

BRIEFING

FEBRUARY 2019

Assessing ride-hailing company commitments to electrification

This briefing assesses and summarizes electric vehicle adoption among five of the world's largest ride-hailing companies. It discusses company-specific electric vehicle adoption, plans for future growth, and catalogues the unique actions that companies are exploring to promote electric ride-hailing on their platforms.

INTRODUCTION

The global transition to electric vehicles continues, with the major markets of China, Europe, and the United States leading the way. Cumulative global electric vehicle sales through December of 2018 surpassed 5 million units, and the fifth million arrived a quick four months after the fourth million.¹ At the same time, although largely a separate trend, ride-hailing fleets are greatly expanding across hundreds of cities in the largest markets, and this growth is expected to continue.

In this briefing, we assess the electrification commitments of five major ride-hailing companies: Didi Chuxing (Didi), Grab, Lyft, Ola, and Uber. Our assessment is based on the limited publicly available information found in company press releases, announcements, blogs, publications, interviews, and media stories that were published leading up to January 2019. We analyze company commitments to electrification based on several metrics, including the number of electric vehicles deployed, public announcements or goals for continued growth, investments in vehicles or their

¹ "Spotlight on ZEVS at the Global Climate Action Summit," Zero Emission Vehicle Alliance, (2018, September 18), <http://www.zevalliance.org/spotlight-on-zev-gcas/> and Zero-Emission Vehicle Alliance (2019, January 22). <https://twitter.com/ZEVAlliance/status/1087933293121716225>

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infrastructure, auto industry partnerships to supply electric vehicles, and various other actions to overcome barriers to electric ride-hailing. We emphasize that there is high uncertainty on the exact time periods of nearly every data estimate in this report including the number of company vehicles, users, daily trips, electric vehicles, partnerships, and investments. As a result, most of the data and figures presented in this report amount to best available approximations and estimates, rather than definitive or comprehensive data.

Figure 1 illustrates the markets where the five major ride-hailing fleets operate. These five companies have expanded their geographic reach across the major regions of Asia, Australia, Europe, North America, and South America. Two or more of these companies compete in markets shown by the hashed shading, including Australia, Brazil, India, Mexico, United States, and United Kingdom.

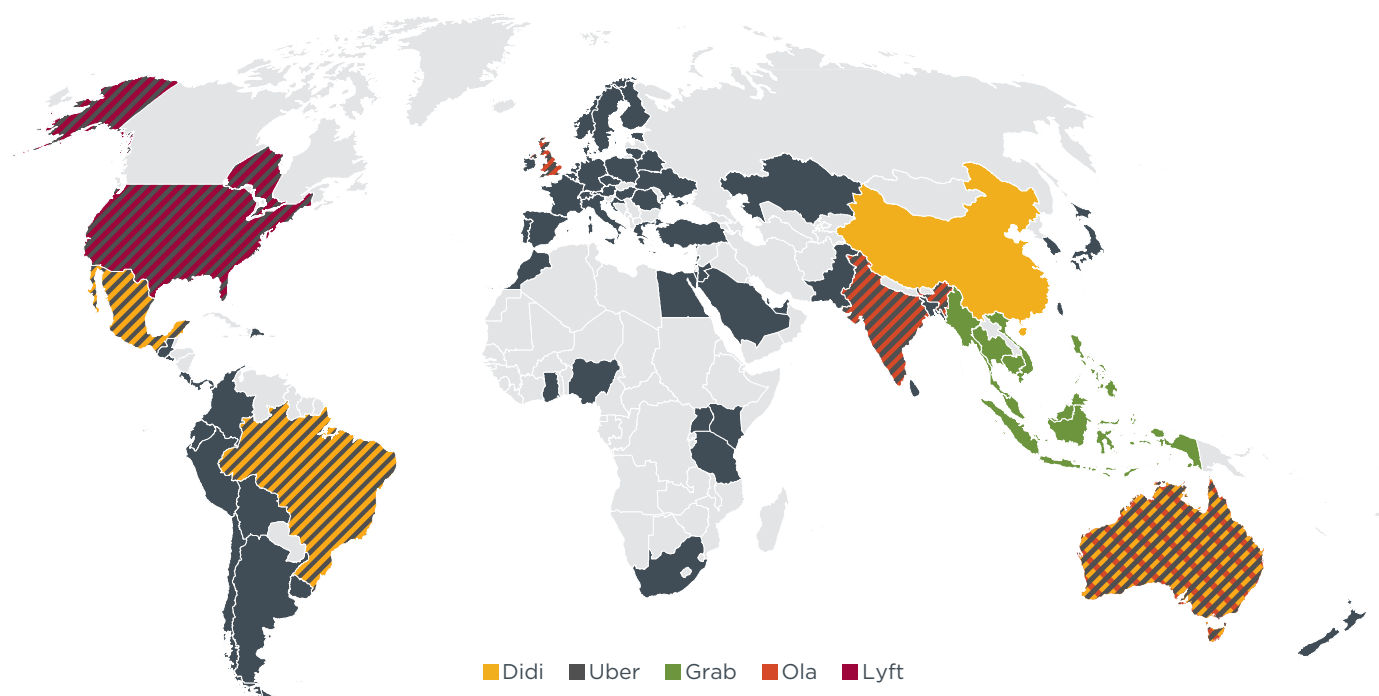


Figure 1. Major ride-hailing companies and the markets where they operate.

Figure 1 shows generally the company operations are relatively constrained geographically (e.g., Didi in China, Grab in Southeast Asia, Lyft in North America, Ola in India). Uber is the exception, with operations in many of the major countries across six continents. The underlying data in the figure are based on best available information on company operations including company websites, press releases, and media stories. Because of data limitations encountered at the local level, we show these plots at the national and subnational scale, but note that ride-hailing is concentrated largely in major urban areas and generally is not available across the entirety of a country or region. As examples of city-by-city expansion within the national markets, Uber and Lyft on their company websites list about 300 and 500 U.S. cities, respectively, where they operate.

Table 1 summarizes the major ride-hailing companies by several metrics, including market valuation, geographic coverage, and an approximate number of trips, drivers, vehicles, and passengers using each platform. The companies are ordered based on the largest number of trips per day. Together they have served tens of billions of trips, have several hundred million users, compete nearly 50 million trips daily, and have a market valuation of more than \$150 billion.

Table 1. Ride-hailing company markets, valuation, and operational statistics.

| Company | Primary market | Other markets | Market valuation | Operational statistics |
|-------------------------|----------------|--|------------------|---|
| Didi² | China | Australia, Brazil | \$56 billion | <ul style="list-style-type: none"> • 7.4 billion trips per year in 2017 • 25 million trips per day • 450 million users • 21 million drivers |
| Uber³ | North America | 600+ cities across Africa, Asia, Australia, Europe, and South America | \$72 billion | <ul style="list-style-type: none"> • 4 billion total trips completed • 15 million trips per day • 75 million users • 3 million drivers |
| Grab⁴ | Singapore | Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Vietnam | \$10 billion | <ul style="list-style-type: none"> • 1 billion total trips completed • 3.5 million trips per day • 68 million users • 2 million drivers |
| Ola⁵ | India | Australia, United Kingdom | \$7 billion | <ul style="list-style-type: none"> • 1 billion trips per year in 2018 • 2.7 million trips per day • 125 million users • 1 million drivers • 900,000 vehicles |
| Lyft⁶ | United States | Ontario (Canada) | \$15 billion | <ul style="list-style-type: none"> • 1 billion total trips completed • 1 million trips per day • 23 million passengers • 1.4 million drivers |

