Mobilizing Private Investment for Sustainable Transport Infrastructure

Position paper - contribution from the Michelin Challenge Bibendum Community

May 2016
ACKNOWLEDGEMENTS

This report was coordinated by EY and Michelin within the framework of the Michelin Challenge Bibendum (MCB) initiative.

 Authors
Alexis Gazzo, EY (alexis.gazzo@fr.ey.com)
Sacha Kley, EY (sacha.kley@fr.ey.com)

The authors would like to thank the members of the MCB Community on “Mobilizing private investment for sustainable transport infrastructure” for their valuable guidance and input. The participation of these individuals to our community does not represent any commitment from their companies or organisations.

► Afhypac Valérie Bouillon Delporte, Yann de Parscau
► Air liquide Dominique Lecocq
► Amundi Thierry Ancona, Lise Bardin-Bérenger
► Aveve Marie Castelli
► Caisse des Dépôts Thomas Sanchez
► Région Bourgogne Catherine Fournier
► Région Nord-Pas-De-Calais Laurent Candelier
► Demeter Partners Benjamin Wainstain, Philippe Detours
► Engie Anne Cécile Bonneville
► ENPC Virginie Boutueil
► ERDF Bruno Dobrowoslski, Sylvie Busson
► GROLLEAU Gilles Roland
► HSBC Virginie Grand, Pierre Sorbets
► IES Synergy Michel Orville
► I4CE Michel Laffitte, Benoit Leguet
► Michelin Olivier Dario, Valérie Bouillon Delporte, Yann de Parscau
► Renault Vincent Carré, Sébastien Albertus
► Symbio Fcell Fabio Ferrari
► Vinci Energies Nicolas Planteau, Caroline Chapuis
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
<td>4</td>
</tr>
<tr>
<td>Purpose of this report</td>
<td>5</td>
</tr>
<tr>
<td>Battery Electrical Vehicles (BEV)</td>
<td>6</td>
</tr>
<tr>
<td>Fuel-Cell Electrical Vehicles (FCEV)</td>
<td>8</td>
</tr>
<tr>
<td>Mobilizing Private Investments: Addressing market barriers</td>
<td>12</td>
</tr>
<tr>
<td>Conclusion</td>
<td>15</td>
</tr>
</tbody>
</table>
Foreword

As one of Michelin Challenge Bibendum Communities, we have built a shared vision of challenges facing the financing of charging infrastructure for Electric Vehicles (EVs). Our community aimed at bridging the gap between financing needs of charging infrastructure and the requirements from investors. With the support of Ernst & Young and Michelin, the community brought together a variety of organizations, including private banks and investment funds, city and regional-level government representatives, car manufacturers, electricity distribution operators, hydrogen producers, construction companies and professional associations. Our work was structured around three main questions: What are the current barriers to financing charging infrastructure for EVs? How to increase the involvement of private capital in the financing of these infrastructures? What additional support from public decision-makers is required?

Our approach has led to the elaboration, between April and December 2015, of 4 business cases: electricity charging stations in co-owned parking lots, curbside charging stations, hydrogen charging for a captive fleet, and national deployment of hydrogen charging stations. Based on the economic models established for each of these business cases, a number of recommendations to overcome identified market barriers are presented in the last section of the report. In particular, our analysis indicates that direct investment subsidies are needed to jump start the market but are not necessarily the most adapted instrument to support sustainable mobility growth on the long run: some more elaborated approaches, including the development of risk-mitigating schemes, are needed to build an attractive value proposition for investors.
Purpose of this report

The transportation sector is the largest source of GHG emissions in France, representing 28% of total GHG emissions in 2013.¹ In order to meet EU objectives for GHG emissions reduction, a strong effort is expected from the transportation sector, in particular via the development of cleaner vehicles. As technical progress has made new motorization technologies available at a larger scale, the emergence of these new markets strongly relies on how the corresponding infrastructures will be able to develop and meet their expected growth.

