



Whitepaper

An essential guide for cities on the journey towards effective public charging

Read on to discover the challenges facing city authorities and operators and how to overcome them.

www.flowbird.group



Helping cities and towns accelerate towards a zero emission future

2035 DEADLINE

As countries around the world strive to meet strict climate change targets, the transition to zero emission vehicles (ZEVs) will play a crucial role. To accelerate the shift, many countries have set deadlines for the sale of new petrol and diesel vehicles to end. In the UK, for instance, all new cars and vans will be zero emission at the tailpipe from 2035.

There is an urgency now to come up to speed preparing for the growth of EV adoption, providing public charging infrastructure that can meet demand and satisfy government directives. Operators and authorities must be proactive in rolling out well-managed and maintained electric vehicle (EV) charging facilities that integrate into wider mobility networks and meet communities' needs.

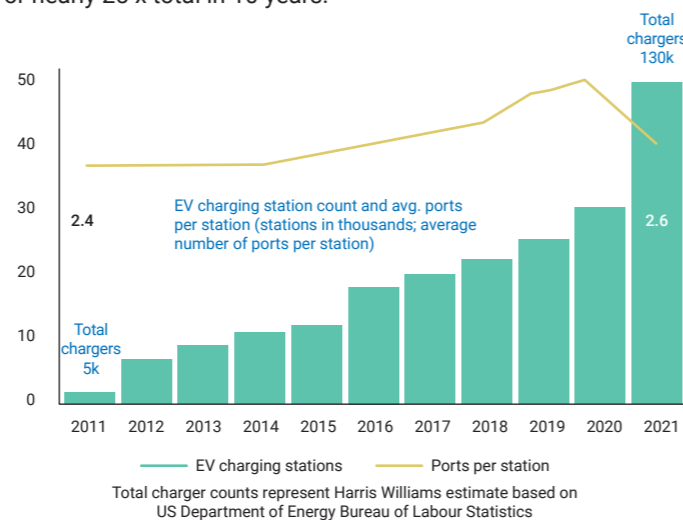
Public access is the top priority

In the United States and Europe, equal access to public EV charging is yet to be provided. Charging stations remain concentrated in big cities, and some highly populated coastal areas.

Expansion into towns and rural areas is needed to motivate purchase of EVs. It will be an essential step towards increasing EVs' share of the vehicle market, aligning to climate targets.

EV charging accessibility

Charger counts have grown ~38% annually, or nearly 25 x total in 10 years.



Bumps in the road ahead for authorities

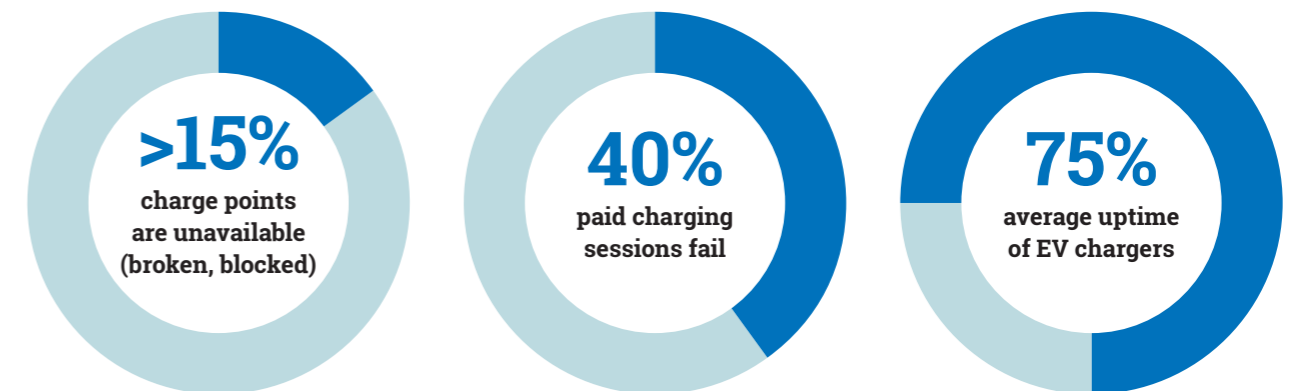
For operators and authorities, it may seem as if the journey towards making public EV charging convenient and reliable will be long. Many are nowhere close to fulfilling government directives (like AFIR in the EU).