The table shows the scale of the ride-hailing fleets in terms of market share and operations. Headquartered in China and expanding to Australia and Brazil, Didi is the largest and provides more than 25 million daily trips, has 21 million drivers, and serves 450 million passengers. Uber is the second largest ride-hailing company and provides 15 million daily trips, serves 75 million passengers and has 3 million drivers. Grab serves

- 2 Xinhua, "DiDi completes 7.43b rides in 2017," *ChinaDaily*, January 9, 2019, <http://usa.chinadaily.com.cn/a/201801/09/WS5a541c98a31008cf16da5e76.html> and Eva Yoo, "Didi plans to raise \$1.5 billion using asset-backed securities," *Technode*, March 19, 2018, <https://technode.com/2018/03/19/didi-1-5-billion-abs/>.
- 3 "Company Info," Uber Newsroom, accessed January 15, 2019, <https://www.uber.com/newsroom/company-info/>.
- 4 "You're one in a billion!" Grab, November 6, 2017, <https://www.grab.com/sg/blog/youre-one-in-a-billion/>.
- 5 "Who we are: The Ola story," Ola, accessed January 15, 2019, <https://www.olacabs.com/about.html> and "Ola announces plans to enter UK, offers compelling choice in the ride-hailing market," *Business Wire*, August 7, 2018, <https://www.businesswire.com/news/home/20180806005725/en/Ola-Announces-Plans-Enter-UK-Offers-Compelling>.
- 6 "One billion rides. One billion connections," Lyft Blog, September 18, 2018, <https://blog.lyft.com/posts/one-billion-rides> and Lyft, "Economic Impact Report" (2018). <https://take.lyft.com/economic-impact/>.

3.5 million daily trips to markets in Southeast Asia; the company has 68 million users and 2 million drivers. Ola provides about 2.7 million daily trips with business operations concentrated heavily in cities in India, where three-wheeled passenger rickshaw ride-hailing vehicles are common. U.S.-based Lyft is the fifth largest and provides 1 million daily trips and has 1.4 million drivers.

EARLY ELECTRIC VEHICLE DEPLOYMENT

Ride-hailing electric vehicle adoption to date varies significantly. Figure 2 shows the estimated number of electric vehicles in each company fleet. Here, as throughout this briefing, we include both battery electric and plug-in hybrid electric vehicles. The data shown throughout are the latest available reported numbers, which we interpret as generally being the number of vehicles through 2017 for each company, unless noted otherwise as through mid-2018. As shown, electric vehicle use in company fleets ranges from several hundred to a few hundred thousand. Didi stands out as a clear leader with more than 260,000 electric vehicles in operation at the end of 2017,⁷ whereas Ola, Uber, Lyft, and Grab have a small fraction of this number. Based on more recent informal reporting, Didi appears to have more than 400,000 electric vehicles in mid-2018.⁸

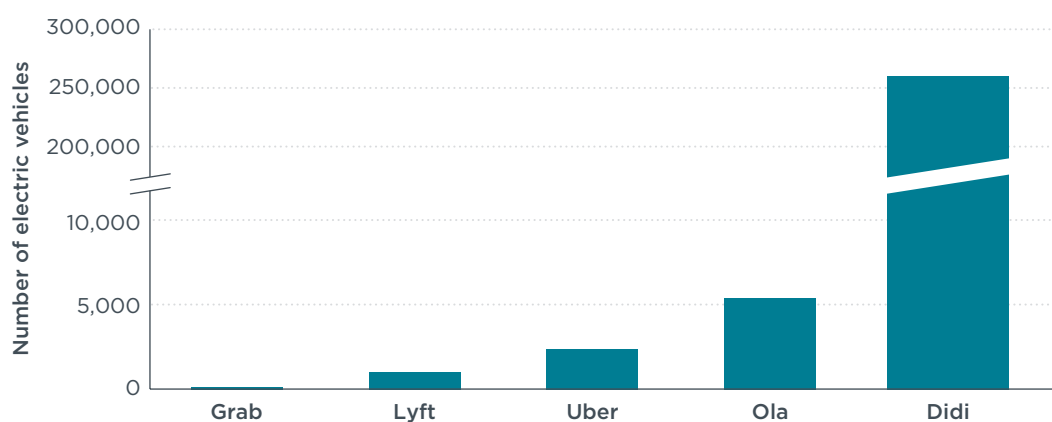


Figure 2. Estimated number of electric vehicles in ride-hailing operations.

Looking at the data in a different way, Figure 3 shows the total number of all the vehicles (bar, left-axis), and the share of vehicles that are electric (data points, right-axis). Unless data on the number of vehicles are available, we assume that the number of vehicles in each company's fleet is equal to the number of drivers. As shown, Didi has the largest overall vehicle fleet, followed by Uber, Grab, Lyft, and Ola. Didi also has the highest share of electric vehicles—more than 1% of vehicles on the platform are electric. Ola has an electric vehicle share of about 0.6%. Grab, Lyft, and Uber have less than one-third of this value, each with electric vehicle shares less than 0.2%. Didi prominently stands out as the top major ride-hailing company in terms of the total number of electric vehicles in its fleet, as well as with the share of vehicles that are electric.

⁷ Didi Chuxing, "Corporate Citizenship Report" (2017), http://img-ys011.didistatic.com/static/didiglobal/do1_p53rQtXhA6BjW6uWpF6t

⁸ Liyuan, Cai, "Interview with Dr. Yang Jun: Decisive battle for new energy," *Autohome*, August 17, 2018, <https://www.autohome.com.cn/news/201808/921031.html>

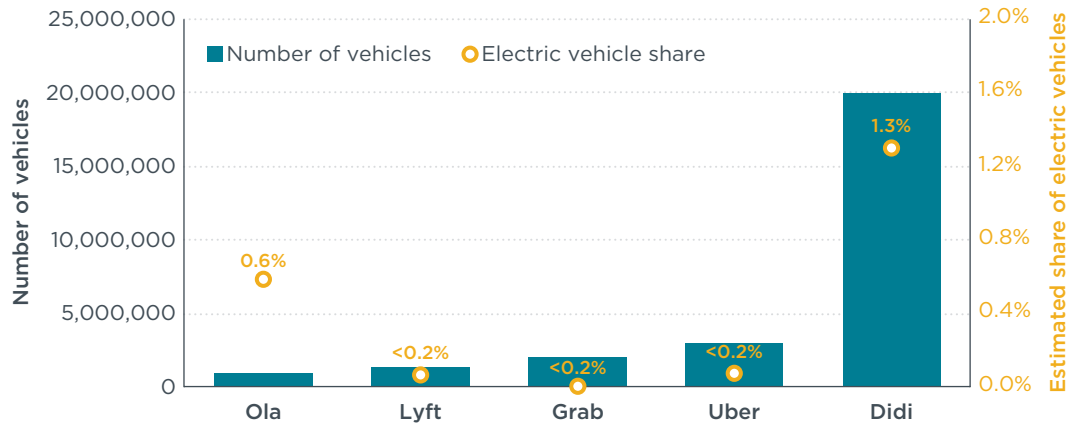


Figure 3. Estimated number of ride-hail vehicles and electric vehicle share.

