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How to drive electric vehicle uptake in your city

[Transport](#)[Urban Planning and Design](#)Originally Published: **March 2019**Author(s): **C40 Cities Climate Leadership Group, C40 Knowledge Hub**Featured Organisation(s): **International Council on Clean Transportation (ICCT)**

To reduce transport emissions, cities need to encourage a shift to walking, cycling and public transport, and electrify the vehicles left on their roads: their bus fleets, municipal vehicles, commercial fleets and private vehicles. Bergen, Oslo, Liuzhou and Shanghai and many others are already on their way to becoming electric vehicle (EV) cities, while an electric-rickshaw revolution is underway in Indian cities.¹ As the technology advances and costs have come down, the transition to EV is increasingly feasible.

This article explains how cities can drive EV uptake through a comprehensive policy package. Originally published in 2019, it was updated in 2021. Read related articles for guidance on [deploying charging infrastructure](#) and [procuring zero emission buses](#).

Electric vehicles are zero emission, but they still contribute to air pollution and congestion

EVs have great potential as a way for cities to reduce local air pollution, greenhouse gas emissions and transport sector fossil fuel use. Coupled with renewable energy, EVs can produce zero emissions at the vehicle tailpipe and much lower life-cycle emissions.

However, they still contribute to congestion and air pollution, due to particles released from tyres and while braking. Therefore, a shift to EV should be positioned within a wider plan for most city journeys to be made

Accelerate the EV market by electrifying city fleets

Cities can move fastest in shifting vehicles to EV by focusing on those they have most control over, such as municipal fleets and buses. These also tend to be high-mileage vehicles which offer the greatest emissions cuts when they are electrified. In addition, by mandating that taxis and ride sharing vehicles are zero emissions, the city can drive demand for EVs and the creation of charging infrastructure.

Cities should set an end date for internal combustion engine (ICE) buses. To be in line with the Paris Agreement emissions reduction targets, city bus fleets should be fully zero emission by 2030.² Cities including Auckland, Warsaw and Medellín have committed to procuring only zero emission buses by 2025, at the latest, through the [Green and Healthy Streets Declaration](#).³ Shenzhen already has a fully electric bus fleet of over 16,000 units and over 20,000 electric taxis. Read [How to shift your bus fleet to zero emission by procuring only electric buses](#) for guidance on how to do this.

London's iconic black cabs will be fully zero emission by 2032

Since January 2018, all new black cabs (taxis) in London have been required to be zero emissions capable (plug-in hybrid electric vehicle [PHEV] as a minimum). In advance of this change, the manufacturer of London's iconic black cabs rebranded as the [London Electric Vehicle Company](#) and designed a new PHEV model. The electric cabs cost around £10,000 more than older ICE cabs, but drivers have access to grants of up to £7,500 to purchase a new electric cab, a delicensing payment of up to £5,000 for taking older (10 years or more) cabs off the street, subsidised home charging installation, and are expected to save around £2,300 a year in fuel costs. A 15-year cap on the age of ICE taxis means that all black cabs in London will be zero emission by 2032.

Use financial incentives to encourage uptake until EVs reach upfront cost-competitiveness with ICE vehicles

EVs already have a lower total cost of ownership than ICE vehicles in many markets.⁴ EVs are expected to approach upfront cost-competitiveness with conventional vehicles within the next ten years.⁵ In the meantime, cities can use incentives to lower the upfront or ownership cost to drive uptake of EVs – or lobby the relevant authorities to introduce them if they don't have the power to do so themselves.

Electric vehicle types

PHEVs are zero emission capable but as they use an ICE engine, alongside an electric motor, they are not zero emission.

As BEVs are cleaner, cities should concentrate incentives on these vehicles.

