

SII – Sustainability Innovation Inventory

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Autolib' (Paris)



Executive Summary

Following on the footsteps of its successful municipal bike-sharing program, Vélib', Paris will be introducing a similarly structured car-sharing program in 2009. Like Vélib', but unlike most current car-sharing programs, Autolib' will allow users to pick up and drop off vehicles at different locations, thus providing a flexible service designed to complement Paris' public transportation network. The Autolib' fleet will consist of 4,000 electric vehicles accessible from 700 pick-up/drop-off locations in and around Paris.

Autolib' is a project spearheaded by Paris' mayor, Bertrand Delanoë, and is part of a larger initiative to reduce air pollution in Paris by 32% before 2012.

Are Electric Vehicles a Sustainable Technology?



Figure 4: The Autolib' slogan – “une voiture juste quand il faut” – highlights the sustainability goals of the program and helps promote a concept of the automobile as a service rather than a possession.

While the Autolib' all-electric fleet will be an obvious improvement over traditional automobiles in terms of environmental impact, critics of the program have expressed concern that a convenient public car-sharing program in a city like Paris – which already has many good alternatives to driving – will add a sudden influx of additional traffic to already congested urban roads and discourage current bicycle and public transportation use.

Mayor Delanoë intends for Autolib' to encourage people not to buy cars of their own, by providing access to cars for people when they need them, rather than promoting driving as a means of urban transportation. To encourage this, Autolib' usage fees will be priced to be attractive to city residents as an alternative to car ownership without coming into competition with public transportation.

Current car-sharing companies such as Zipcar and municipal/no-profit car-sharing organizations around the world have amassed a significant amount of evidence on the environmental benefits gained by changing the car culture mentality from one of ownership to a use-as-needed model. According to the various experiences of car-sharing programs, for each vehicle they put on the road, between 4 and 20 personal cars are taken off the road. Not only does car-sharing reduce overall traffic and parking demand from privately owned vehicles, car-sharing program fleets also tend to have newer (i.e. more fuel-efficient and emissions-controlled) technology and be better maintained than the average personal vehicle. In addition to “greening” the roads, car-sharing programs have been shown to influence their members' transportation habits towards more sustainable practices in general. Studies of several car-sharing programs have found the following behavior changes among their members:

- Increased **public transportation** use
- Increased use of **bicycles** for transportation purposes
- Increased **walking** for transportation purposes
- Members tend to change their minds about **purchasing a new car** or sell their current car after joining Zipcar
- Members **drive less per year** than their cities' average per-person mileages

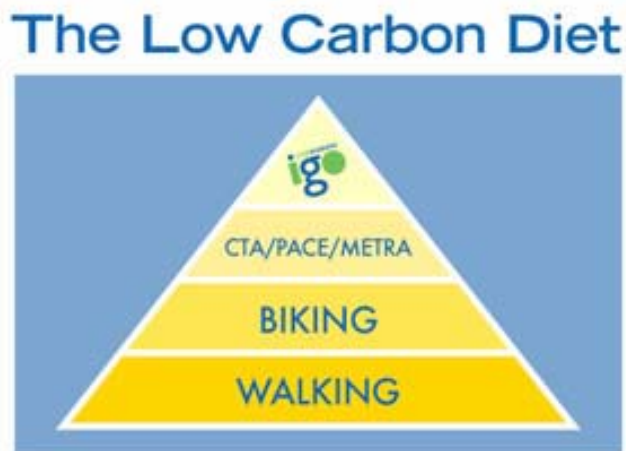


Figure 1: A model for healthy transportation habits, according to Chicago-based nonprofit car-sharing program I-GO. Just as the old USDA food pyramid encouraged people to limit their consumption of processed sugars, oils, and fats, I-GO suggests that cars should be thought of as a “sometimes” treat rather than a staple of urban transportation. (The second block from the top in the transportation pyramid refers to Chicago public transit options.)