Maintenance of existing systems is fraught with problems – most of which stem from a central issue:

The inability of cities and towns to take control of their entire EV charging ecosystems.

Many urban areas depend on multiple charge point operators (CPOs) to deliver EV charging services.

With no 'nerve centre' to unify operations, authorities can't standardise service levels, pricing and payment methods. There is no consolidation of operational data, and therefore no 'intelligence' driving the management of tariffs, vehicle rotation, enforcement, or maintenance.



A chaotic driver experience

All of this combines to create an inconsistent user experience. Without a 360-degree perspective over real-time charger availability across a city, customer communications aren't underpinned by accurate data.

Where multiple CPOs operate, there can be several driver apps available, but none supported by up-to-date information, that will steer them smoothly towards an available, working charge

point. Inevitably, utilisation rates are poor, as charge points are often broken or blocked.

Cruising to find a space leads to frustration, which is compounded when hardware is out of order, or there are separate payment processes for charging and parking. If a session fails, there can be many contact points for CPOs, leaving drivers unclear about where to get help.

Data: Harris Williams, based on U.S. data: ChargeUp Europe

A roadmap for change is needed

The EV public charging experience is far from satisfactory. With the clock ticking for operators and authorities to meet legislative requirements, now is the moment to clear a path towards transformation. Cities are looking to technical innovators to solve their fundamental problem: the lack of centralisation and standardisation of EV parking and charging management.

Where are we now?

Climate crisis drives urgent need for convenient, reliable EV infrastructure.

Current EV charging infrastructure delivers a frustrating user experience.

Where are we headed?

Governments set compulsory standards for park-and-charge.

Pace of roll-out is slow, and the clock is ticking for an accelerated response.

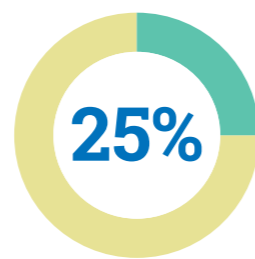
Bumps in the road

Lack of cohesion in EV charging management in cities and regions.

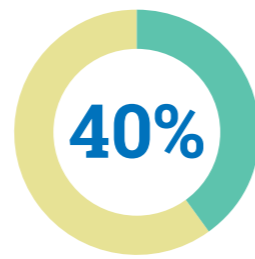
Perceived complexity of rolling-out and managing charging networks.



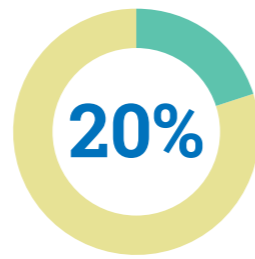
The EV charging experience today



25% average downtime of EV chargers



40% Drivers reporting charger operability issues



20% Drivers reporting charger payment issues

“Flowbird has developed a complete, out-of-the-box solution for EV Park&Charge that supports cities on every step of their e-mobility journey.”

Source: Harris Williams, based on U.S. data, California Air Resources Board (CARB) Electric Vehicle Supply Equipment Standards Technology Review, February 2022



Where are we now?

To prepare to meet mandatory requirements, and to inspire confidence in drivers to make the switch to EV, cities have a challenge: To build infrastructure that makes charging an EV as easy and convenient as refuelling a petrol or diesel car, wherever you live or work.

Enabling EV drivers to plug-in and power-up anywhere – on-street, at workplaces, and at destinations like hotels and supermarkets won’t happen overnight!

This is a new, regulated area, and its perceived complexity can become a barrier to success. To rise to the challenge, authorities will depend on technical partners to help deliver robust, scalable EV charging networks that can be managed centrally.

A global commitment to four key principles is necessary

Crucially, the bugbears of today’s EV drivers must be overcome, so that all public spaces offer EV charging infrastructure that meets four primary user needs:

01. Access for all

Everyone – people of all incomes, wherever they live – can find and access reliable public charge points.