Comparing the number of electric vehicles on ride-hailing platforms to cumulative global electric vehicle sales puts their relative presence into perspective. Figure 4 shows the estimated number of electric vehicles in ride-hailing fleets and cumulative global electric vehicle sales from 2010 through 2017. As shown, the cumulative global electric vehicle sales through 2017 was about 3.2 million units. Didi again stands out as accounting for a sizable share of cumulative global electric vehicle sales; electric vehicles on the Didi platform account for about 8% of global sales through 2017. Didi's fleet of more than 260,000 electric vehicles through 2017 is 21% of China's cumulative 1.2 million over that same period. In contrast, Uber and Ola appear to have about 2,500 to 5,000 electric vehicles, and Grab and Lyft appear to have about 100 to 1,000.

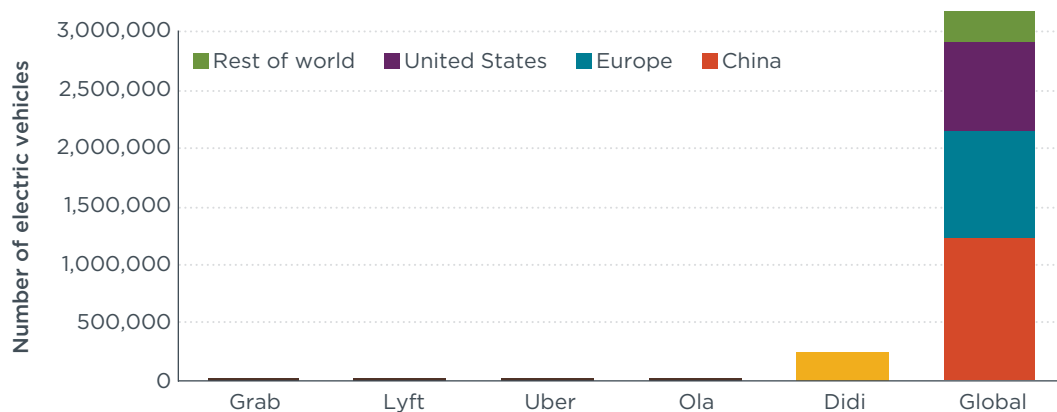


Figure 4. Estimated number of electric vehicles in ride-hailing operations and cumulative global electric vehicles from 2010-2017.

It is possible to make additional comparisons between ride-hailing companies and the broader market where specific data in particular markets have been made available. The California Public Utilities Commission (CPUC) has published data on the number electric vehicles in ride-hailing fleets and the approximate share that are electric in California.⁹ Uber and Lyft launched their core services in 2012, and at the end of 2017 about 1% of Uber and Lyft vehicles—approximately 3,000—were electric. Data are not

⁹ Simi Rose George and Marzia Zafar, "Electrifying the ridesourcing sector in California" (California Public Utilities Commission, April 2018), <http://www.cpuc.ca.gov/General.aspx?id=6442457050>

available on the annual share of new ride-hail vehicles in California that were electric, but this number can be compared fairly with the state's overall new electric vehicle registrations over this same time period. A cumulative total of about 350,000 new electric vehicles were registered in California from 2012 through 2017; the share of electric vehicles in California increased from 1.4% in 2012 to 5% in 2017,¹⁰ for an average of 3.2% over that same period. Therefore, over the last five years, Uber and Lyft drivers in California have deployed electric vehicles at about one-third the uptake rate of the broader market. This is illustrated in Figure 5, where the very slim bars on the left show the cumulative number of electric vehicles on the Uber and Lyft platforms in California and compares them to the California state average (bar, left-axis). The relative electric vehicle shares are also shown (data points, right-axis) for Uber and Lyft as well as the California state average.

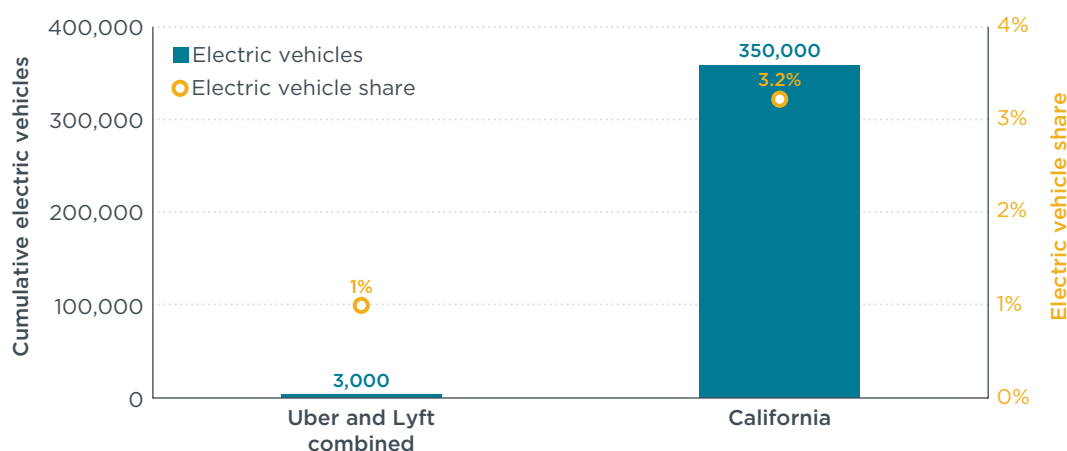


Figure 5. Estimated cumulative number of electric vehicles and share of vehicles that are electric in ride-hailing fleets and statewide in California from 2012–2017.

Data are very limited on these types of comparisons, but there are anecdotes that suggest some other ride-hailing companies have much higher electric vehicle uptake in their fleets in certain regions. The all-electric ride-hailing company CaoCao in China has about 16,000 electric vehicles in its fleet as of mid-2018.¹¹ For context, CaoCao's vehicle fleet is only about 1% the Lyft fleet; however, it has about 5 to 20 times more electric vehicles in service than Lyft. In addition, several taxi fleets around the world have partially or fully transitioned to electric vehicles; examples include Amsterdam's Schiphol Airport fleet, London's Black Cabs, Shenzhen's local taxi fleet, Téo Taxi in Montréal, and others in Berlin, New York, Paris, and Washington, DC.

ELECTRIC VEHICLE GOALS

Ride-hailing company electric vehicle commitments vary greatly across companies and markets in their level of ambition, time frame, and metric. Some companies have region-specific targets whereas others have overall fleet goals; some companies

¹⁰ Nic Lutsey, *California's continued electric vehicle market development* (ICCT: Washington DC, May 2018), <https://www.theicct.org/publications/california-electric-vehicle-2018>

¹¹ Kane Wu and Julie Zhu, "Two Chinese EV sharing platforms in \$730 million push to fuel growth: sources," Reuters, August 13, 2018, <https://www.reuters.com/article/us-caocao-fundraising/two-chinese-ev-sharing-platforms-in-730-million-push-to-fuel-growth-sources-idUSKBN1KY0PM>

have set near-term targets for 2019 while others have longer-term targets for 2025 and beyond; and some companies seek to electrify a specific number of vehicles, a percentage of the fleet, or a number of trips. To estimate future electric vehicle shares, we use data on company-specific targets for overall fleet growth. When such targets are not available, we assume a modest simple growth rate of 10% per year for future years for the overall company fleets.

Didi. In November 2017, Didi announced its goal to increase electric vehicles on the platform about fourfold to reach 1 million by 2020. The company has expanded on these ambitions and now aims for 10 million electric vehicles by 2028. Didi had about 21 million drivers and more than 20 million vehicles in 2017. Meeting these goals would mean that electric vehicles would account for approximately 4% of Didi's fleet by 2020, growing to 25% by 2028. No city- or country-specific electric vehicle targets were identified. Although the company is expanding operations to new markets (e.g., Brazil), it seems likely to expect the majority of Didi's electric vehicle adoption will be in its primary market, China, because of the especially strong local and central government policies there.