More specifically, Battery Electrical Vehicles (BEV) and Fuel-Cell Electrical Vehicles (FCEV) are expected to grow substantially in market share by 2030: the FCEV market could reach 800,000 vehicles by 2030² while the 2009 national plan for electrical vehicles hoped for a total of 2 million vehicles (BEV + Plug-in Hybrid Electrical Vehicles) in 2020. This market shift will require important infrastructure development to provide an adequate form of energy to the millions of future users in France and Europe: electricity charging stations for BEV and Hydrogen charging stations for FCEV. Such infrastructure has so far only been developed on a small scale in situations where they are either mainly financed through public grant programs (e.g. subsidies on Hydrogen charging stations) or by corporations and investors that assume the project’s entire risks. These public subsidy programs are key to launch the market and to support infrastructure projects. However, they will not be able to meet the future financing need of the market. For this reason, attracting private capital in sustainable mobility infrastructure will be crucial to ensure that the ramp-up of electrical mobility is not hindered by financing gaps.

This issue is the basis of the work carried out by the “Mobilizing Private Investment for Sustainable Transport Infrastructure” Community, focusing on 4 points:

► Developing a shared vision on electric mobility (BEV & FCEV) recharge infrastructure;
► Identifying main charging needs to be targeted;
► Assessing infrastructure investment and operational costs and proposing innovative business models and strategies;
► Discussing investment opportunities and business cases with financing institutions.

Our Community included a number of professionals actively involved in sustainable mobility, including public structures and authorities, equipment manufacturers, car manufacturers, building companies, banks and investment funds. This report summarizes the main findings of the collaborative work of the community, focusing on:

► The analysis of 4 business cases, in order to identify financing needs, associated risks (including “traffic risk”) and innovative financing approaches. Two business cases relate to BEVs, two other to FCEVs. Each of the two technologies does not exclude the use of the other, as the use of these two types of vehicles is different and we supposed their respective addressable markets to be disjointed. These business cases are presented in sections 2 and 3;
► Recommendations and guidance to overcome identified market barriers and to develop innovative financing schemes, presented in section 4.

¹ Source: http://www.developpement-durable.gouv.fr/IMG/jpg/Repartisions_des_emissions_de_GES_en_France.jpg
² Source: H2 Mobility France - Study for a FCEV national deployment plan
Battery Electrical Vehicles (BEV)

BEV Business Case 1: Electricity charging stations in co-owned parking lots

This business case addresses the following question: What is the best way to achieve economic and technical efficiency when installing charging points in co-owned parking lots? The analysis was based on the following assumptions: a typical 50 spot co-owned parking lot in a French urban area for the 2016 to 2026 period; an average of 6 electrical vehicles for 50 parking spots (based on the expected demand for a 10 year horizon). The regulatory framework is considered advantageous to this scenario, as the Decree 2011-873 requires the co-ownership to examine any request for a charging point by any user. The co-ownership must then either propose a course of action for the installation or allow individuals to take care of their infrastructure.

The retained optimal course of action is as follows:

- A first shared infrastructure is installed along with a first charging point, in order to prepare the possible installation of other charging points later, paid for by each individual. Since there is a timing issue, the first person to ask for an installation would have to pay for the common infrastructure, which would not be acceptable. The best case scenario would thus be to share the cost for the common infrastructure between all the future users.

- Since the co-ownership will not finance an installation that would not benefit all of its members, a third party contractor could fund the shared equipment. The characteristics of such a contractor’s work would be as follows:
  - Commitments: The contractor would size the installation to the expected future demand and fund the initial costs;
  - Benefits: The contractor would have an exclusive installation, operating and maintenance contract for the current and future charging points in the parking lot. Each future customer would pay back the contractor, on a pro-rata basis, a portion of the initial shared costs. The contractor could consider a joint business model, using for example the data it collected for additional services (e.g. parking sharing).
  - Risk & Opportunities: The contractor could mitigate its risk across numerous co-owned parking lots to ensure profit. Future revenue could turn out to be significant compared to initial investment, given the exclusivity on operating and maintenance, and through other revenue streams (such as managing consumption during electricity demand peaks).