03. Fair pricing

Growing choice in providers and open data on pricing drives competition, transparency, and fairness.

02. Ease-of-use

On- and off-street charging for private and commercial drivers is convenient, reliable and stress-free.

04. Simple payments

The charge for parking and charging is combined and drivers can pay using a contactless card or a mobile device.

Where are we headed?

**2050
DEADLINE**

With transport emissions today representing around 25% of the total greenhouse gas emissions in the EU, its goal of becoming the first climate-neutral continent by 2050 requires ambitious changes in transport and mobility policy, supported by technical innovation.

Accelerating towards this goal, the new regulation for the deployment of alternative fuels infrastructure (AFIR) sets mandatory deployment targets for electric recharging infrastructure across the EU (and the UK).

It seeks to boost consumer confidence in driving EVs, by insisting on price transparency, common payment options and accurate customer communication.

AFIR sets out recommendations for best-practice, alongside legal obligations, which operators or authorities must comply with, or risk facing penalties. Outside of the EU, similar regulations are being put in place, putting pressure on authorities around the world.

It's 'crunch time' for making EV infrastructure fit for purpose.

How can we get to the destination faster?

It's clear that cities need to provide effective, efficient EV infrastructure – and fast! But there's a strong message coming from operators and authorities that the road ahead is difficult for

them to navigate alone. There is an opportunity for specialised technical partners like Flowbird to remove the common obstacles (and excuses) standing in the way of optimal EV infrastructure.

The word on the street is that EV governance needs a shake-up – and cities and towns need support navigating the challenges.

“ We haven't got time, resources or expertise to do things better.

“ We don't know how to approach parking and charging as a combined solution.

“ We don't know how to meet new directives for EV.

“ It's impossible to control Charge Point Operators (we have no SLAs).

“ We don't have a clear view of data across internal and external charging networks.

“ It's complicated to standardise pricing and payment methods.



AFIR directives

CITIES MUST LEGALLY PROVIDE:

- Open data on location of public charge points
- Adequate spaces for parking and charging
- 98% uptime of chargers
- Simple card payment at charging stations
- Charge points that meet technical standards



What is considered 'public accessible'?

- Publicly owned and residential car parks where parking bays are not designated to individual households.
- Privately owned car parks to which the public has access, such as supermarket and hotel car parks, and those at motorway service areas.
- On street recharging and refuelling points on public roads.



Streets ahead: Flowbird's all-in-one solution is ready to go!

Urban mobility specialist, Flowbird, has come up with an all-in-one solution called Park&Charge, which helps cities take the fast track to excellence in public EV charging.

For more than 65 years, Flowbird has been designing parking technology for cities that prioritises user

experience. Our response to the charging challenge is comprehensive – answering the needs of operators, authorities and EV drivers for an EV parking and charging solution that's just as simple as parking alone. Our fast-fix solution doesn't compromise on quality.

80
countries

70%
on-street parking
market share

4,350
cities

>350m
transactions per year

>100m
users per week

>7m
mobile parking app users

Take control with Park&Charge

We believe we've created something unique. The missing link cities and towns need to bring order to the chaos of the EV charging experience.

Our Park&Charge solution features our fully-fledged, hardware agnostic parking and EV management suite – Flowbird HUB – at its core.

Unifying entire EV ecosystems, it brings efficacy and efficiency to every aspect of management. The HUB can be connected through standard protocols to any Charge Point Operator, charging hardware, mobile parking and EV apps, to allow a free-flow of real-time data back and forth.

On a management level, centralisation creates a level playing field across internal (managed by the city) and external (managed by CPOs) charging infrastructure.

