication Consultant
The Solution

WRI provided a three-pronged strategy to improve communication on LEZ/CC.

First, we worked with the BMCT on public communication strategies for better two-way communication through a more transparent public outreach plan and a more positive interaction with the public. The idea was to involve more residents in the entire policymaking process to effectively address their concerns and comments.

Second, WRI initiated public education campaigns through TV programs at the only official local TV station, Beijing TV, to introduce international best practices, the causes of congestion and emissions, the possible solutions and resulting benefits. WRI also created a channel to support two-way communication between the government and the public. A weekly radio program was launched beginning in July 2016 to provide a venue for the government to introduce congestion-mitigation measures, and listeners were invited to raise questions and seek answers from the government. In addition, we produced a series of infographics to explain the complicated problems and solutions in a visualized format that is easy for the general public to understand. These campaigns created steppingstones for further support on CC by increasing awareness of the public in an intuitive way.

Third, we developed a structured survey and collected public opinions from more than 10,000 respondents for two consecutive years, trying to understand how the public perceives the current challenges in urban congestion, how they support CC policies, what their concerns are and how they expect revenue to be allocated. The surveys have not only served as a reliable source for understanding support for CC, but also provide a way to educate the public about CC and its potential benefits.

Opinion surveys found that the proportion of respondents who were in favor of the CC policy increased from 23 percent to nearly 26 percent within a year, coupled with a significant 15 percent shift from opposing to neutral in 2017, compared with 2016.
Not all the people oppose congestion charging policy, since some cities have already implemented it. We should understand public opinions and attitudes, and increase public awareness on the policy through various public communication strategies to ensure successful policy implementation.”

Mr. Xiaoming Liu
Vice-Minister of Transport

The Impact

Having endorsed our public communication strategy and understood the importance of public outreach, BMCT began public consultation on traffic congestion mitigation measures in December 2015 to collect opinions and suggestions.

For the first time in history that an international NGO has done so, WRI delivered the communication brochure on CC and complementary measures to 387 representatives of the BJMPC and 207 representatives of the BJMPPCC in early 2016.

WRI has successfully influenced more than 1 million residents in Beijing through the three-pronged strategy. Opinion surveys found that the proportion of respondents who were in favor of the CC policy increased from 23 percent to nearly 26 percent within a year, coupled with a significant 15 percent shift from opposing to neutral in 2017, compared with 2016. The surveys indicate that people tend to change their attitude from natural aversion to a moderate position.
EMISSION ACCOUNTING

Helping government to make evidence-based decisions, WRI undertook the development of emissions accounting models and the evaluation of the potential abatement of pollutants under various policy plans. We also assisted Beijing in developing a system to evaluate the socioeconomic impacts of LEZ/CC, and facilitated China’s first-ever joint evaluation of LEZ health impacts by bringing together such sectors as transportation, environmental protection and public health.

The Challenge

Vehicles account for 31% of total PM$_{2.5}$ and 50% of nitrogen oxides, making the transportation sector the leading pollution source in Beijing. In particular, freight vehicles, which account for less than 10 percent of all vehicles, contribute more than 50% of the total vehicle emissions in Beijing (Xinhua News Agency 2017). In 2016, 22 million Beijing residents, including 2.4 million children, were exposed to toxic air for 168 days, resulting in huge economic loss and severe impacts on public health.

With a people-oriented philosophy becoming more widely accepted, policymakers have increasingly started to consider solutions that put people at the heart of the decision-making process. Assessments of the co-benefits from transportation policies on human health are urgently needed to help government better understand the social benefits as well as the impact of emissions reduction and to restructure investment portfolios. However, evaluating the health benefits of a transportation policy requires a cross-sector effort and faces many challenges in terms of inter-departmental collaboration and data-sharing.
The Solution

WRI worked closely with the BMCT and the BEPB to support evidence-based decisions by developing emission accounting models and evaluating the emission abatement potential for different policy plans. We also helped the BMCT to develop an evaluation system to estimate the socioeconomic impacts of LEZ/CC.