Uber. Some of Uber's early electric vehicle ambitions include the company's April 2017 announcement to make 10% of its Oregon fleet electric by 2019. In June 2018, Uber announced the Uber Champions Initiative, aiming to deliver 5 million electric trips in North America over the following year. Based on the operational data in Table 1 this is about 3,000 vehicles and less than 1% of the company's North American fleet. Uber announced much stronger targets in the United Kingdom in October 2018, aiming for 20,000 vehicles—about half of its London fleet—to be electric by the end of 2021, increasing to 100% of its fleet there by 2025.

Grab. In August 2018 Grab announced that it will add 200 electric vehicles to its Singapore fleet in 2019. Although the company has not announced quantitative targets or goals, in November 2018 Grab was in discussion with Hyundai to purchase electric vehicles and “deploy at scale.”¹²

Ola. Ola announced in April 2018 its Mission Electric, an initiative to accelerate electric vehicle adoption across the company's platform. In the near term, Ola aims to add 10,000 electric rickshaws to its fleet by April 2019. The company targets 1 million electric vehicles on its platform by 2021. Ola has about 1 million vehicles in its overall fleet and aims to grow to 5 million by 2021. If both goals are met, electric vehicles would represent about 20% of the fleet.

Lyft. As part of the company's climate impact goals, Lyft announced in June 2017 its vision to provide 1 billion annual rides in electric autonomous vehicles. Assuming each vehicle completes about 18 trips per day (approximately equivalent to an average full-time ride-hailing driver in the United States), 1 billion trips is about 150,000 electric autonomous vehicles, equivalent to about 4% of the company's 2025 vehicle fleet. Although unquantified, Lyft also announced that it will work to add “thousands” of electric vehicles to its fleet in 2019.

12 Sohee Kim and Yoolim Lee, “Hyundai puts \$250 million in Grab in a bet on EV mobility era,” *Automotive News*, November 7, 2018, <http://www.autonews.com/article/20181107/MOBILITY/181109818/hyundai-mobility-electric-grab>

Figure 6 summarizes these electric vehicle companywide and major regional adoption goals. Because the companies and their electric vehicle targets differ significantly with regard to fleet size, we illustrate electric vehicle adoption goals estimated as a share of each company's overall fleet size. Some companies including Uber have region-specific targets (e.g., electrify the Uber London fleet by 2025). In this figure we plot only the companywide and major regional goals for the core markets in which they operate. Grab has not announced any electric vehicle targets and so is excluded here. Overall, the figure shows that the most aggressive goal (Didi) translates to having about one in every four vehicles be electric. Few companies have announced long-term plans (i.e., beyond 2021) to electrify more than a small percentage of their vehicle fleet.

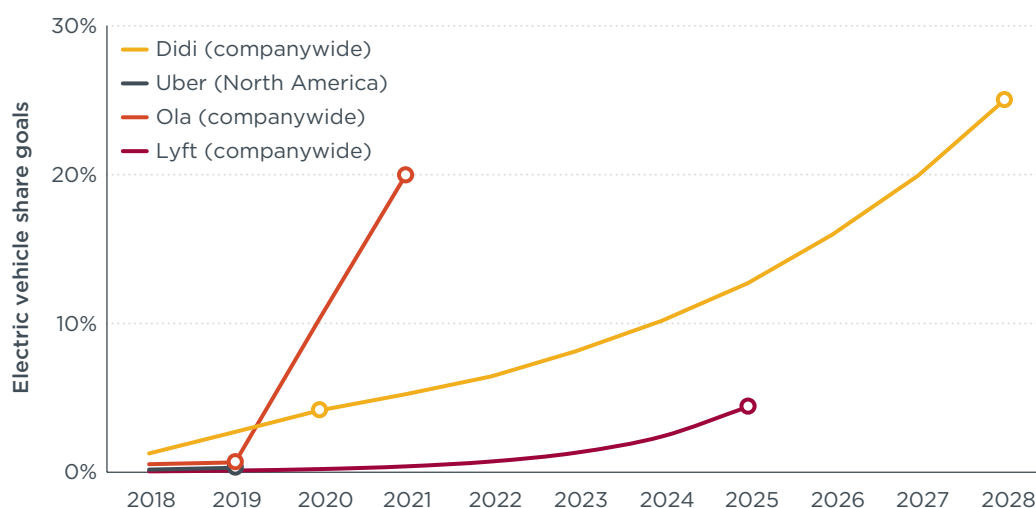


Figure 6. Ride-hailing electric vehicle companywide or major region goals estimated as share of company fleet.

The most aggressive target is Didi's goal (yellow line) of 10 million electric vehicles by 2028, which amounts to about 25% of its fleet. Ola (orange) aims for 10,000 electric vehicles by 2019 and 1 million by 2021, and these goals translate to about 1% and about 20% of the company's fleet, respectively, given the company's overall fleet growth goals. Lyft's goal to provide 1 billion trips in autonomous electric vehicles means that about 4% of its vehicles would be electric by 2025. Uber's goal to provide 5 million electric rides in North America by 2019 is likely to result in less than 1% of the company's North American fleet, and far less than 1% of its global fleet, being electric in 2019. As shown by the lack of black line beyond 2019, Uber has not announced targets for its North America operations beyond 2019, and Uber could set additional milestones for future years.

To provide context to the electric vehicle share goals in Figure 6, Bloomberg New Energy Finance projects that electric vehicles will represent 11% of new global light-duty vehicle sales in 2025 and 28% in 2030.¹³ The company targets shown in Figure 6 (e.g., Didi's goal for 25% by 2028) refer to the full stock of the ride-hailing company fleets, therefore Didi's aspirational goal is well ahead of forecasts such as those done by BNEF. Also, for context, China has a New Energy Vehicle goal for 20% of all

¹³ Bloomberg New Energy Finance, "Electric vehicle outlook 2018" (May 21, 2018), <https://about.bnef.com/electric-vehicle-outlook/>.

new vehicles to be electric by 2025; considering some lag between electric vehicle shares of new vehicles and electric vehicle shares of total vehicle stock, Didi's goal is approximately aligned with the national goal.

Uber has announced different electric vehicle targets for some of the local markets where it operates. Figure 7 illustrates Uber's region-specific electric vehicle targets, estimated as a share of the company fleet in the respective markets. The figure shows Uber's announced electrification goals in London (blue), Oregon (red), and North America (gray). As shown, Uber's targets vary significantly. Uber's goal to electrify its London fleet stands out as particularly robust—the company aims for half its London fleet to be electric by 2021, growing to 100% by 2025. In Oregon, Uber aims for 10% of its fleet to be electric by 2019, but no targets beyond this date have been announced. As introduced above, the company also has a target for its North America operations of 5 million electric rides by 2019, which is likely to result in less than 1% electric vehicle share.