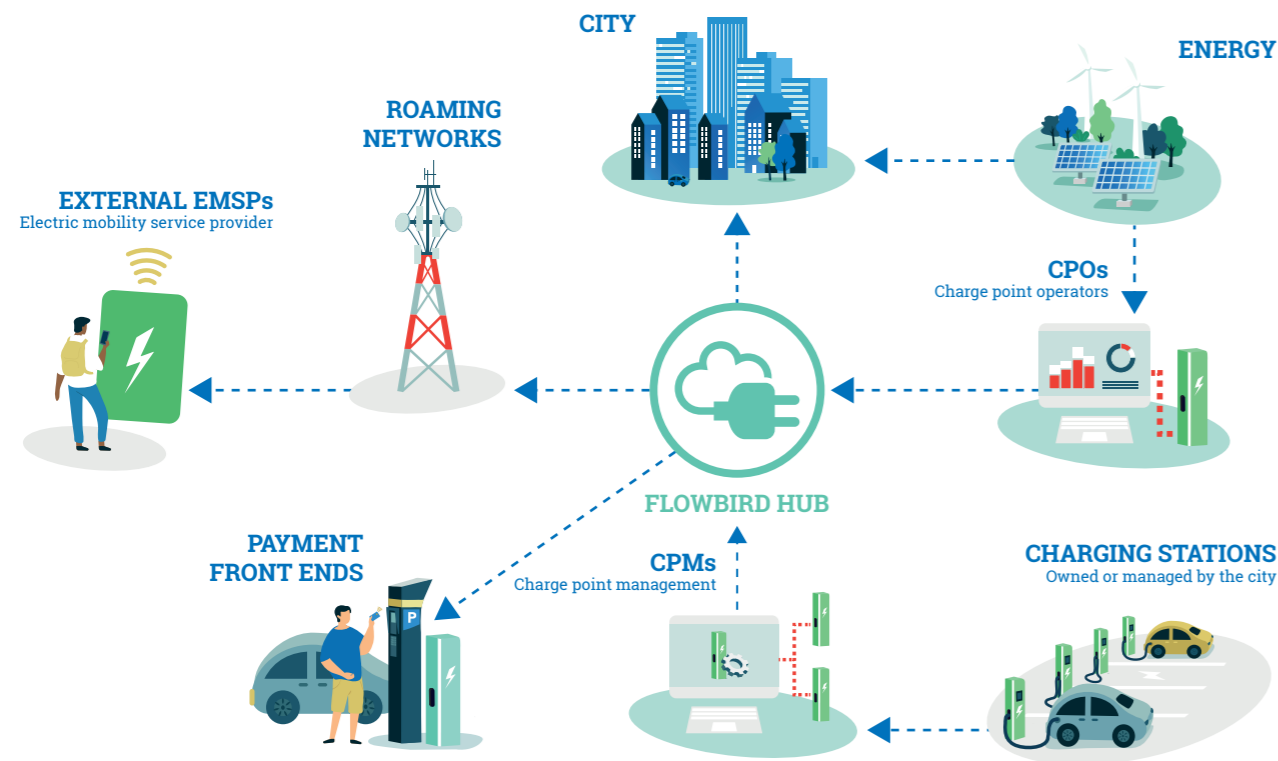
Standardisation of service levels, pricing and payment methods brings clarity to management processes and to the end user, who can feel confident about the experience they will receive when they pull up to charge.

Because data is harvested in real-time from all corners of the network into a single back-office, it gives both management teams and end-users information they can trust.

For managers, that could be a heads-up on vehicle occupancy to inform rotation and enforcement, or alerts to carry out terminal maintenance. For drivers, it could be a smooth navigation to an available charger.



A flexible, scalable solution



System unification is the headline benefit of Flowbird Park&Charge for operators and authorities, with Flowbird HUB providing the centrepiece. But it's important to see the HUB as the core, around which management teams can build a flexible, scalable solution.

The platform can be connected to all Flowbird physical and digital sales channels, including our AFIR compliant S5 series of payment terminals. But authorities are also free to integrate any third-party hardware or user interfaces using standard APIs. There's no vendor lock-in and the fluid architecture of our system adapts as new requirements or technology emerges.

We've invested in building a network of valued hardware partners, the best EVSE suppliers from around the world, so that we can offer a choice of equipment that caters for every public EV charging scenario. With our established field engineer and service delivery teams, we can offer charging hardware, installation and maintenance services – completing our end-to-end solution.