Financial and regulatory incentives can take the form of:

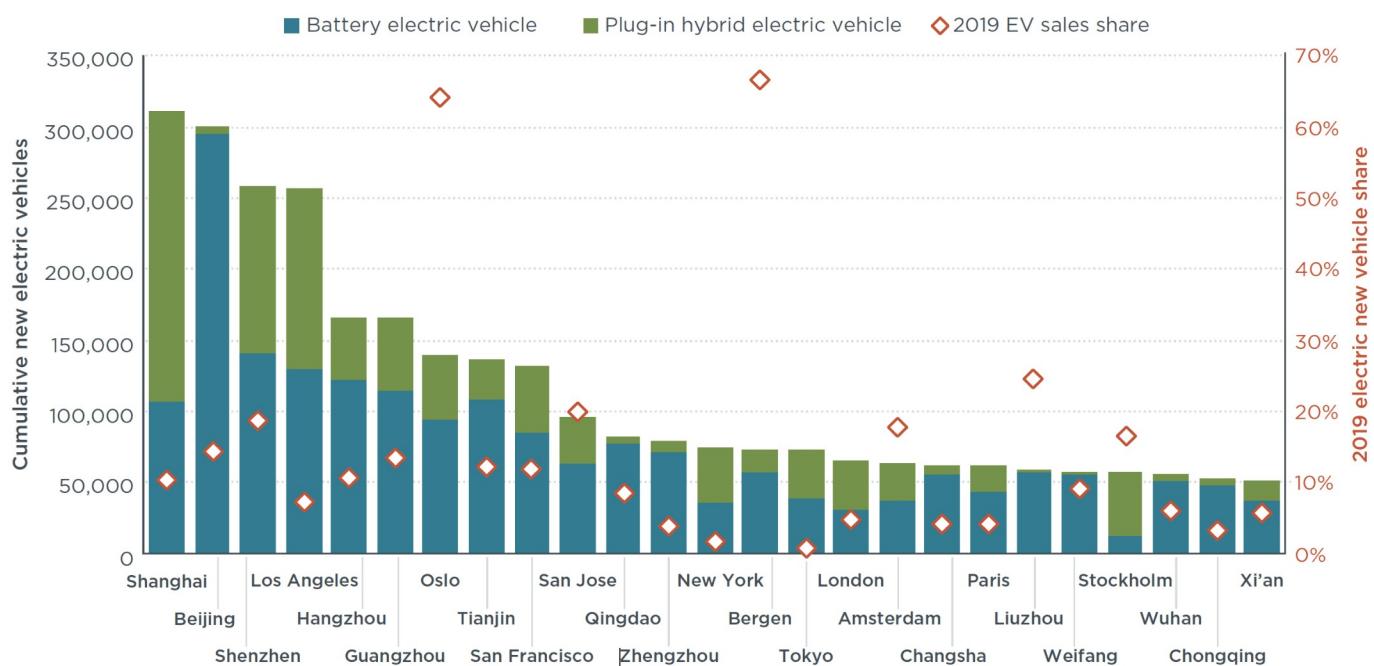
- **Exemptions from road pricing charges, vehicle bans or road and ferry tolls.** Cities that can implement road pricing or bans on vehicles will usually also be able to exempt EVs. For example, London has seen a significant increase in the proportion of cleaner hybrid vehicles because of its congestion charge exemption.⁶
- **Taxi and ride-hailing regulation.** Require that all new taxis and ride-hailing vehicles are electric, cap the maximum age of ICE taxis, and provide financial support, such as a scrappage scheme, to taxi drivers who make the switch.
- **Targeted incentives for business, such as company car tax exemptions.** In Norway, companies have been offered a 50% reduction in company car tax when purchasing BEVs since 2000, and since 2015 they have been exempt from 25% VAT on leasing vehicles. This is particularly important for smaller businesses which might struggle with upfront costs. In the Paris region, small businesses can receive an incentive of up to €6,000 (\$7,100) to buy electric light-duty company vehicles.⁷ Cities can also collaborate with the private sector to explore new financing models, such as access to rentals and leasing.
- **Vehicle tax breaks for EVs.** Work with the relevant government agency to offer rebates, tax credits or other tax exemptions to make the cost of leasing or purchasing EVs more comparable to ICE vehicles. Achieving this parity is easier in countries with high VAT and taxes on the purchase of ICE vehicles. This comparable purchase cost is the main driver of the high electric car adoption in Norway, where these taxes are high. The importance of these incentives was underscored in Atlanta in July 2015: Georgia's state rebate for EVs was revoked and EV sales plummeted by 90%.⁸ These tax breaks need to be set by national or state/regional governments, depending on the level at which these taxes are set.
- **Scrapage schemes for ICE vehicles.** This can help drivers cover the cost of making the switch to EV. The introduction of a low emission zone that charges or bans polluting ICE vehicles from entering is often coupled with a scrapage scheme. For guidance on the design and implementation of scrapage schemes, read ICCT's *Survey of best practices in reducing emissions through vehicle*

- **Fuel tax breaks for electric vehicle charging.** This will further reduce the operating cost. Again, these tax breaks would usually need to be set at the national level.