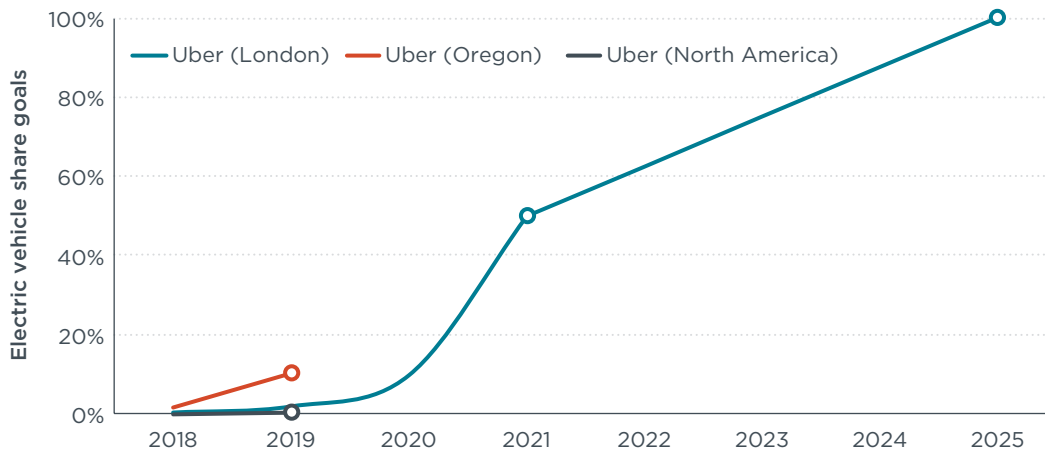


Figure 7. Uber's market-specific electric vehicle adoption goals estimated as a share of its fleet in particular markets.

Figure 8 compares Uber's electric vehicle targets in London with those of the London government. Also shown are the cumulative number of electric vehicles in the Uber fleet and on London roads in 2017. As shown, the London government aims for 75,000 ultra-low emission vehicles (i.e., plug-in hybrid electric or battery-electric vehicles) by 2020 and as many as 250,000 by 2025. Uber aims for 20,000 electric vehicles by 2021 and 40,000 by 2025, which represent 50% and 100% of its fleet, respectively. In 2017, Uber had approximately 150 electric vehicles in London, representing only a small fraction of the 30,000 electric vehicles on local roads. If Uber and London achieve their goals, Uber will effectively be 27% of London's electric vehicle fleet in 2021 and 16% in 2025, such that Uber's London commitment would make up a sizable portion of all the electric vehicles operating in London over that time frame.

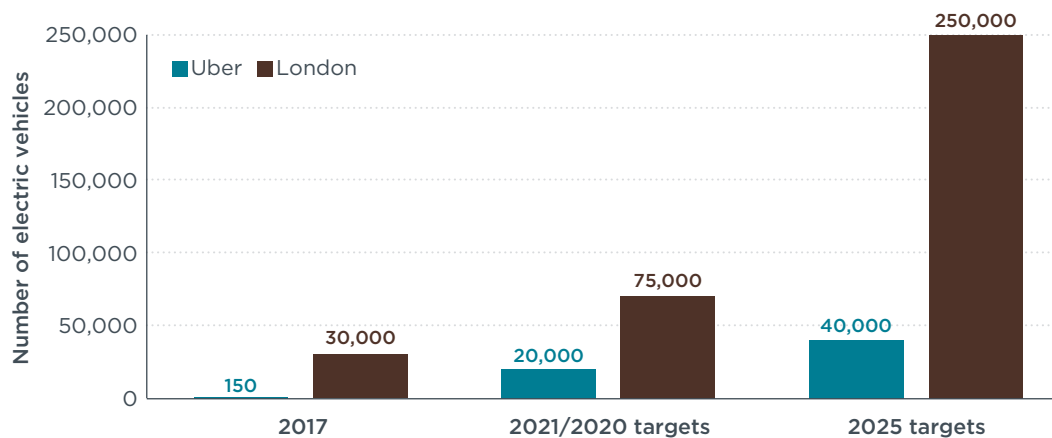


Figure 8. Electric vehicle goals for London as announced by Uber UK and local government.

To provide context to the electric vehicle targets in Figure 8, there are in total about 108,000 licensed shared-use vehicles in London, consisting of 21,000 black cabs and 87,000 private-hire vehicles. There are also about 2.6 million personally owned cars in London.¹⁴

As a final quantitative comparison, we put the ride-hailing company electric vehicle announcements in context with the overall automaker announcements regarding electric vehicle deployment. Figure 9 compares the ride-hailing company targets with the announcements made by automobile manufacturers selling electric vehicles around the world. Targets are summarized in units of cumulative electric vehicle sales based on increasing sales to meet their stated 2020–2026 plug-in electric vehicle goals.¹⁵ As shown, automakers have committed to selling well over 50 million cumulative electric vehicles by 2025. Per the goals summarized above, electric vehicles in ride-hailing fleets would amount to about 9% of all those electric vehicles, with Didi (yellow) accounting for approximately 7%, and Lyft, Uber, and Ola together representing 2% as shown by the very small slim red, gray, and orange bars on the left.

14 Transport for London, “Roads task force – technical note 12” (2012), <http://content.tfl.gov.uk/technical-note-12-how-many-cars-are-there-in-london.pdf> and London Department for Transport, “Taxi and private hire vehicle statistics: England 2017” (2017), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/642759/taxi-private-hire-vehicles-2017.pdf

15 Nic Lutsey, *Modernizing vehicle regulations for electrification* (ICCT: Washington D.C., May 2018), <https://www.theicct.org/publications/modernizing-regulations-electrification>

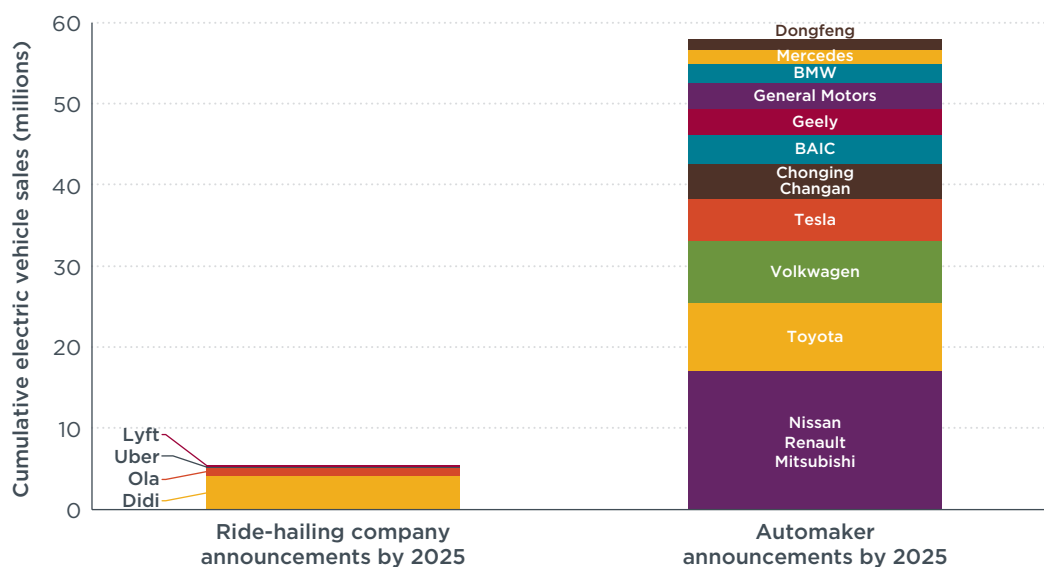


Figure 9. Ride-hailing electric vehicle targets and automaker announcements for 2025.