In this scenario, the contractor would finance the initial installation (3,000€ for an average parking lot). This initial cost would then be transferred to future users on a pro-rata basis (for instance 1/6th of the common cost for each of the 6 expected users by 2026) and have an exclusive installation, operation and maintenance contract for the whole parking lot, ensuring future margins would repay the initial investment. To ensure sufficient scaling up in this scenario, the total need for initial financing for private parking installations in Paris in the 2016-2026 period would amount to €20m.5

---

2 Individual infrastructure: 1,500€/person 1 Common infrastructure: 3,000€

3 Co-owned is meant to refer to a building with shared ownership amongst tenants.
4 In February 2016 a major agreement was signed between the French state and the AVERE: the ADVENIR programme aims at financing the installation of 12000 such charging stations through the use of Energy Efficiency Credits.
5 Assumptions are as follows: 40,000 electrical vehicles in private parking in Paris by 2026 for roughly 500,000 existing parking spots in privately owned parking spots. BEV sales concentrated in urban areas, allowing for a 10% market penetration in 2026 in these areas, in compliance with a target for 2 million electrical vehicles in 2026.
BEV Business Case 2: Curbside charging stations

This second business case (BC2) addresses potential vehicle owners who do not own or rent a parking space. These users will need a main charging solution on the curbside in urban areas. We explored the conditions in which a private entity would provide a conventional charging service in a dense urban environment.

This scenario has to tackle three main issues: providing a competitive primary charge solution, mitigating traffic risk for the operator of the charging service and enabling innovative revenues to compensate for high upfront costs for the infrastructure. The fundamental principle of our scenario is that the operator will ensure there is one charging point for each new owner of an electrical car, at the time when the owner subscribes to the charging service.

A Discounted Cash Flow model was implemented taking into account the different constraints mentioned above. In order to arrive at a viable project, some strong prerequisites on the revenue and cost structures were identified to reach the financial equilibrium shown in the figure below.

Those prerequisites are as follows:

- The operator should be exempt from the concession cost for the public space used, which amounts to nearly half of the total costs of such a project;
- Revenues should consist in a fixed annual subscription with unlimited access to charging services for frequent users plus a daily subscription for occasional users;
- Additional revenues must be identified, such as advertising on the charging stations or remuneration of interruptions in consumption by the electricity network manager. Without these additional revenues, only 80% of the costs would be covered by an acceptable service price.

The traffic risk has to be strongly mitigated. The installation of a new charging point happens once a client has actually subscribed to the service. When enough points are available, only 2 new ones are installed for 3 new subscribers.

With these assumptions, we obtain the following financial indicators for a 2016-2026 project, with a total estimated market of 30,000 subscribers in 2026.

- **Investment:** 42m€ for Paris - ~ 2bn€ for France
- **ROI:** 6%
- **Annual normative Cash-Flow:** 3m€ for Paris

The financial performance indicators provided by the model analysis, and in particular the average expected return on investment, are not sufficiently attractive in comparison to typical project finance requirements. However, the very low volatility of the ROI in this Business Model needs to be highlighted; as a new charging station is only set up once a new client has subscribed to the service, the CAPEX to create the offer is only incurred once the demand is secured, which allows for mitigating the risk as the investment needs are diffuse. In addition, an investor may decide during the project to increase or reduce its total financial exposure. For example, if after the first year only 100 stations are actually set up, (inducing CAPEX of less than €1 million), an investor may decide not to push forward and to opt-out.

---

6 Cost hypotheses used were obtained from interviews with representatives of different contractors in the charging station installation value chain. They do not constitute any actual commercial offer.
Fuel-Cell Electrical Vehicles (FCEV)

FCEV Business Case 1: Development of Hydrogen Refueling Stations (HRS) for captive fleet

FCEV Business Case 1 is actually the first phase in a roll-out scenario for a global Business Case for Fuel-Cell Electrical Vehicles.