Leading electric vehicle cities

Comprehensive packages of national- and city-level policies have steered the below 25 cities into positions as global EV leaders. In 2019, Shanghai, Beijing and Shenzhen led by total cumulative sales, and Oslo and Bergen on EV share, where around two-thirds of passenger vehicle sales were electric.¹⁰ China has the largest EV sales by number of vehicles, and big plans for expansion.

Cumulative electric vehicle sales and 2019 sales shares in EV capital cities¹¹



This analysis from ICCT does not include two- and three-wheeled electric vehicles, such as the e-rickshaws which comprise around 80% of India's electric vehicle market (over 1.5 million e-rickshaws).¹² The Electric vehicle guidebook for Indian states provides recommendations on policy actions to promote EVs, including two- and three-wheelers, in the Indian context – while focussed at state level it sets out actions available to city governments, too.

Provide convenience incentives and other perks

Making a shift to EV easy for the public and private sector is essential to increase uptake. Key strategies cities can take are:



- **Build public EV charging infrastructure and encourage other stakeholders to invest.** An English EV
A charging infrastructure network (including home and workplace charging, and city and inter-city fast charging) is critical for uptake.¹³ Read *How to build an electric vehicle city* for more information on how cities can deploy this infrastructure.
- **Offer free public parking and priority parking, and consider offering free charging initially.**
For example, Oslo designated more than 1,300 parking spaces in municipal car parks for BEVs, which were originally free to use, while Amsterdam and Bergen give priority for highly coveted residential parking permits to EVs.^{14, 15} However, free parking can encourage a shift from public transport to driving, so this needs to be carefully managed. Cities can target these perks in areas less well served by public transport and areas outside of the city centre, for example. They can also offer charging at railway stations and airports, such as at Seattle-Tacoma International Airport which has 48 EV parking spaces with free charging.¹⁶
- **Enable and incentivise zero emission freight.** Establish last-mile logistics hubs, zero-emission zones for freight, preferential parking policies and more to support the shift to a decarbonised last-mile delivery system. For example in New York City, electric-assisted cargo bikes are permitted to park in areas once reserved for vans and trucks.¹⁷ In Montreal, the city converted an unused municipal building into a last-mile zero-emission delivery hub to reduce downtown truck traffic.¹⁸ For more on these approaches, read *Zero-Emission Zones: Don't wait to start with freight!* and *Zero-emission freight: Vehicle market and policy development briefing*.
- **Allow EVs access to bus lanes to enable EV drivers to travel more quickly.** Monitor the impact of this policy on bus journeys: if the number of EVs using bus lanes begins to interfere with bus journeys this access may need to be revoked for some or all bus lanes. In cities where car pool lanes are operational, access for zero emission vehicles can be an additional incentive for EV uptake, as in California.
- **Encourage innovative electric car-sharing businesses.** These enable more people to use EVs without owning them. Chinese cities lead in this field through the EV Card programme, a car sharing program with more than 30,000 EVs and 10 million registered users.¹⁹ Other successful examples include London's e-Zipcar fleet in partnership with Volkswagen, Nissan's e-share mobi in Tokyo, and ShareNow in 16 cities in eight European countries, with 2,900 EVs in its 11,000-car fleet.²⁰ Success factors for electric carsharing explains more, focusing on Europe and North America.
- **Enable faster and cheaper registration for EVs.** For example, in Chinese cities such as Shanghai, EV drivers receive a free and fast-tracked license plate, avoiding the longer wait endured by ICE vehicle drivers.²¹ Delhi launched a 'Switch Delhi' EV policy in August 2020 which waives road tax and registration fees for EVs alongside providing generous subsidies.²²



Raise public awareness of the benefits of EVs and dispel myths

Run a public awareness campaign to dispel the myths, particularly about the range and reliability of EVs, and to promote benefits including any financial or convenience incentives offered.

