Electromobility for tourists: testing business models in the Paris region

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Promoting electromobility

The use of EV:
Benefits for the urban environment
But additional purchase cost for users + limited range & battery capacity

Potential EV owners:
Max 30% of French households (Windish, 2013)

→ *The spread of EV starts with niche markets:*  
  *2d car, shared vehicles, corporate fleets…*

→ Institute for Sustainable Mobility (*LVMT for Renault*):  
  *identifying niche markets*
Shared mobility

A changing definition

- encompassing traditional rental?
- reflecting innovation in business models
Shared mobility

A changing definition
• encompassing traditional rental?
• reflecting innovation in business models

Shared-use vehicle business models:
(Shaheen & Cohen, 2013)
• Round-trip carsharing
• One-way carsharing
• Personal vehicle sharing
• **Vehicle sharing at tourist resorts**
  • Environmental aim: promoting sustainable tourism
  • Educational aim: testing EV
  • Examples: Drive Electric Orlando, GreenCar Hawaii…
Some research questions

Which profitability for EV shared-mobility services?
Autolib in Paris -> not yet profitable

Which possible transfer of niche markets?
Drive Orlando Electric -> a possible transfer to Paris?

How include tourists in the scope of transforming urban mobility?
46 million people visit the Paris region each year
The target: Disneyland / Val d’Europe

- Disneyland Paris
  1\textsuperscript{st} tourist site in Europe
  15 million visits a year
  ½ foreigners
  2-day stay on average

Source: Cluster Tourisme Paris Val d’Europe
Key determinants

EV rental in hotels

Major tourist sites located within the EV’s travel range (50-70km)

Longer stays

For families
Design of the business model

Proposal: EV rental at €250 a week
Market study: 100 to 1,000 four-person families
4 scenarios: 50 EV, 100 EV, 150 EV, 200 EV

Cost distribution:
Investment costs: 26 to 34%
Operation - Variable costs: 35 to 42%
Operation - Fixed costs: 37 to 26%
Estimate of potential demand

Disneyland hotels:
5,800 double rooms have 75% occupancy
5 - 15% visitors could stay longer
Of these, 10 - 30% interested in the EV rental service
-> 75 - 690 families could rent an EV each week

Val d’Europe hotels:
30% of Disneyland hotel capacity
15 - 30 % could stay longer
-> 75 - 690 families could rent an EV each week

-> 135 - 1 030 families could rent an EV each week
Production means

**Equipment:**
- Renault Zoe EV
- Slow-charge terminal  
  -> 1 / EV
- Folding e-scooter  
  -> 1 / 20 VE

**Team:**
- 1 director
- 1 assistant
- Jockey  
  -> 1 / 20 EV

**Premises:**
- Office
- Maintenance workshop
Expected revenues

EV rental for a week: €250
30 rentals per EV per year
Ticket sales: +18 € per rental

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>50 EV</th>
<th>100 EV</th>
<th>150 EV</th>
<th>200 EV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual revenues</td>
<td>€402,000</td>
<td>€804,000</td>
<td>€1,206,000</td>
<td>€1,608,000</td>
</tr>
</tbody>
</table>
## Investment costs

<table>
<thead>
<tr>
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<th>200 EV</th>
</tr>
</thead>
<tbody>
<tr>
<td>EV price depreciated over 5 years (€10,000/unit)</td>
<td>€500,000</td>
<td>€1,000,000</td>
<td>€1,500,000</td>
<td>€2,000,000</td>
</tr>
<tr>
<td>EV price depreciated over 7 years (€12,000/unit)</td>
<td>€600,000</td>
<td>€1,200,000</td>
<td>€1,800,000</td>
<td>€2,400,000</td>
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<tr>
<td>Slow-charge terminal price (€1,000/unit)</td>
<td>€50,000</td>
<td>€100,000</td>
<td>€150,000</td>
<td>€200,000</td>
</tr>
<tr>
<td>Numbers of folding scooters (0,4/EV)</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Folding scooter price (€1,500/unit)</td>
<td>€3,000</td>
<td>€6,000</td>
<td>€9,000</td>
<td>€12,000</td>
</tr>
<tr>
<td>Total investment depreciated (over 5 years)</td>
<td>€553,000</td>
<td>€1,106,000</td>
<td>€1,659,000</td>
<td>€2,212,000</td>
</tr>
<tr>
<td><strong>Annual investment depreciated (over 5 years)</strong></td>
<td><strong>€110,600</strong></td>
<td><strong>€221,200</strong></td>
<td><strong>€331,800</strong></td>
<td><strong>€442,400</strong></td>
</tr>
<tr>
<td>Total investment depreciated (over 7 years)</td>
<td>€653,000</td>
<td>€1,306,000</td>
<td>€1,959,000</td>
<td>€2,612,000</td>
</tr>
<tr>
<td><strong>Annual investment depreciated (over 7 years)</strong></td>
<td><strong>€93,286</strong></td>
<td><strong>€186,571</strong></td>
<td><strong>€279,857</strong></td>
<td><strong>€373,143</strong></td>
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## Operation – variable costs