This first step consists in jump-starting the market through a “Captive Fleet Approach.” By contracting with suitable market segments (corporate fleet, delivery cars, taxis, and urban logistics) in given geographical areas forming clusters, Hydrogen Refueling Stations (HRS) can be set-up with a maximal expected utilization rate. By starting with H2-Range Extended Vehicles, purchase premium for the client is kept to a minimum while an initial HRS deployment is ensured with limited CAPEX.

According to H2 Mobility France, the Total Cost of Ownership (TCO) gap for H2 Range Extended Electrical Vehicles versus Diesel could be as low as 5,000€ for Captive Fleets, making it a viable option.

With this clustering approach on the national territory (taking the example of a roll-out in France), three main goals are achieved allowing for an efficient next step:

- Market assessment: Depending on the reaction of customers, the refueling service can be adapted and the market potential and future growth more closely assessed without having entered the most intensive and risky CAPEX phase;

- HRS costs learning curve: Through the deployment of tens or hundreds of HRS in this first phase, the learning curve can allow for a future cost reduction lowering CAPEX and OPEX, making H2 less expensive for consumer and hence more competitive;

- Ulterior scaling up is made easier: In a national deployment phase, existing HRS may be upgraded to address a higher demand. They can be the starting points for the global network deployment, offering charging service for private owners that will drive the market further up.

The captive fleet clustering phase does not need any new financing scheme given the way it is currently implemented. Direct subsidies for HRS already exist, with regional schemes aiming at equipping specific areas with pilot HRS.

It is expected by H2 mobility France that the clustering phase can structurally not be financially viable by itself, and only makes sense as a first step. Losses are strongly mitigated by the existence of the captive fleet, but the current CAPEX, OPEX and H2 prices do not allow for sufficient profit to be made at this stage.

Global need for financing for a national HRS deployment plan is covered in the FCEV Business Case 2.
FCEV Business Case 2: National deployment of charging stations

Presentation of Scenario

As previously stated, Business Case n°2 for FCEV is the second step of a wider national rollout plan for Hydrogen Refueling Stations. The deployment plan is summed up in the following figure:

From the original situation where a few clusters are formed, the business plan aims at the Deployment of stations as follows: The long-term target is of 6,000 HRS on the French territory, which is 55% of conventional filling stations, to reach the same level of service as for conventional fuels.

- **700 bars HRS**
- Mass market initiation with 500 to 1000 HRS to boost the demand
- Capacities of station from 80 to 400kg per day

The main issue raised by this scenario is the **Traffic Risk**. The Traffic Risk is the risk that, for a given infrastructure, users are not sufficient to cover the costs of the infrastructure. In other terms, the traffic risk in this case would be that a HRS is set up in a given location and not enough FCEV come to refuel at this location.

This risk creates uncertainty on the outcome of the initial investment. Even with a high expected ROI, the traffic risk induces a high variance on this return, limiting the possibility to attract private capital sources in the financing of the project.

Modelling results and analysis of financing needs

For the FCEV Business Cases, a specific modelling approach was developed given the constraints on the availability of pricing data. The model developed thus provides a global equilibrium approach between the market price of H2 for final consumers, HRS CAPEX and H2 Costs for the service operator.

---

7 This illustration does not represent any actual strategic commitment but serves for illustration purposes only.
The first barrier to FCEV penetration on the market is the price gap between a conventional vehicle and an FCEV. Some of this gap will be hard to reduce. Hence, the Total Cost of Ownership (TCO) of the vehicle has to be taken into consideration to assess potential market growth. The TCO includes all the costs incurred by a user during the life of the vehicle: initial vehicle cost, maintenance, insurance, energy. To even out the TCOs of a conventional vehicle and a FCEV, H2 thus has to be less expensive per km than fossil fuel. The key aspect of this approach is therefore the link between the Total Cost of Ownership and the ranges of acceptable prices of H2 for a given consumer, depending on his willingness to pay for a clean product and on his use of his vehicle.