RIDE-HAILING COMPANY SUPPORT ACTIONS

As illustrated in the preceding figures, these five ride-hailing companies all have electric vehicles to some degree. However, adoption varies widely. Didi stands out with more than 260,000 electric vehicles at the end of 2017, which appears to be roughly 50 to 100 times more than the others. Didi also appears to be rapidly increasing electric vehicle adoption, with informal reporting indicating that the company has more than 400,000 electric vehicles in mid-2018. Ola has about 5,000, many of which are electric rickshaws. Uber and Lyft have not disclosed the number of electric vehicles on their platforms, but we estimate that the companies have no more than several thousand electric vehicles in operation on their platforms based on the best available data. Grab appears to have about 130 electric vehicles in its Singapore fleet.

Ride-hailing companies facilitate electric vehicles on their platforms through a variety of promotional activities. Discrete measures that go beyond the public announcements mentioned above include partnerships, incentives, charging infrastructure investments, utility partnerships, driver awareness and education, among others. Table 2 summarizes the company actions in place as of October 2018. The table includes the same five ride-hailing companies described above; includes market size figures for comparison; and signifies whether the company has implemented various electric vehicle actions as a national or global program (with “✓✓”) or in select local markets (with “✓”). The text below further describes each of the electric vehicle actions and identifies several applicable actions taken by the companies based on our research of online resources.

Table 2. Ride-hailing company actions promoting electric ride-hailing.

| Market valuation and vehicle statistics | Didi | Uber | Grab | Ola | Lyft |
|--|------|-------|-------|------|-------|
| Market valuation (billions) | \$56 | \$72 | \$10 | \$7 | \$15 |
| Number of vehicles (millions) | 21 | 3 | 2 | 0.9 | 1.4 |
| Share of vehicles that are electric | 1.3% | <0.2% | <0.2% | 0.6% | <0.2% |
| Electric vehicle action | | | | | |
| Public commitments | ✓✓ | ✓ | | ✓✓ | ✓ |
| Auto industry partnerships to supply electric vehicles | ✓✓ | ✓ | ✓✓ | ✓ | ✓ |
| Electric vehicle requirements on platform | ✓ | | | | |
| Financial incentives | | ✓ | | | |
| Charging infrastructure investment or partnership | ✓✓ | ✓ | ✓ | ✓ | |
| Utility engagement or partnership | | ✓ | ✓ | | ✓ |
| Driver awareness and education | | ✓ | | ✓ | |
| Electric vehicle-friendly in-app features | ✓ | ✓ | | | ✓ |
| Electric vehicle pilots or research | ✓✓ | ✓✓ | ✓ | ✓✓ | ✓ |
| Rider outreach and education | | ✓ | | | |

✓✓ signifies major global or national program

✓ signifies smaller local or regional program

Public commitments. Most ride-hailing companies have made some sort of public commitment to electric vehicles. These come in many forms and the details vary: Some companies aim to adopt a specific number of electric vehicles in the future (e.g., Didi's goal of 1 million electric vehicles by 2020), while others aim to provide a certain number of trips in electric vehicles each year (e.g., Lyft's goal of 1 billion electric-autonomous trips per year by 2025). As a global company, Uber has set multiple region-specific targets (e.g., 5 million electric U.S. trips in 2019; 100% electric fleet in London by 2025) but does not have an overarching electric vehicle goal.

Auto industry partnerships to supply electric vehicles. Ensuring the right models are available to ride-hailing drivers is a critical precursor to greater deployment of electric vehicles in ride-hailing service. Each of the five companies assessed here has at least one partnership with a vehicle manufacturer to supply electric vehicles to its drivers. These programs typically mean that drivers have access to electric vehicles via short-term lease agreements at lower costs than would otherwise be offered in the absence of a partnership. General Motors' spinoff Maven Gig in the United States demonstrates the desirability of electric vehicles when available at competitive prices—the Chevy Bolt is the most popular vehicle selected by Maven Gig drivers.¹⁶ Didi has been especially active forming industry partnerships. The company has partnered with dozens of vehicle manufacturers to supply low-cost purpose-built electric vehicles for its operations in China. Grab has partnered with Hyundai and Kia to provide custom electric models fit for its service. Table 3 summarizes the partnerships between ride-hailing companies and automakers for electric vehicle supply.

16 "Maven joins City of Austin, Texas in deploying all-electric shared use fleet of Chevrolet Bolt EVs," Maven, March 2, 2018, <https://media.gm.com/media/us/en/maven/pressroom/detail.html/content/Pages/news/us/en/2018/mar/0302-maven-austin.html>

Table 3. Ride-hailing company automaker partnerships to supply electric vehicles.

| Company | Estimated number of auto industry partnerships | Companies | Details |
|---------|--|--|---|
| Didi | 31 | Geely, SAIC, Renault-Nissan-Mitsubishi, Toyota, Volkswagen, others ¹⁷ | <ul style="list-style-type: none"> Produce low-cost purpose-built electric vehicles for ride-hailing in China. |
| Uber | 2 | Maven/General Motors, Mahindra ¹⁸ | <ul style="list-style-type: none"> General Motors' Maven Gig rents vehicles, including the all-electric Chevrolet Bolt, to U.S. ride-hail drivers. Mahindra to supply electric vehicles, including e2oPlus and eVerito models, to drivers in India. |
| Grab | 2 | Hyundai, Kia ¹⁹ | <ul style="list-style-type: none"> Partners to design and supply custom electric models optimal for ride-hailing, providing 200 vehicles for Singapore fleet in 2019. |
| Ola | 5 | Mahindra, Tata, Kinetic, BYD, TVS ²⁰ | <ul style="list-style-type: none"> Multiple vehicle manufacturing partners supplied Ola with electric vehicles for the 200-vehicle Nagpur pilot. Ola is seeking additional auto partners. |
| Lyft | 1 | Maven/General Motors ²¹ | <ul style="list-style-type: none"> General Motors' Maven Gig rents vehicles, including the all-electric Chevrolet Bolt, to U.S. ride-hail drivers. |

Electric vehicle requirements on platform. Few ride-hailing companies have taken the bold step of mandating that new vehicles on their platform be electric. Didi appears to be headed in that direction; the company requires all new vehicles in its Shenzhen service be electric, driven by local policies.

Financial incentives. A key barrier for drivers seeking to adopt electric vehicles is upfront cost. To overcome cost barriers, Uber has launched a Clean Air Plan in London to provide drivers with rebates worth about £3,000 to £4,500 to transition to electric vehicles.¹⁷ The program is funded by a £0.15-per-mile clean air fee that Uber is imposing on all trips. Uber is not implementing similar incentive programs in other markets. No other major incentive programs like this were identified by other ride-hailing companies.

Charging infrastructure investment or partnership. Charging infrastructure is a critical enabler of electric ride-hailing, and infrastructure availability remains a barrier in many markets. Four of the five companies assessed here have provided funding or partnered with other charging providers to deploy stations. Didi has a joint venture to construct Didi-branded stations for its fleet. Although charging dynamics and options vary by city, many Didi drivers can choose to use Didi-branded chargers, public chargers, or home chargers. Ola has a similar but smaller program to increase charging stations for its drivers in India. Uber is working to increase charging infrastructure availability in London; the company has partnered with multiple charging providers to increase driver-partner access to home chargers and public rapid chargers, and it is using Uber trip data to learn about driver charging patterns and behavior. The Maven Gig partnership with EVgo, although not specific to Uber or Lyft, allows participating Uber

¹⁷ "Uber's Clean Air Plan to help London go electric," Uber, October 23, 2018, <https://www.uber.com/en-GB/newsroom/uber-helps-london-go-electric/>

and Lyft electric vehicle drivers to use dedicated EVgo stations in several U.S. markets for free for a limited time. Grab has partnered with Singapore electricity provider SP Group to make DC fast and regular charge points available to drivers, and the company is analyzing driver patterns to improve charger access, utilization, and inform future installations at optimal locations such as coffee shops and food outlets.