We brought together the sectors of transportation, environmental protection, public health and social economy to jointly evaluate the LEZ public health impacts, the first such effort in China, by breaking through the barriers in cross-sector data-sharing and collaboration. An assessment framework of transportation emissions estimation, pollutants dispersion, exposure response and the monetization impact was created, and the model, together with evaluation indicators, was integrated into the BMCT’s Energy Consumption and Emission Monitoring system.

The Impact

Application of the models provided solid support for the decision on LEZ implementation. The newly implemented LEZ in Beijing will bring an estimated daily reduction of 11 metric tons of particulate matter and nitrogen oxides between 2017 and 2019 and an abatement each day of 95 metric tons of total air pollutants after 2019 under stricter regulations that will be enacted. In addition to the air pollutants, the LEZ will have a potential annual abatement of 2.5 million metric tons of carbon dioxide by 2020.

According to the health impact analysis, the LEZ policy will reduce inpatient numbers by about 514 and prevent 43 deaths each year in the short term, leading to an annual social cost savings of $42 million. The long-term benefits of the LEZ will be much greater, however, since the long-term impact of air pollution on public health is usually 8 to 10 times that of the short term.

With WRI’s support, we have together developed a vehicle emission model to evaluate the pollutants emission reduction effects under different Low Emission Zone schemes. The findings were presented to BMCT and municipal decision-makers and have facilitated the process of policy implementation.

Ms. Ying Cheng
Chief Engineer of the Beijing Transport Institute
CAPACITY BUILDING

In addition to training programs and large-scale workshops, WRI has organized study tours and provided other capacity-building opportunities for Beijing transportation officials and professionals, as well as media representatives, in an effort to connect decision-makers and the public. The training, which tapped into WRI’s global pool of expert talent, helped to increase understanding of LEZ/CC policies, for which no precedents existed in China, and to promote integrated solutions tailored to the China context.

The Challenge

LEZ/CC are very new policies for China, so there are no precedents to follow. Chinese cities have been relying on regulatory measures (like vehicle ownership control and traffic restrictions) to control the ownership of vehicles rather than economic incentives to restrain demands on private vehicle travel. Government agencies and professional institutes alike lack experience in LEZ/CC. Given the varied political, legal, regulatory, institutional and cultural environments, many factors that are different from those of other countries must be considered.

The Solution

Six study tours were organized for BMCT officials, transportation professionals from Beijing and other Chinese cities, and reporters from major national and Beijing local media. Capacity-building opportunities were provided not only to decision-makers and policy implementers, but also for the first time to the media, as they play a significant role in building effective communication channels to connect decision-makers and the public. By investigating best practices in London, Stockholm and Singapore, as well as the unsuccessful experience in Hong Kong, these different stakeholders were exposed to firsthand information.

With the director of our China transportation team appointed as an external expert to the BMCT — the only expert from an international organization — we have been more active in providing training and capacity-building to BMCT officials. Our training has reached the divisions of policy study, technology, legal affairs, comprehensive transportation, publicity and the Beijing-Tianjin-Hebei Integrated Development Office. In addition, from our global talent pool, we channeled international expertise into the program through training.

Since holding workshops is an effective way to bring domestic and international resources for face-to-face communications with local stakeholders, WRI has organized seven large-scale workshops during the project implementation period. Our speakers and audiences have included government agencies like the MOT, the National Development and Reform Commission (NDRC), the Ministry of Housing and Urban-Rural Development (MOHURD), the BMCT, the BEPB, the BTMB and the transportation commissions or environmental protection bureaus of other cities, as well as private stakeholders like IBM, Baidu, Didi and Mobike.
The deputy director of the BMCT, inspired by the study tour to London, encouraged WRI to bring more of London’s best practices to Chinese cities to change entrenched mindsets. Hong Kong’s unsuccessful experience on CC in the past three decades, and its persistence through continuous efforts to promote CC as a viable solution to congestion management, also motivated Beijing. Encouraged by Hong Kong’s new round of public consultation on CC, the BMCT decided to work with WRI to better understand public opinions through surveys and social media analysis.