The all-electric aspect of Autolib' is a great choice for Paris, but may be a more complicated decision for other cities interested in implementing similar programs. Because of France's reliance on nuclear power, electricity is relatively inexpensive in Paris. Depending on local prices for gasoline and electricity, other cities may want to consider hybrid or high-efficiency vehicles instead of all-electric. Alternatively, they may want to tie a car-sharing program to a distributed urban power network of small-scale renewable energy sources that could deliver power directly to the vehicle charging stations. The latter scheme has the added benefit of providing energy storage through the vehicles' batteries, thus allowing cities with overtaxed electricity grids to draw power from parked electric cars during times of peak demand.

Electric vehicle enthusiasts are also quick to point out that the infrastructure brought by Autolib' to maintain a fleet of 4,000 electric vehicles in Paris will encourage the development of a larger market for electric vehicles in general.

Current Technology

Like Vélib, Autolib' will have vehicle pick-up/drop-off locations all over the city. Autolib' is currently planning 700 pick-up/drop-off spots in Paris and its outskirts, 200 of which will be underground. (For perspective, the Paris Metro currently has 300 stations.) A central computer system will allow users to specify a return location when they pick up their car, if they wish, and reserve a guaranteed spot at their eventual destination.

The Autolib' economic model will allow two kinds of car use. All Autolib' subscribers will be required to sign up and get a smart card that will give them access to the Autolib' vehicles. Beyond that, Autolib' members will have the option either to purchase a monthly pass or to pay as they go. The monthly pass will run approximately €250 per month with a 60 mile-per-day limit (analyses of the program note that, while this seems expensive, it is much cheaper than owning a car in Paris). Alternatively, for people interested in using Autolib' only occasionally, the per-use option will allow Autolib' members to pay “a few Euros” (the price has yet to be set) for a car by the hour. The per-use option will allow members to reserve a car online or simply take a car from any location in the city as needed without prior reservation, subject to vehicle availability.

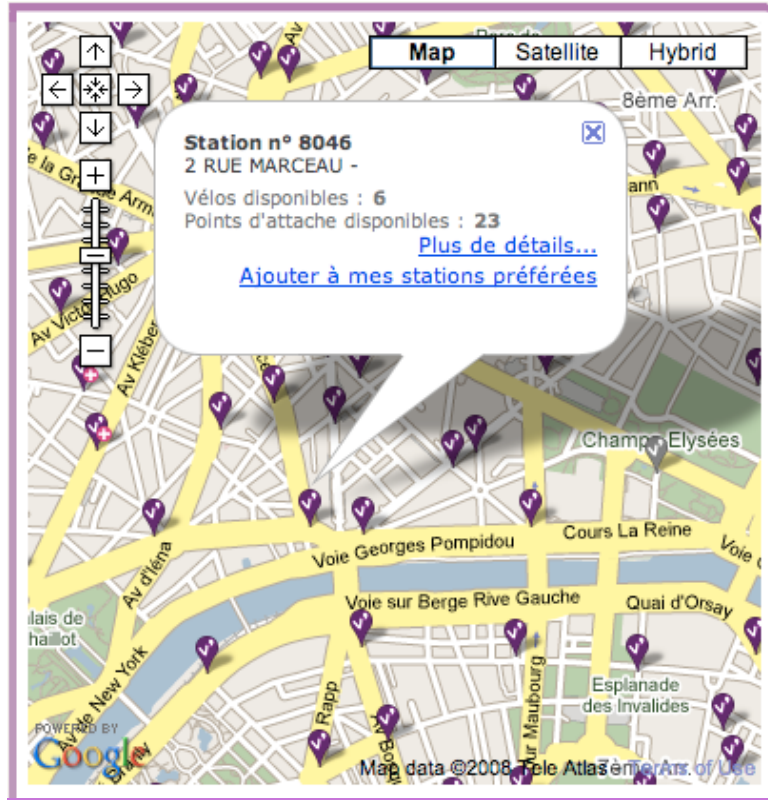


Figure 2: The Vélib' website allows users to check real-time bike or bike-parking availability at locations around the city, to better coordinate their travel plans. Autolib' will have similar online features that allow travelers to plan their trips based on real-time data.