Utility engagement or partnership. Electric power utilities play a key role in facilitating transportation electrification. A handful of partnerships between ride-hailing companies and utilities are emerging, especially in the United States. These programs aim to increase electric ride-hailing by measures such as raising driver and passenger awareness, installing public fast charging stations, and offering preferential electricity rates for electric ride-hail drivers. These also can be beneficial for utilities, allowing them to understand, plan for, and better manage the electric loads of these commercial fleets. Uber, for example, has partnerships with U.S. utilities including Duquesne Light, Rocky Mountain Power, Portland General Electric, and Sacramento Municipal Utility District. Lyft has partnerships with Rocky Mountain Power and Georgia Power. In Singapore, Grab has a strategic partnership with electricity provider SP Group. No partnerships between utilities and Didi or Ola were identified in our research.

Driver awareness and education. Driver awareness and understanding is key to increasing the use of electric vehicles in ride-hailing. Ola's pilot project in Nagpur includes training and education to help drivers understand vehicle maintenance, refueling, and in-car technology. As part of Uber's EV Champions Initiative in North America, Uber provides online electric vehicle resources in some local markets. For drivers in San Diego, California, the website includes information on the advantages of driving electric, state and federal incentives, low maintenance, public charging stations, environmental benefits, answers to frequently asked questions, testimonials, and links to more information.¹⁸ No resources by Didi, Grab, or Lyft were identified.

Electric vehicle-friendly in-app features. Some ride-hailing companies have developed in-app features to facilitate electric ride-hailing on their platforms. Uber, for example, introduced long trip notifications to provide drivers information on distances for trip requests to help electric vehicle drivers avoid running out of charge during rides. Electric Uber drivers also can request to be matched with passengers traveling to destinations near available charging stations, thus minimizing additional travel needs to reach a charger. Lyft is piloting an in-app option for passengers to choose a green option (hybrid or electric vehicle). Didi's driver app shows nearby available charging stations, thereby providing a one-stop-shop for driving and charging. No electric vehicle-friendly in-app features by Grab or Ola were identified.

Electric vehicle pilots or research. Each of the ride-hailing companies in this assessment has conducted some sort of electric vehicle pilot or research. Lyft launched its first electric vehicle pilot in Atlanta, Georgia, in October 2018 to promote electric vehicle use among drivers and passengers. In May 2017 Ola began testing 200 electric vehicles in Nagpur, India, to identify challenges and opportunities to grow its electric vehicle fleet. Didi has multiple research laboratories in China and expanded to California in March 2017, opening Didi Labs to develop advanced transportation technologies including electric and autonomous vehicles. Grab launched a fleet of 30

¹⁸ "Electric vehicle resources page: Leading the charge for a greener San Diego," Uber, accessed January 15, 2018, <https://www.uber.com/drive/san-diego/resources/san-diego-electric-vehicle-partner-resource/>

BYD electric taxis in Singapore in 2014 and expanded the program in February 2017 by adding 100 BYD e6 vehicles.

Uber has been especially active piloting electric vehicles. The company conducted a 6-month trial in London in August 2016 to study the challenges of electric ride-hailing and better understand opportunities for the wider adoption of electric vehicles. The Energy Savings Trust monitored and analyzed the pilot and produced a report summarizing the trial to inform company strategy.¹⁹ Uber has other electric vehicle pilots in Portland, Oregon, and Pittsburgh, Pennsylvania, and has conducted focus group assessments with partner drivers in many North American cities.

Rider outreach and education. Ride-hailing cars serve many passengers, creating an opportunity to significantly raise public awareness and understanding. However, few companies have taken steps to complement their electric vehicle efforts with rider outreach. Uber's EV Champions Initiative in North America includes passenger notifications to highlight that their ride is in an electric car. Additional rider-friendly in-car materials with information about electric vehicles and their benefits are available in selected cities with participating drivers. No rider engagement or outreach efforts by Didi, Grab, Lyft, or Ola were identified.

Other company activities to support electric vehicles. There are myriad company activities that could be undertaken to support electric ride-hailing. A practice that has been critical to growing the electric vehicle market in places like Norway is peer-to-peer networking for current and prospective consumers. Increasing driver access to credible information about electric ride-hailing is a key step to improving driver understanding and familiarity with the new technology, and there is evidence that ride-hailing drivers especially value and trust the experiences of fellow drivers. Ride-hailing companies could arrange peer-to-peer networks and set up platforms for drivers to share their experiences. Ride-hailing companies also could support policies that fit their timeline for electrification. Recent legislation in California, Senate Bill 1014 of 2018, directs state agencies to develop rules that reduce emissions from ride-hailing operations, including specific electric vehicle targets. Lyft and Uber were neutral on the final version of the bill. In the future, companies that are dedicated to transitioning their fleets to electric vehicles could publicly support such legislation and also support the incentive, infrastructure, and consumer awareness actions that generally help overcome the prevailing barriers to electric vehicles.

Table 4 summarizes the electric vehicle commitments of the five major ride-hailing companies that are the focus of this assessment. It includes company-specific adoption goals, the applicable regions for those goals, and the key actions that each company is taking to help meet the targets.

¹⁹ Energy Savings Trust, "Electric private hire vehicles in London: on the road, here and now" (March 29, 2017). <http://www.energysavingtrust.org.uk/blog/uber-electric-vehicle-trial-appy-drivers>

Table 4. Summary of ride-hailing company electric vehicle goals and selected actions.

| Company | Electric vehicle goals and planned adoption | Region for electric vehicle goal | Key electric vehicle milestones or actions |
|-------------|--|-------------------------------------|--|
| Didi | 1 million by 2020; 10 million by 2028 | Unspecified | <ul style="list-style-type: none"> • Auto industry partnerships for electric vehicle supply • Investment and partnership to build charging infrastructure²⁵ • In-app features to connect drivers with available chargers²⁶ • More than 260,000 electric vehicles at the end of 2017 |
| Uber | 600 by 2019 (10% of fleet) | Oregon, United States ²⁷ | <ul style="list-style-type: none"> • Partner with advocacy organization Forth • Driver training and education materials • Rider awareness and education |
| | 20,000 by 2021 (50% of fleet); 40,000 by 2025 (100% of fleet) | London, UK | <ul style="list-style-type: none"> • Financial incentives worth about £3,000 to £4,500 • Investment and partnership to build charging infrastructure |
| | 5 million rides in electric vehicles in 2019 | North America ²⁸ | <ul style="list-style-type: none"> • Seven pilot cities • Partnerships with NGOs, electric utilities, and universities • Driver education and informational materials, rider awareness • In-app features to minimize range anxiety • Free charging at select partner utility chargers (e.g., SMUD²⁹) |
| Grab | 200 by 2019 | Singapore ³⁰ | <ul style="list-style-type: none"> • Partner with SP Group for public charger network access • SP Group deploy chargers at driver-friendly locations • Preferential electricity rates at all SP Group chargers • Analyze behavior to improve charging practicality |
| | Unspecified | Southeast Asia ³¹ | <ul style="list-style-type: none"> • Launch multiple electric pilots across Southeast Asia • Hyundai and Kia to supply custom electric vehicle models • Partner to develop charging infrastructure • Raise public awareness |
| Ola | 10,000 e-rickshaws by 2019; 1 million vehicles by 2021 | India | <ul style="list-style-type: none"> • 200-electric vehicle Nagpur pilot, 4 million electric kilometers³² • Partner with drivers, cities, automakers, charging providers • Investment in charging infrastructure • Driver training and education materials³³ |
| Lyft | 1 billion rides per year in electric autonomous vehicles by 2025 ³⁴ | Unspecified | <ul style="list-style-type: none"> • Partner with Maven Gig for electric vehicle supply • Offer electric vehicles through Express Drive rental program • Atlanta pilot and utility partnership with Georgia Power³⁵ • Pilot in-app option for riders to request hybrid or electric cars |