Our sensitivity analysis indicates, for a given number of km of use per year and the net CAPEX difference between a FCEV and a gasoline ICE vehicle, the H2 price that balances the TCOs. The calculated sensitivity matrix is presented below:

<table>
<thead>
<tr>
<th>H2 price (€/kg)</th>
<th>1000</th>
<th>2500</th>
<th>4000</th>
<th>5500</th>
<th>7000</th>
<th>8500</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,000</td>
<td>14.0</td>
<td>12.1</td>
<td>10.5</td>
<td>8.8</td>
<td>8.4</td>
<td>8.0</td>
</tr>
<tr>
<td>11,000</td>
<td>13.9</td>
<td>12.2</td>
<td>10.7</td>
<td>9.1</td>
<td>7.5</td>
<td>7.1</td>
</tr>
<tr>
<td>12,000</td>
<td>13.8</td>
<td>12.2</td>
<td>10.8</td>
<td>9.4</td>
<td>7.9</td>
<td>6.5</td>
</tr>
<tr>
<td>13,000</td>
<td>13.7</td>
<td>12.3</td>
<td>11.0</td>
<td>9.6</td>
<td>8.3</td>
<td>6.9</td>
</tr>
<tr>
<td>14,000</td>
<td>13.6</td>
<td>12.3</td>
<td>11.1</td>
<td>9.8</td>
<td>8.6</td>
<td>6.9</td>
</tr>
<tr>
<td>15,000</td>
<td>13.6</td>
<td>12.3</td>
<td>11.1</td>
<td>9.8</td>
<td>8.6</td>
<td>6.9</td>
</tr>
<tr>
<td>16,000</td>
<td>13.5</td>
<td>12.4</td>
<td>11.2</td>
<td>10.0</td>
<td>8.8</td>
<td>7.7</td>
</tr>
<tr>
<td>17,000</td>
<td>13.5</td>
<td>12.4</td>
<td>11.3</td>
<td>10.2</td>
<td>8.9</td>
<td>7.7</td>
</tr>
<tr>
<td>18,000</td>
<td>13.4</td>
<td>12.4</td>
<td>11.4</td>
<td>10.3</td>
<td>9.3</td>
<td>8.2</td>
</tr>
<tr>
<td>19,000</td>
<td>13.4</td>
<td>12.4</td>
<td>11.4</td>
<td>10.4</td>
<td>9.5</td>
<td>8.5</td>
</tr>
<tr>
<td>20,000</td>
<td>13.4</td>
<td>12.4</td>
<td>11.5</td>
<td>10.6</td>
<td>9.6</td>
<td>8.7</td>
</tr>
<tr>
<td>21,000</td>
<td>13.3</td>
<td>12.5</td>
<td>11.6</td>
<td>10.7</td>
<td>9.8</td>
<td>8.9</td>
</tr>
<tr>
<td>22,000</td>
<td>13.3</td>
<td>12.5</td>
<td>11.6</td>
<td>10.8</td>
<td>9.9</td>
<td>9.1</td>
</tr>
<tr>
<td>23,000</td>
<td>13.3</td>
<td>12.5</td>
<td>11.7</td>
<td>10.8</td>
<td>10.0</td>
<td>9.2</td>
</tr>
</tbody>
</table>

For example, in order to offer the average vehicle user (about 15,000 km/year for gasoline-fuelled cars) a net price difference of 7,000€, H2 price has to be lower or equal to 8.6€/kg for the market to be at equilibrium.

Depending on the technology costs and the constraints on H2 end-user price, the addressable market is then given by the corresponding minimal number of km per year. At a given H2 price, all the users who expect to drive less than the corresponding number of km will not choose to buy a FCEV, because the TCO of a fossil fuelled vehicle will remain the lowest.

The model considers possible prices for H2 between 9 and 12€/kg, to cover most of the cases in the sensitivity matrix.

---

8 In our model, TCO for Internal Combustion Engine (ICE) does not take into account any externality (e.g. Carbon tax) that might increase fuel prices by 2025. The average diesel price used for calculations is 1.7€/liter in 2025.

9 Net CAPEX difference is the total cost of the vehicle for the purchasing consumer, minus direct public subsidies, minus the “green premium” which is the amount one would accept to pay in order to have a “green” or clean product.