Range anxiety is a primary concern holding back EV uptake. Drivers fear that they won't be able to reach their destination. However, there are now a range of BEVs on the market to suit most drivers' needs. Cheaper EVs with a small battery, such as the Volkswagen e-Up, have an advertised range of around 160 miles and are well suited to shorter journeys within the city.²³ Cars with bigger batteries, such as the Tesla Model X, boast ranges of around 300 miles.²⁴ Provided drivers have sufficient access to home, work and/or public charging, EV range is no longer a problem. Drivers with access to overnight and at-work charging only need to visit charging stations for long-distance trips.

The most impactful arguments in favour of electric cars are:

- **The lower total cost of ownership (TCO).**²⁵ EVs have fewer moving parts than ICE vehicles and therefore require less maintenance. Batteries are rapidly getting cheaper and EVs also cost less to fuel in most markets, unless electricity is very expensive and gasoline is heavily subsidised. New EVs have a lower TCO in the UK, Japan, Texas and California.²⁶ BEVs used as high-mileage vehicles typically have the lowest TCO. From a cost perspective, therefore, fleet vehicles are well-suited to a shift to electric.²⁷ EVs become particularly attractive purchases on the second-hand market, where the price premium is reduced.²⁸ Drivers may be able to subsidise charging with rooftop solar. Cities should also promote awareness of national or state incentives which discount the purchase of new EVs.
- **The opportunities for improved revenues for vehicle operators.** Linked to the lower ownership and fuelling costs outlined above. This is the major driver of uptake for e-rickshaws in India. Drivers have found that e-rickshaws are quieter, faster, cleaner and cheaper to run and maintain than traditional (ICE) auto-rickshaws, making it a more lucrative model.^{29, 30} Shifting a taxi fleet to electric has also been shown to be profitable for companies in cities including San Francisco and Stockholm.^{31, 32}
- **Health and economic benefits.** These include reduced tailpipe emissions, improved air quality and, at speeds under approximately 30 mph, noise reduction (EVs are almost as noisy as ICE vehicles at faster speeds, when tyres and friction account for the greatest share of noise). They benefit everyone, not just EV drivers. Read Why clean air is vital for your city's health and prosperity for more on how air pollution is becoming a key social, political and economic issue in cities across the world.

Improve EV access for lower- to moderate-income communities

 English

Lower-income neighbourhoods are often disproportionately impacted by poor air quality. However, due to the high upfront costs of new vehicles (including but not limited to electric), EVs typically penetrate vehicle markets most quickly in high-income areas, which means wealthier demographics stand to benefit most from EV subsidies.³³

Lower-income groups will see benefits through improved air quality and noise reduction on the streets, and in the medium term will be able to purchase EVs as they are passed on to the second-hand market (where the EV price premium is usually greatly reduced, presenting a cost-effective option for buyers when coupled with cheaper fuelling and maintenance).³⁴ In the United States, the ICCT estimates car owners in the lowest-income quintile will save \$1,000 each year – or 7% of income – by switching to EVs.³⁵

Cities should invest in, or encourage the private sector to promote, EV access to lower-income communities including through shared mobility and public transportation as outlined below.

- **Targeted EV car-sharing programmes.** In Los Angeles, for example, the [BlueLA](#) EV car-sharing fleet serves low-income communities with poor transit access. It has helped to improve economic prospects by improving mobility options for residents in these areas. Low-income drivers receive a 25% discount for the service.
- **Raise awareness of EV leasing schemes.** Leasing an EV removes the consumer risks of uncertain resale value, battery degradation and rapid technology advances. Cities can raise awareness of this ownership model.
- **Target financial incentives for lower-income buyers.** San Francisco offers subsidies for low-income residents to buy old and new EVs, while incentive programmes exist in Los Angeles and Paris for used EVs.³⁶
- **Provide opportunities to experience electric mobility.** Events and programmes that allow people to test drive EVs improve the likelihood of purchase or use of EV car-share schemes among all income groups. Evaluations of such programmes have shown the biggest increase, however, is among lower-moderate income (income <\$50k) consumers.³⁷
- **Introduce regulation to ensure that electricity tariffs at charge points in low income communities are affordable.** Some private commercial charging points have been found to charge customers more than double the cost of a domestic tariff, penalising lower-income EV drivers who are less likely to have access to home charging.³⁸ Any EV charging price regulation would need to assess the locally-appropriate tariff for affordable charging given local electricity prices, to balance

affordability with the need for sustainable business models for charging.