A helping hand at every stage of the e-mobility lifecycle



Everyday management made simple

With time and resources under pressure, Flowbird Park&Charge cuts to the chase, making EV systems run smoothly. Our cloud-based platform, Flowbird HUB, simplifies workflows and enables accurate, real-time communications, making everyday processes easier and faster.

- Roll-out EV pricing policies across sales channels
- Monitor charging and payment hardware and respond to alarms
- Collect cross-channel data, and carry out analytics and reporting
- Configure and roll-out business rules – e.g. forced vehicle rotation
- Send real-time data to enforcement teams (via enforcement apps)
- Send real-time data to drivers (via driver apps or web portals)



Park&Charge empowers cities to level-up service quality

With all charging hardware connected to a single hub, quality control is easy – helping cities hit their targets for improving the availability and use of EV charging.

FULL CONTROL of the EV ecosystem for its lifecycle.

INTEGRATION of all chargers and Charge Point Operators.

CENTRALISED DATA of charging and parking in one place for analysis and insight.

PAYMENT SERVICE handles secure payment acceptance, processing and collection.

INCREASED UTILISATION through better management maintenance.

SCALABILITY to meet all existing and future EV needs.

Boosting the confidence of EV drivers

The success of climate targets depends on making EV charging as easy as parking, so that owning and running an electric vehicle is as simple as a petrol or diesel car.

Flowbird Park&Charge can be cities' ally in delivering the experience that measures up – and motivates more drivers to switch to EV.

Combining best-in-class technology from Flowbird and our EVSE partners, it makes every customer touch point feel effortless.

All the trigger-points of frustration have been removed. In their place, common-sense must-haves, including: Single payments for park and charge; simple payment methods; and well maintained equipment.

Flowbird's mobile Park&Charge app complements the experience, although third-party apps can also be integrated.

Using a mobile app, drivers can:

- Find available Park&Charge stations
- Define session duration
- Extend the original time
- Pay for parking and charging
- Only pay for the time used

Centralised management offers a reassuring benefit to drivers – a single point of contact for customer service, provided by Flowbird's 24/7 support team.

Our expert remote assistants can be accessed via terminals or our mobile app, to guide drivers through unlocking charging cables, starting a charging session, and rebooting chargers.

They need never feel stranded again.

Headache	Solution
Separate payments for parking and charging	Single payment at terminal, in-app or online
EV charging sessions regularly	Reliability enhanced by 24/7 maintenance and support
Endless circling to find a charge point that's working and available	Mobile app updated with real-time information on charge-point availability
Multiple contact points for support when several CPOs operate	A single contact point for simple customer self service



Some of our hardware partners



Automation by innovation.

E-mobility readiness: lessons from Scandinavia

Preparing for the transition to e-mobility is a steep mountain to climb for every country around the world.

In Europe, for example, the pace of public charger installations must sharply pick-up in the next two years.

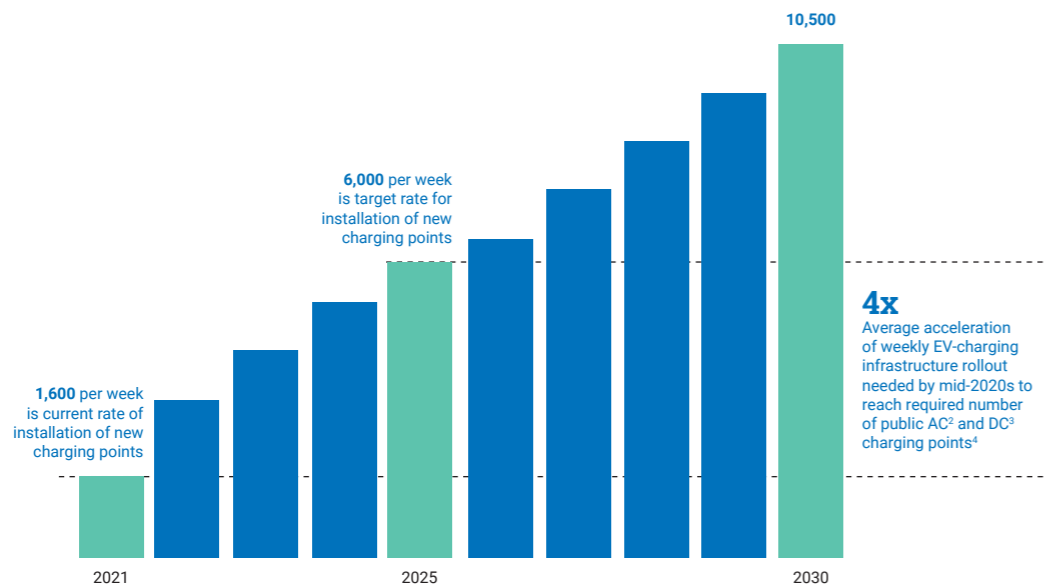
While some countries are lagging behind, others are setting examples of how both EV adoption and e-mobility readiness can be accelerated.