10 http://www.insee.fr/fr/themes/tableau.asp?reg_id=0&ref_id=NATTEF13629
A Discounted Cash Flows model for an HRS

The Discounted Cash Flows model for one 200kg/day Hydrogen Refueling Station, with a 15-year life span, provides the results indicated in the figure below. Each line represents the limit equilibrium between H2 Cost and HRS CAPEX at one fixed H2 sale price. For example, the dark blue line shows, for a 11€/kg selling price, the equilibrium between H2 production cost and HRS CAPEX in order to reach a 10% Return on Investment with a 80% use rate at stations. Potential traffic risk (corresponding to a possible lower use rate of the installation) would tend to lower a selected colored line.

At cost level considered appropriate by professionals from the sector (represented by the yellow frame), we note that there exist many economical equilibria for H2 prices ranging from 9 to 12€/kg. This implies that it is possible to reach a 10% return on investment with the current market economic constraints for a large scale infrastructure deployment business case. The crucial issue is the traffic risk i.e. the hypothesis of an 80% utilization rate of a station. From an investor’s perspective, mitigating this risk will be critical before finalizing any investment decision.
Mobilizing Private Investments: Addressing market barriers

In the course of the analysis of the selected business cases, four main market barriers were identified. They embody the current gap between Sustainable Charging Infrastructure (SCI) projects’ specific characteristics (such as scale, profitability and risk profile) and the requirements of current financing schemes and structures.

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Risks of SCI projects are not sufficiently covered</td>
<td>a. Set up a new guarantee fund dedicated to Sustainable Charging Infrastructure projects</td>
</tr>
<tr>
<td>2. Profitability below market expectations</td>
<td>b. Set up an insurance scheme based on expected environmental benefits</td>
</tr>
<tr>
<td>3. Classical financing structures are not adapted to SCI projects</td>
<td>c. Public grants to close the gap between current high costs and future higher margins</td>
</tr>
<tr>
<td>4. Long-term visibility of market growth is lacking</td>
<td>d. Consider and allow the emergence of additional revenue streams apart from pure charging services</td>
</tr>
<tr>
<td>5. Classical financing structures are not adapted to SCI projects</td>
<td>e. Consider innovative financing structure schemes that would correspond to the SCI projects’ characteristics</td>
</tr>
<tr>
<td>6. Long-term visibility of market growth is lacking</td>
<td>f. Provide long-term visibility via adequate policy signals and long-term political commitments</td>
</tr>
</tbody>
</table>

1. Risks of SCI projects are not sufficiently covered

In order to address the traffic risk (risk that the use of the recharge infrastructure will not be sufficient to cover costs) different risk-mitigation schemes can be designed.

A. Set up a new guarantee fund dedicated to SCI projects

In the case of the deployment of H2 refuelling stations (HRS), each station may have a high inherent risk profile, while the deployment program as a whole is in average, profitable. Based on the experience of other risk-mitigation schemes set up for sustainable energy technologies, a proposed approach would be to set up a guarantee fund. Such a fund could take many forms depending on the exact stage of the project for which risk needs to be covered. Reimbursable advances\(^1\) can be used for early stage market analysis or set-up of very small infrastructure. The repayment of the advance could be linked to the study’s conclusions or infrastructure use.

Simple guarantee funds could also be used to cover the traffic risk, by guaranteeing part of the CAPEX of the infrastructure against traffic risk.

In any case, specific schemes derived from existing guarantee funds should be further investigated in order to design the most appropriate responses to the types of risks encountered in Sustainable Charging Infrastructure projects.

---

\(^1\) Such schemes were for example considered to cover the “geological” risk (risk that the drilling does not provide the expected energy) for geothermal drilling projects. Repayable advances were used in early stages for feasibility studies while a standard guarantee fund covered the geological risk during operating phase.
### B. Set up an insurance scheme based on expected future environmental benefits

The underlying principle of such an idea is that building an HRS implies potential future CO₂ emission reductions, if the infrastructure is used as forecasted. The mechanism could work as follows:

- At the time of the investment, a potential total of avoided emissions are calculated for a given period, for example, 100 tons for 2020-2025;
- In 2025, the actual avoided emissions are measured. For example, let’s suppose 50 tons were actually avoided. In this case, the State would pay for the 50 non-avoided tons of emissions at an originally set price;
- This amounts to compensating the unused capacity and not the actual environmental benefit.