The World Metropolitan Transport Development Forum, held by WRI in October 2016, attracted more than 500 participants to advocate transportation demand management policies focused on CC and low-carbon, sustainable transportation strategies. The vice-minister of the MOT and the vice-mayor of Beijing, in remarks at the forum, both called for integrated solutions to tackle crippling urban congestion, especially economic-incentive measures such as CC and dynamic parking fees. Officials from the United States, the United Kingdom and many Chinese cities gave presentations to exchange information and communicate on solutions.

In the Beijing Low Emission Zone and Congestion Charging project, WRI equipped us with knowledge of transportation and emission patterns in the mega-cities, and assisted us in transportation policymaking through sharing international practices. Through collaborating with WRI, we’ve learned a lot about how to apply economic methodologies and the philosophy of science to our work, which is of great inspiration.

**Mr. Jifu Guo**
Member of the 13th National Committee of the Chinese People’s Political Consultative Conference, Director of Beijing Transport Institute
SCALING UP

Because Beijing can point the way for the rest of China on CC policy, implementing such a plan in the capital city is considered crucial to introducing CC to other cities. Therefore, WRI has advocated a top-down approach to mainstreaming CC. A key achievement of this strategy was the inclusion, in the MOT’s 13th Five-Year Plan for Urban Public Transport, of our suggestions for a package of congestion solutions giving priority to CC and parking fees. This marked the first such mention of CC in the ministry’s overall urban transportation strategy. Following Beijing’s lead, other cities have considered or conceived of plans for implementing LEZs.

The Challenge

Efforts to scale up policies like LEZ/CC, for which no precedents exist, face many challenges. Beijing, as China’s capital city, can potentially serve as a role model to motivate other Chinese cities to follow its example in policymaking. Without on-the-ground practice of a CC policy, intervention remains difficult in other cities.

We would like to express our gratitude to WRI for their long-term support to our congestion charging project.

Mr. Dingsheng Xie
Division Chief of Suzhou Management Office of “Large-City Congestion and Carbon Reduction” Project Financed by GEF
The Solution

WRI’s strategy is to focus on mainstreaming the CC concept using a top-down approach. Through working with the CATS under the MOT, we have channeled our suggestions about implementing CC as one of the urban congestion mitigation measures into the MOT’s 13th Five-Year Plan for Urban Public Transport and advocated cross-departmental collaboration on congestion mitigation.

In tandem with capacity-building, we have enlightened policymakers and practitioners about international trends, national policies and Beijing’s ongoing congestion-mitigation efforts. We also assisted local partners in the evaluation of policymaking feasibility through brainstorming and expert consultations.

The Impact

The MOT issued the 13th Five-Year Plan for Urban Public Transport in 2016, incorporating our suggestions for a package of solutions to mitigate urban traffic congestion. The package designates economic incentive measures — CC and parking fees — as prioritized solutions, fostered by comprehensive development of a public transportation system and streamlined non-motorized transportation. This marks the first time that CC has been mentioned in the ministry’s overall strategy for urban transportation development.

Inspired by Beijing, Shenzhen announced its consideration of implementing an LEZ to ban gasoline-powered vehicles below China III Emission Standards and diesel vehicles below China IV Emission Standards from entering the city. Shanghai, following Shenzhen, also conceived plans for implementing an LEZ to control vehicle emissions. In July 2016, the Nanjing Development and Reform Commission issued a draft Transportation Development White Paper for public consultation, in which CC was proposed as one of the economic incentives to restrict car ownership and usage. In addition, Suzhou released its Road Transportation Congestion Mitigation Work Plan 2017, which called for completion of research on the Suzhou Old Town CC plans by July 2017. Hebei Province released the document “Opinions on Promoting the Comprehensive Treatment of Air Pollution” and 18 special implementation plans for air pollution control work in April 2017, which required cities in the province to study CC policies and to gradually implement traffic restrictions on highly polluting vehicles. Zhengzhou outlined a CC trial plan in its 2017-2035 Action Plan to Develop a National Central City (a city in charge of leading, developing and performing tasks in political, economic and cultural aspects in the region). Chengdu, Qingdao, Wuhan and Jinan also started feasibility studies on CC.
KNOWLEDGE HUB

