

mobil.TUM - International Scientific Conference on Mobility and Transport

Transforming urban mobility

7th June 2016, Munich, Germany

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

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- 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?

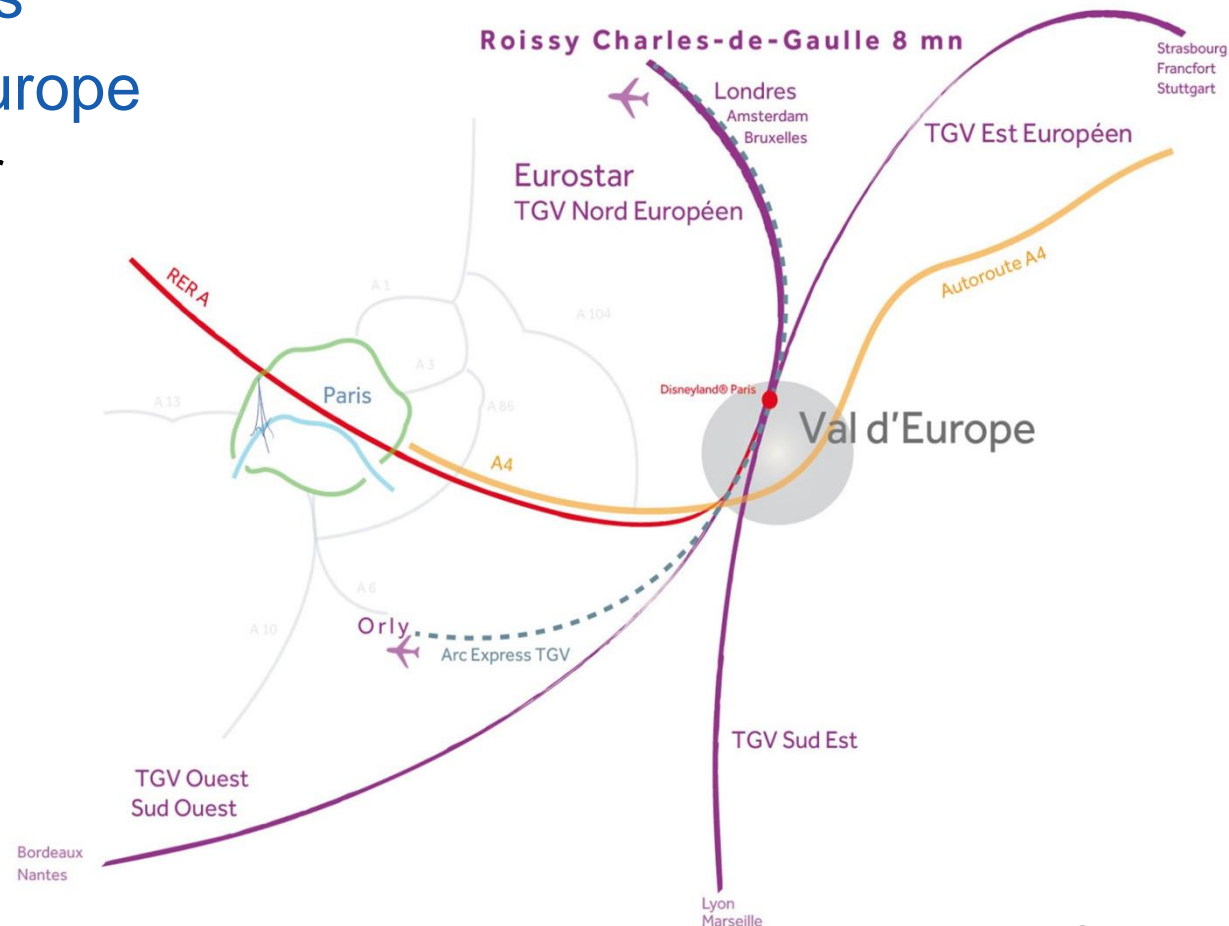
Drive Orlando Electric -> a possible transfer to Paris?

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
- 1st tourist site in Europe
15 million visits a year
½ foreigners
2-day stay on average



Key determinants

EV rental in hotels

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

Longer stays

For families

Main tourist sites

- ★ Disneyland Paris
- 📍 Château de Versailles
- 📍 Château de Fontainebleau
- 📍 Le Parc des Félines
- 📍 Château de Vaux-le-Vicomte
- 📍 Basilique de Saint-Denis
- 📍 Museum WW1 - Meaux
- 📍 Château de Vincennes
- 📍 Eiffel tower - Paris city
- 📍 Musée du Louvre - Paris city
- 📍 Musée d'Orsay - Paris city
- 📍 Zoological Park - Paris city



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

Scenarios	50 EV	100 EV	150 EV	200 EV
Annual revenues	€402,000	€804,000	€1,206,000	€1,608,000