Such a scheme gives the investor a “worst case scenario curve” which is better than without the scheme. The risk of the investment is then much lower than otherwise. To push this possibility further, it would be possible to base such a solution on an emissions trading scheme (such as EU-ETS) with a minimum guaranteed price and an exchange market. In this hypothesis, credits would be given for free at the end of each period to cover the difference between the maximum avoidable emissions and the actually avoided emissions. The project owner could then sell these credits on the corresponding market.

One very important aspect of this scheme is the ability to accurately measure and ensure the ecological benefits and emissions avoidance. For example, controls would have to be enforced to ensure that emissions are actually avoided by switching from a Combustion Engine to a FCEV, and not only displaced at the H₂ production level. Origin of the distributed H₂ and evaluation of the CO₂ costs of its production process would have to be taken into account to truly measure the ecological impact and the correct application of the financial insurance scheme.

### 2. Profitability below market expectations

#### C. Help close the gap between current high costs and future higher margins through public support

Classical incentives could be considered, such as repayable advances, tax credits, concessional loans or investment grants. In France, for example, subsidies are granted by different Government organizations for the financing of both electrical and hydrogen charging stations. Such public support can also take the form of an exemption on paying public space occupation fees for curbside charging stations or even of an injection in equity from public structures. Subsidies to car buyers also accelerate market growth while carbon taxes may change TCO equilibria between conventional and electrical vehicles. Supporting the market growth acts both on investment risks of charging infrastructure and on return on investment levels.

Globally, any fiscal policy impacting the equilibrium price between conventional and electrical cars will affect projects’ profitability. Indeed, as shown via the case studies, the price for the charging service is determined by a “maximum acceptable price,” which equalizes the total cost of ownership between conventional and electrical vehicles. For example, taxing conventional fuels could also increase the margin on the charging service without changing the consumer’s decisions. Reducing direct subsidies, when they exist, on fossil fuels would have the same impact on the equilibrium between sustainable and fossil mobility.

#### D. Consider and allow the emergence of additional revenue streams apart from pure charging services

For several business cases analyzed, the main issue is to increase sales in the long run, in order to cover capital and operating costs. In addition to revenues from charging services, the possibility of additional revenue streams could potentially increase the attractiveness of SCI. Advertising services are a strong lead in this field. Several charging station projects in California became very profitable by putting advertising screens on each charging point. Where regulatory constraints are not compatible with such a model, targeted advertising or even pure data could be sold, gathered from the way the service is used by its users. On the charging service side, stations could also be used for “last-mile” fleets, constituting a global logistic service and offer. Globally, innovative thinking on additive business models will be key to ensure the sustainable economic performance of SCI projects.
3. Classical financing structures are not adapted to SCI projects

Consider innovative financing structure schemes that would correspond to the SCI projects characteristics

The characteristics of the projects as described do not appear to align with for traditional financing structures. It is as much a matter of size (minimal project sizes to attract project finance providers and infrastructure funds would be 50M€) as of profitability (6% ROI being below the standard requirements of market players). Several developments in the market show that partnerships with local authorities to set up dedicated public-private structures to support the development of public lightning programs, for instance, may provide new models to bring together local (and in some cases national) fiscal revenues and private sources of funding to support innovative technologies. A number of recently deployed regional investment funds have also demonstrated the relevance of local investment vehicles to finance energy efficiency and renewable energy projects at a local/regional scale.

Many innovative structures are being developed in order to more efficiently carry out all kinds of projects in the sustainable energy field; such initiatives exist in the solar and wind energy or energy efficiency space. More particularly, many crowdfunding-inspired mechanisms are currently used for such financing. They are attractive in many ways: they lower the equity requirements for the project’s owner, they may have lower requirements for return on investment that banks or private equity funds, and they create a form of commitment by future potential users that will help leverage the market itself.