- **Electrify school buses.** Children are especially vulnerable to air pollution. Cities should update regulations or procurement rules to ensure that any new school buses purchased are EV, and that all school buses are electrified in the medium term.³⁹ In the United States, school buses account for 80% of all buses nationwide and electrifying them would cut the country's bus emissions by nearly half.⁴⁰

Read ICCT's *Expanding access to electric mobility in the United States*⁴¹ and TERI's *Electric Mobility Paradigm Shift: Capturing the Opportunities*⁴² (in India) for more detailed guidance on approaches to expanding access.

Commit to phasing out ICE vehicles by 2030 and lobby national governments

Making such a commitment sends a strong signal about the future of ICE vehicles and EVs. It gives consumers the confidence to purchase EVs, and gives manufacturers cause to develop EV technology and models.

Cities should commit to phasing out ICE vehicles by a certain date, usually in 5-10 years. Signatories to the Green and Healthy Streets Declaration have committed to phasing out ICE vehicles by 2030 at the latest, in addition to procuring only electric buses by 2025. Announcing plans in advance, with time for consultation on the details, provides fleet operators and drivers time to prepare. Paris, for example, announced a diesel ban seven years in advance.

Because many vehicles are on the roads for over a decade, a total phase out will take time. By 2050, *all* vehicles on cities' roads need to be zero emission to meet climate goals, including heavy goods vehicles for which there are currently very limited options on the market today.⁴³

Phasing out ICE means incentivising zero emission vehicles and penalising polluting vehicles by:

- **Restricting the sales or registration of new ICE vehicles after a certain date.** Vehicles already on the roads would still be legal, but the number of ICE vehicles will decline as the vehicle stock turns over. This commitment needs to be made at the level of government at which vehicles are registered – usually national or regional level. Cities should lobby the relevant government body to make these commitments. Commitments made by national governments send powerful signals spurring EV investment within and outside of cities, such as in inter-city charging infrastructure, which is important for addressing EV range confidence and uptake. A statement or position on ending ICE sales from a city or group of cities can be very powerful. Mayors and city leaders from Leeds, Sheffield, Liverpool, Manchester, Bristol, London and other British cities put pressure on the UK Government to end ICE sales by 2030, which it introduced in November 2020.^{44, 45}



English

- **Using road pricing with strict emissions standards to charge ICE vehicles and/or ideas** English
disincentive to drivers, or set a date from which ICE vehicles will be banned. These vehicle restrictions are typically initiated in a designated area of the city where there is significant pollution and congestion. These initiatives are often known as a low emission zone or clean air zone to make clear the intentions of the restrictions and charges. The area could be gradually expanded to cover the whole city. Cities without the legal power to enact road pricing or restrict ICE vehicles should work with the relevant authority to initiate equivalent vehicle restrictions that will achieve similar impacts.
- **Lobby for vehicle emissions standards at a national/regional level.** Regulations for new vehicles have been pivotal to bringing cleaner cars (including but not limited to EVs) to Europe, China and the USA. They require manufacturers to develop cleaner vehicles and those in breach of the standards face fines. Cities in jurisdictions not subject to, or with weaker, standards can lobby for stronger regulations. For example, in December 2018, Paris, Madrid and Brussels together won a court ruling against the EU, overturning an amendment that weakened vehicle emissions standards.⁴⁶ Vehicle standards also help to accelerate the availability of cost-competitive EVs and the development of new, additional models. Model availability – in number and variety – has been a significant barrier to uptake in many markets. Manufacturers are attracted to the cities and regions with the biggest incentives.



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