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</thead>
<tbody>
<tr>
<td>Battery rental (€588/EV/year)</td>
<td>€29,400</td>
<td>€58,800</td>
<td>€88,200</td>
<td>€117,600</td>
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<tr>
<td>Energy (€200/EV/year)</td>
<td>€10,000</td>
<td>€20,000</td>
<td>€30,000</td>
<td>€40,000</td>
</tr>
<tr>
<td>Insurance (€400/EV/year)</td>
<td>€20,000</td>
<td>€40,000</td>
<td>€60,000</td>
<td>€80,000</td>
</tr>
<tr>
<td>Telecommunications (€200/EV/year)</td>
<td>€10,000</td>
<td>€20,000</td>
<td>€30,000</td>
<td>€40,000</td>
</tr>
<tr>
<td>Vehicle maintenance/service (€600/EV/year)</td>
<td>€30,000</td>
<td>€60,000</td>
<td>€90,000</td>
<td>€120,000</td>
</tr>
<tr>
<td>Parking (€600/EV/year)</td>
<td>€30,000</td>
<td>€60,000</td>
<td>€90,000</td>
<td>€120,000</td>
</tr>
<tr>
<td>Maintenance/energy scooters (€50/scooter/year)</td>
<td>€100</td>
<td>€200</td>
<td>€300</td>
<td>€400</td>
</tr>
<tr>
<td><strong>Annual variable operating costs</strong></td>
<td>€129,500</td>
<td>€259,000</td>
<td>€388,500</td>
<td>€518,000</td>
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# Operation – fixed costs

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<tr>
<td>Minimum wage + charges (MWC) / month</td>
<td>€2,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Director (MWC)</td>
<td>3</td>
<td>0.5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Secretary/support function (MWC)</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Ambassador (MWC)</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Total employees</td>
<td>4</td>
<td>6.5</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Total minimum wage + charges</td>
<td>5</td>
<td>8.5</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>Total annual wage costs</td>
<td>€120,000</td>
<td>€204,000</td>
<td>€264,000</td>
<td>€312,000</td>
</tr>
<tr>
<td>Rent 7m² per employee (per m² / year)</td>
<td>€180</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workshop 70m² (per m² / year)</td>
<td>€70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total annual rent</td>
<td>€9,940</td>
<td>€13,090</td>
<td>€16,240</td>
<td>€18,760</td>
</tr>
<tr>
<td>Overheads (per employee / year)</td>
<td>€400</td>
<td>€1,600</td>
<td>€2,600</td>
<td>€3,600</td>
</tr>
<tr>
<td>Annual fixed operating costs</td>
<td>€131,540</td>
<td>€219,690</td>
<td>€283,840</td>
<td>€335,160</td>
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Cost distribution

50 EV over 5 years
- 35% Annual investment depreciated
- 30% Annual variable operating costs
- 35% Annual fixed operating costs

50 EV over 7 years
- 37% Annual investment depreciated
- 26% Annual variable operating costs
- 37% Annual fixed operating costs

200 EV over 5 years
- 26% Annual investment depreciated
- 34% Annual variable operating costs
- 40% Annual fixed operating costs

200 EV over 7 years
- 27% Annual investment depreciated
- 31% Annual variable operating costs
- 42% Annual fixed operating costs
## A profitable scheme from 50 EV

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<td>€131,540</td>
<td>€219,690</td>
<td>€283,840</td>
<td>€335,160</td>
</tr>
<tr>
<td><strong>Annual operating balance</strong></td>
<td><strong>€140,960</strong></td>
<td><strong>€325,310</strong></td>
<td><strong>€533,660</strong></td>
<td><strong>€754,840</strong></td>
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<td>Annual investment depreciated (over 5 years)</td>
<td>€110,600</td>
<td>€221,200</td>
<td>€331,800</td>
<td>€442,400</td>
</tr>
<tr>
<td>Annual net profit depreciated (over 5 years)</td>
<td>€30,360</td>
<td>€104,110</td>
<td>€201,860</td>
<td>€312,440</td>
</tr>
<tr>
<td>Annual investment depreciated (over 7 years)</td>
<td>€93,286</td>
<td>€186,571</td>
<td>€279,857</td>
<td>€373,143</td>
</tr>
<tr>
<td>Annual net profit depreciated (over 7 years)</td>
<td>€47,674</td>
<td>€138,739</td>
<td>€253,803</td>
<td>€381,697</td>
</tr>
</tbody>
</table>
Sensitivity to the financing cost

Discussing the level of risk based on a financing cost of:

- 2%,
- 5%,
- 8%,
- 12%,
- 15%

-> A positive net present value if the financing cost = < 8%.
To conclude

A proposed scheme for a targeted demand:

• Implement a pre-test survey
• Quantify the potential demand estimate
• Testing shorter rental proposals

A scheme sensitive to:

• Location of recharge terminals + electricity policies
• Partnership with tourist sites
• Partnership with hotels
• Environmental and social externalities

A scheme part of the promotion of Val d’Europe and the Paris Region

• How is the created value shared between actors (public + private)?
• How does EV shared mobility contribute to transforming urban mobility?
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