To assist decision-makers in the complicated process of formulating LEZ/CC policies, WRI has created a comprehensive, bilingual learning platform. This hub builds on WRI’s vast knowledge base and experience, including nearly two dozen client reports on our collaborative work, infographics, blogs, newspaper op-ed pieces, journal articles and information on international cities’ best practices. It targets Beijing municipal transportation officials and decision-makers, but also has caught the attention of two ministries as well as city agencies across China, and provides valuable resources for professionals and nonprofessionals alike.

The Challenge

Even though LEZ/CC policies have been implemented for years in many cities outside China, the information shared in China has been very limited and has focused on the two typical cities of London and Singapore. LEZ/CC policies are very complicated, and detailed knowledge of political enabling conditions, project design, technology selection, public communications, operations and management are all crucial to successful implementation. Insights from actual practitioners are especially valuable.

The Solution

To ramp up knowledge-sharing capacity, WRI developed a knowledge hub (www.lez-cc.info/en) to provide in-depth information about LEZ/CC through a bilingual (Chinese and English) online platform. The hub integrates international cities’ practices and WRI’s work in Chinese cities to offer a comprehensive learning environment for professional and nonprofessional people alike.

In the years of project implementation, we developed 23 client reports based on our collaborative work with different stakeholders, such as government agencies and their affiliated research institutes, universities and NGOs. In addition, we worked out a series of infographics and dozens of blogs on social media, as well as newspaper op-ed pieces and papers in journals, to disseminate knowledge about LEZ/CC.
The Impact

Targeting the BMCT as the major stakeholder that we are influencing, WRI’s reports, infographics and knowledge hub have reached the general director, four deputy directors and the majority of departments/divisions of the BMCT, including the policy study office, the technology and publicity divisions, the parking management office and the Beijing-Tianjin-Hebei Coordinated Office. Additionally, our knowledge products received attention at the national level from the MOT and the MOHURD, as well as at many transportation and environmental agencies in such cities as Shanghai, Shenzhen, Wuhan, Nanjing, Chengdu and Qingdao. WRI’s knowledge products on LEZ/CC policies have also become good resources for professionals working in relevant areas.

“I’ve read your reports on Low Emission Zone and Congestion Charging that I received at the workshop organized by the Beijing Transport Institute. The reports are great, and I’ve really learned a lot that can be applied to our work.”

Mr. Meng Zheng
Deputy Director of Rail Department,
Wuhan Transport Development Research Institute
FINANCIAL REPORT

Expenses by Component (October 2014 – December 2017)

Total: $2,999,958
## Expenditure Report (October 2014 – December 2017)

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
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<tr>
<td>Labor</td>
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<td>Research Expenses</td>
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<td>Conference Expenses</td>
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<td>Publications</td>
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<td>Communications</td>
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<td>Travel</td>
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<tr>
<td>Subgrants(^1)</td>
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<tr>
<td>Facilities and Other Direct Costs(^2)</td>
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<tr>
<td>G&amp;A Expenses(^3)</td>
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</tr>
<tr>
<td><strong>Total program expenses</strong></td>
<td><strong>2,999,958</strong></td>
</tr>
</tbody>
</table>

\(^1\) Subgrants to local partners

\(^2\) Facilities and Other Direct Costs include occupancy, office maintenance, service & supplies, electronic network, support & maintenance, research materials & quality assurance, and a small GHG tax from business travel and electricity use.

\(^3\) General and Administrative Expenses: Organization-wide shared costs including senior leadership, accounting, grant and subrecipient management, human resources, web management, audit, and related services.
APPENDICES
(in separate document)

A. Beijing Low Emission Zone Policy Introduction
B. Beijing Low Emission Zone Project KPI Summary
C. WRI Support to Chinese Cities LEZ and CC Development
D. Selected Outreach
   i. Workshops and Training
   ii. Reports
   iii. Articles
   iv. Communication Brochures

References


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