Two Scandinavian countries that have made strides are Norway and Sweden.

Here we take a look at what they have achieved and lessons we can learn from their example.

The pace of public-charger installations in Europe must quadruple by 2025

Installed public charger points for electric vehicles¹, number of installations per week



¹Target rate reflects utilisation-oriented scenario described in the European Automobile Manufacturer's Association (ACEA) report.
²Alternating current
³Direct current
⁴470 weeks left until end of 2023 and some 3 million charging points installed

Source: European Alternative Fuels Observatory, national transport and mobility organisations; McKinsey EV charging-infrastructure model

Norway	Sweden
Current status	
<ul style="list-style-type: none"> → 6th place in the EV market in Europe → EV fleet tripled between 2017-21 → 16% passenger cars were EV in 2021 	<ul style="list-style-type: none"> → 4th place in the EV market in Europe → 549% EV fleet growth forecast 2022-30 → 62% new cars are plugin EVs in 2023
Success driver #1: strong incentives for buying EVs	
<ul style="list-style-type: none"> → Large subsidies → Lower tax → Bus lane access → Free parking → Toll exemption 	<ul style="list-style-type: none"> → Grant scheme → Lower tax → Bus lane access → Local city offers (e.g. free charging) → Cost-savings for businesses
Success driver #2: investment in EV infrastructure	
<ul style="list-style-type: none"> → 256% growth in publicly accessible chargers between 2015-21 → 13.6 charging locations per 100 kilometres of roadway 	<ul style="list-style-type: none"> → 438% growth in publicly accessible chargers between 2016-21 → 16 charge points p/km2 (Stockholm) → Innovations include a 'charging road'
Top 3 lessons learned:	
<ol style="list-style-type: none"> 1. Policy makers must be creative to incentivise greater adoption of e-mobility 2. EV infrastructure can't lag behind adoption: it's imperative to grow fast! 3. Even cities leading the transition to e-mobility have a long way to go 	

How to take charge of your e-mobility ecosystem – ready to begin your journey?

As the world transitions to e-mobility, we're on the verge of an enormous industrial step-change, the biggest since the introduction of the internal combustion engine and the birth of the automobile in the late 19th century. It's going to be a challenging and rewarding ride, with climate targets and regulations forcing action at an accelerated pace.

This whitepaper set out to highlight a clear roadmap for cities and regions daunted by the scale of the task ahead. Faced with fragmented and ineffective

e-mobility charging networks, we hope our ideas for unifying and simplifying the management and use of EV charging systems will spark renewed optimism that e-mobility readiness is achievable.

As you buckle up for the journey ahead, we're on hand at Flowbird to offer technical know-how and a fully-fledged technical solution for a manageable EV ecosystem. We're confident that our innovations can enable any city to meet the needs of the EV drivers of the future.

FLOWBIRD
Urban
Intelligence

**Join us on our mission to make
charging as simple as parking**



Get in touch today to start your e-mobility journey:
emobility@flowbird.group

www.flowbird.group