While Autolib' has not yet announced the model of car it will use, two existing electric vehicles that have been suggested as possibilities include the three-seat Bolloré Blue Car and the Cleanova electric delivery car (see Figure 3). French service providers, including La Poste and EDF, are currently testing the Cleanova delivery car. A comparison of the cars' technology and performance characteristics can be seen below:

	Bolloré Blue Car	Cleanova electric car
Battery	Lithium-metal-polymer	Lithium-metal-polymer
Range	124-155 miles	112-124 miles
Charging Time Required	50% power in 2 hours; full power in 6 hours	Full power in 4-8 hours



BlueCar



Cleanova

Figure 3: The BlueCar three-seat city car (above left) and the Cleanova van (above right) both run on lithium-metal-polymer batteries. The two companies are slated as potential suppliers for Autolib', which will bring a fleet of 4,000 electric vehicles to Paris in an effort to discourage individual car ownership in the city. (Pictures from: <http://www.evuk.co.uk/imgs/BlueCar.jpg> and <http://www.mygreenwheels.com/ev-comparison-guide/>)

Technology and Experience Roadmap

As a new service, Autolib' can learn a lot from the experiences of other car-sharing organizations as well as from the Vélib' bicycle-sharing service. Autolib' also offers new opportunities for technology applications in transportation.

Lessons Learned from Car-Sharing / Lessons for Car-Sharing

Car-sharing programs all over the world by now have years of experience managing car sharing monitoring, working with member preferences and needs, and changing urban car culture from a right-to-own to a right-to-use. In no particular order, here are some different car-sharing implementation options which Autolib' might be interested in exploring:

- **City Car Share**, in San Francisco, offers lower "night owl" rates, in order to encourage members to drive at non-peak traffic times and evenly distribute demand for their cars
- The North American company **Zipcar** locates cars not only in dense urban areas, but also places where urbanites frequently go and might need a car (for instance, Ikea stores)
- Toronto's **AutoShare** partners with green energy suppliers to make its service more of a sustainable technology and get ready for the electric car era
- The London branch of the **City Car Club** uses London's Oyster Card (an electronic stored-value public transportation smartcard) as its member key-card for accessing the Club's vehicles
- Switzerland's **Mobility CarSharing** is run as a cooperative; members can buy a lifetime subscription to the service for about the cost of four years of annual membership fees

On the other hand, as the first car-sharing program to experiment with non-fixed drop-off locations, Autolib' will quickly amass methodologies of interest to other car-sharing organizations and may revolutionize the way car-sharing is practiced around the world.

Lessons Learned from Vélib'

While the flexibility in pick-up/drop-off locations is a strong point of Vélib' and a major innovation of Autolib', it will be important for Autolib' to learn from Vélib's bicycle distribution management methods. Vélib' distribution is not an easy problem, as locations are not equally popular as pick-up and drop-off

points. Despite coordination efforts, the Vélib' program must periodically redistribute its bicycles by truck – a solution not easily transferable to a car-sharing service. Distribution (and redistribution) will consequently be a major concern for Autolib' and will require a commitment to observation, analysis, and adaptive management during Autolib's introductory period.

In-car Navigation Systems and Traffic Monitoring

As Autolib' already relies on mobile information technology for reservations, car availability monitoring, and drop-off arrangements, the Autolib' software could easily be coordinated with in-car navigation and traffic monitoring systems. Real-time communication already allows these navigation systems to relay traffic information and alternative route-finding tools to drivers on the road; synching this system with the Autolib' database would allow drivers to also change drop-off location reservations if traffic conditions are unfavorable and help drivers find and navigate to an available drop-off spot in a more convenient location.

Additionally, the Autolib' fleet could help collect traffic data on the road. As city property, the Autolib' fleet could be outfitted with traffic sensors, GPS, and data transmission technology to automatically monitor and report traffic conditions whenever they are in use. This large potential set of traffic monitoring devices would help alleviate some of the privacy concerns associated with other traffic monitoring programs (such as the [Nokia Mobile Century](#) project), which rely on privately owned mobile phones or other mobile devices to collect traffic data.

Other Monitoring

In addition to traffic monitoring, a large fleet of mobile sensors deployed on municipally owned vehicles could be used to measure air quality, noise levels, street conditions, and any number of other urban characteristics helpful for planning and maintenance. Such data could be displayed in real-time on the Internet to encourage greater citizen awareness and community participation.

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