The renewable energy sector provides a growing number of examples, including green bonds with a 5% net coupon which allowed funding renewable energy projects via largely equity financing.

4. Long-term market visibility is not sufficient to allow for clear commitment by actors

Offer long-term political commitments... and expect reciprocal commitments by private actors

In a still emerging market such as the electric vehicle market, political and regulatory signals are crucial to counteract inherent risks of infrastructure projects. In various fields, Government commitments were very positive in facilitating private actors’ decision-making. At a European scale, the Climate & Energy package offered a strong political framework for an efficient energy transition. More recently, commitments made during the COP 21 concur in giving more credibility to matters relating to a more sustainable economy.

In the Sustainable Mobility markets, such commitments would give confidence to all players: car makers would be sure of the perspectives of their significant investments, consumers would be less afraid of having the technology underlying their potential cars abandoned in the medium-term, while investors could consider financing such projects less risky given the strong underlying political will.

These commitments do already exist, for example, as subsidies for electric vehicles or city parking fee exemption in some cities (e.g. Paris). But these financial schemes do not provide long-term visibility for market players. Yet, in all fields relating to sustainability, providing a long-term view is key, as acting on a long-term basis is the definition of Sustainable Development itself. Incentives can take various forms, apart from pure subsidies: creation of labels, increasing regulations on acceptable pollution levels, regulation of inner cities traffic circulation, strategic partnerships with industrial actors or even a stronger push towards a significant CO₂ tax.

Such commitments as discussed on the Government side must not be considered enough if they do not come along with reciprocally “binding” commitments by corresponding private actors. Sustainable Infrastructure development cannot be seen as a pure set of constraints that the Public sector tries to alleviate through political commitments and incentives only, but as a tremendous opportunity to create new value while anticipating environmental stakes. In exchange for stronger public support, whether through creating an appropriate legal framework or offering direct incentives, private market players must be ready to commit to Sustainable Charging Infrastructure growth. Working together towards a shared vision, as the work of this Community has demonstrated, can make a contribution to accelerating the deployment of sustainable mobility solutions.
Conclusion

Our work towards a common vision on the sustainable infrastructure market has led us to build four business cases, addressing the key issue of how to make these infrastructure projects attractive for private funding. The key market barriers we have identified during our exchanges with the participants of the sustainable transport infrastructure financing community (commercial banks; private equity funds, city and regional-level government representatives, car manufacturers, electricity distribution operators, hydrogen producers, construction companies, professional associations) currently face in several geographies.

These barriers range from policy level questions on defining long-term market perspectives to specific issues related to risk mitigation. While different responses have been identified to address these barriers, the aim of this report was not to provide detailed solutions but rather to identify directions for further analysis. To move forward and ensure the transition to a more sustainable mobility, more substantial work is now needed to push one step further the feasibility analysis of some of the financing instruments and approaches described in this document.

A viable infrastructure roll-out, on both BEV and FCEV markets, will be the key to the market’s ramp up: we hope that the work of the MCB community on “Mobilizing private investment for sustainable transport infrastructure” will have paved the way for this next phase.
About EY

EY is a global leader in assurance, tax, transaction and advisory services. The insights and quality services we deliver help build trust and confidence in the capital markets and in economies the world over. We develop outstanding leaders who team to deliver on our promises to all of our stakeholders. In so doing, we play a critical role in building a better working world for our people, for our clients and for our communities.

EY refers to the global organization and may refer to one or more of the member firms of Ernst & Young Global Limited, each of which is a separate legal entity. Ernst & Young Global Limited, a UK company limited by guarantee, does not provide services to clients. For more information about our organization, please visit ey.com.

© 2016 Ernst & Young et Associés.
All Rights Reserved.

Studio EY France – 1604SG700
Photo: Fotolia

In line with EY's commitment to minimize its impact on the environment, this document has been printed on paper with a high recycled content.

This material has been prepared for general informational purposes only and it is not intended to be relied upon as accounting, tax, or other professional advice. Please refer to your advisors for specific advice.

ey.com