20 "Didi Chuxing starts JV program to build EV charging network, says CEO Cheng Wei," *Business Wire*, November 2, 2017, <https://www.businesswire.com/news/home/20171102005989/en/Didi-Chuxing-Starts-JV-Program-Build-EV>

21 Josh Horwitz, "Didi Chuxing plans to build electric-vehicle charging stations across China," *Quartz*, November 2, 2017, <https://qz.com/1118336/didi-chuxing-plans-to-build-electric-vehicle-charging-stations-across-china/>

22 "Uber's first U.S. electric vehicle initiative," Uber, accessed January 15, 2019, <https://www.uber.com/fr-US/drive/portland/resources/electric/>

23 Adam Gromis, "Electrifying our network," Uber, June 19, 2018, <https://www.uber.com/newsroom/electrifying-our-network/>

24 "SMUD and Uber partner to bring electric vehicle incentive and outreach program to Sacramento," Sacramento Municipal Utility District, June 22, 2018, <https://www.smud.org/en/Corporate/About-us/News-and-Media/2018/2018/SMUD-and-Uber-Partner>

25 "Grab invests in new electric vehicle fleet, enabled by SP Group's fast-charging DC network," Grab, August 23, 2018, <https://www.grab.com/sg/press/business/grab-invests-in-new-electric-vehicle-fleet-enabled-by-sp-groups-fast-charging-dc-network/>

26 "Hyundai Kia invest additional US\$250 million in Grab," Grab, November 7, 2018, <https://www.grab.com/sg/press/business/hyundai-%E2%80%A2kia-invest-additional-us250-million-in-grab/>

27 "Mission: Electric," Ola, accessed January 15, 2019, <http://www.mission-electric.in/>

28 "Nagpur leads India's electric mobility revolution powered by Ola & Mahindra," Mahindra, May 26, 2017, <http://www.mahindra.com/news-room/press-release/nagpur-leads-india-s-electric-mobility-revolution-powered-by-ola-and-mahindra>

29 "Lyft climate impact goals," Lyft, June 15, 2017, <https://blog.lyft.com/posts/2017/6/14/lyft-climate-impact-goals>

30 "Georgia Power promotes electric transportation to meet customers' charging needs," Georgia Power, October 19, 2018, <https://www.georgiapower.com/company/news-center/2018-articles/georgia-power-promotes-electric-transportation-to-meet-customer-needs.html>

CONCLUSIONS

There has been a flurry of activity from 2012 through 2018 with the two major automobile trends of ride-hailing and electric vehicles. These two trends have experienced their initial launches and are well into the millions of vehicles globally. However, the convergence of the two trends—electric ride-hailing—has seen comparatively little progress. With this briefing, we characterize how the major ride-hailing companies are approaching electrification in terms of the electric vehicle deployments, stated electrification goals, and the company electric vehicle support pilots and programs underway.

Progress toward electrifying fleets varies greatly across the ride-hailing companies.

Didi is at the vanguard of electrifying its ride-hailing fleet, moving in line with the most bullish electric vehicle markets in the world in China. Didi is well out in front of other companies with more than 260,000 electric vehicles by the end of 2017—about 1.3% of its entire fleet—and appears to be rapidly increasing. Ola has the second highest share with approximately 0.6% of its fleet electrified, while operating in India where there are far fewer electric vehicle models available than in China. Grab, Lyft, and Uber, based on best available data, each appear to have electric vehicle shares less than 0.2%, with up to several thousand electric vehicles in their overall operations of millions of vehicles. Overall and in most markets around the world, electric vehicle adoption by ride-hailing fleets lags that of the broader private vehicle market. While these electric vehicle deployments amount to serious efforts, they also clearly indicate that electric vehicles have not become a core part of ride-hailing companies' business models.

Future goals to electrify fleets vary greatly across the ride-hailing companies, and also by region.

Didi, building on its early growth, has committed to rapidly electrify to reach goals of 1 million electric vehicles by 2020 and 10 million by 2028, which could represent up to a quarter of its fleet. Similarly, Ola's goal for 1 million electric vehicles by 2021 could amount to about one fifth of the company's fleet, given its overall growth targets. The other companies have not set comparable goals. Lyft's goal of 1 billion trips in autonomous electric vehicles could amount to less than 5% of its vehicles being electric by 2025. Uber's goal of 5 million electric rides in North America by 2019 could amount to less than 1% of the company's fleet being electric. These statements, despite regular and robust projections of electric vehicle cost competitiveness in the 2025 time frame,³¹ show uncertainty about ride-hailing fleets transitioning completely to electric.

The basic building blocks being used to electrify ride-hailing fleets are evident in the ride-hailing companies' local pilot projects.

Uber, although among the most reluctant to commit to electrification, is implementing the most diverse range of electric vehicle programs throughout its vast global operations. The company is experimenting with innovative electric vehicle programs in select local markets, include pricing its own fleet to fund its electrification, partnering with utilities to offer free charging, creating in-app features to support different electric vehicle driving and charging behavior, and committing to completely electrify its London operations within eight years. Many companies have taken actions that include establishing partnerships with

31 Nikita Pavlenko, Peter Slowik, and Nic Lutsey, *When does electrifying shared mobility make economic sense?* (ICCT: Washington D.C., January 2019), <https://www.theicct.org/publications/shared-mobility-economic-sense> and Peter Slowik and Nic Nic Lutsey, *Evolution of incentives to sustain the transition to a global electric vehicle fleet* (ICCT: Washington D.C., November 2016), <https://www.theicct.org/publications/evolution-incentives-sustain-transition-global-electric-vehicle-fleet>

automakers to ensure the right vehicle offerings and with charging providers to ensure alignment between charging deployment and drivers' needs. More data are needed to better understand how electric ride-hailing vehicles are being driven and charged, so continued sharing of related data on driving, parking, and charging locations seems critical to aligning ride-hailing company and city goals. Cities that are planning to implement zero-emission-vehicle only driving areas in the future are especially attractive for such collaborations.

Based on these developments, it is clear that electrifying ride-hailing fleets will remain a policy-driven development unless ride-hailing companies stake out a leadership position in committing to steer the transition of their fleets. Didi's most bullish drive toward electrification is, of course, across the various China markets with the strongest combination city policies that push and incentivize electrification. Uber's commitment to fully electrify its London fleet amounts to a substantial fraction of the city's overall electrification goals, and such a transition occurs when induced by a citywide pricing program and the implementation of an Ultra Low Emission Zone. Ride-hailing companies are in position to take their electric vehicle ambitions to the next level. To match the broader technology and market developments, ride-hailing fleets could set their sights on a long-term transition to electric, with more aggressive near-term market-specific goals that are aligned with partner cities with emission-free mobility goals.