Investment costs

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

Operation – variable costs

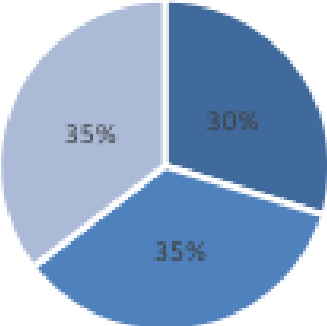
Scenarios	50 EV	100 EV	150 EV	200 EV
Battery rental (€588/EV/year)	€29,400	€58,800	€88,200	€117,600
Energy (€200/EV/year)	€10,000	€20,000	€30,000	€40,000
Insurance (€400/EV/year)	€20,000	€40,000	€60,000	€80,000
Telecommunications (€200/EV/year)	€10,000	€20,000	€30,000	€40,000
Vehicle maintenance/service (€600/EV/year)	€30,000	€60,000	€90,000	€120,000
Parking (€600/EV/year)	€30,000	€60,000	€90,000	€120,000
Maintenance/energy scooters (€50/scooter/year)	€100	€200	€300	€400
Annual variable operating costs	€129,500	€259,000	€388,500	€518,000

Operation – fixed costs

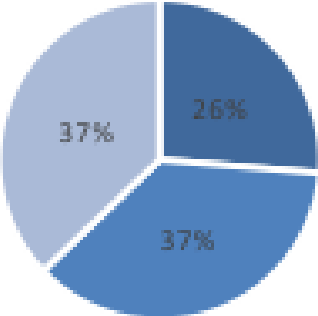
Scenarios		50 EV	100 EV	150 EV	200 EV
Minimum wage + charges (MWC) / month	€2,000				
Director (MWC)	3	0.5	1	1	1
Secretary/support function (MWC)	1	0.5	0.5	1	1
Ambassador (MWC)	1	3	5	7	9
Total employees		4	6.5	9	11
Total minimum wage + charges		5	8.5	11	13
Total annual wage costs		€120,000	€204,000	€264,000	€312,000
Rent 7m ² per employee (per m ² / year)	€180				
Workshop 70m ² (per m ² / year)	€70				
Total annual rent		€9,940	€13,090	€16,240	€18,760
Overheads (per employee / year)	€400	€1,600	€2,600	€3,600	€4,400
Annual fixed operating costs		€131,540	€219,690	€283,840	€335,160

Cost distribution

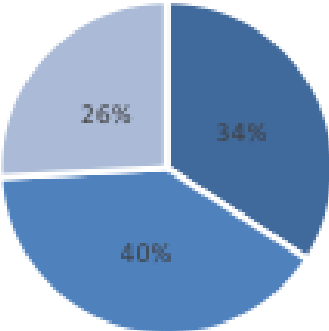
50 EV over 5 years



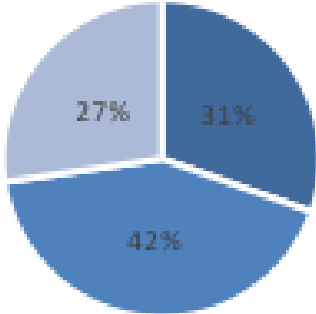
50 EV over 7 years



200 EV over 5 years



200 EV over 7 years



- Annual investment depreciated
- Annual variable operating costs
- Annual fixed operating costs

A profitable scheme from 50 EV

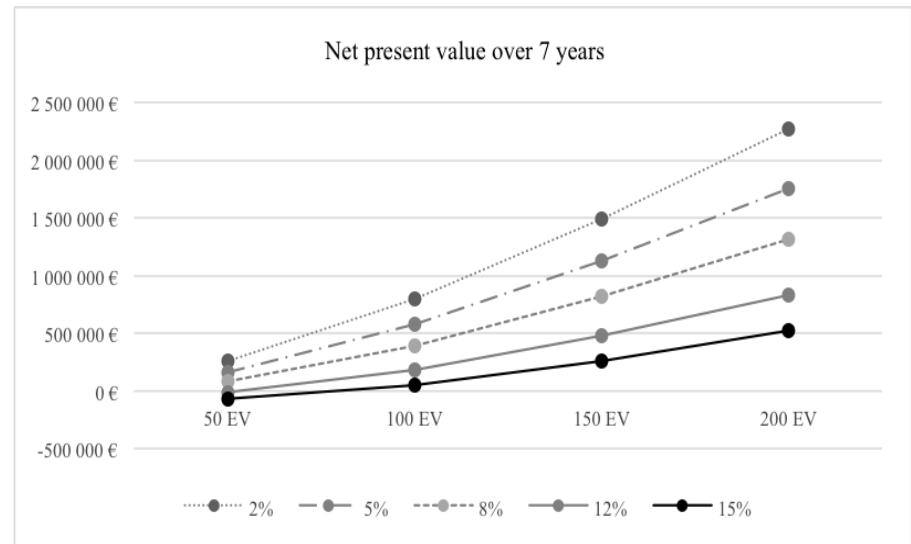
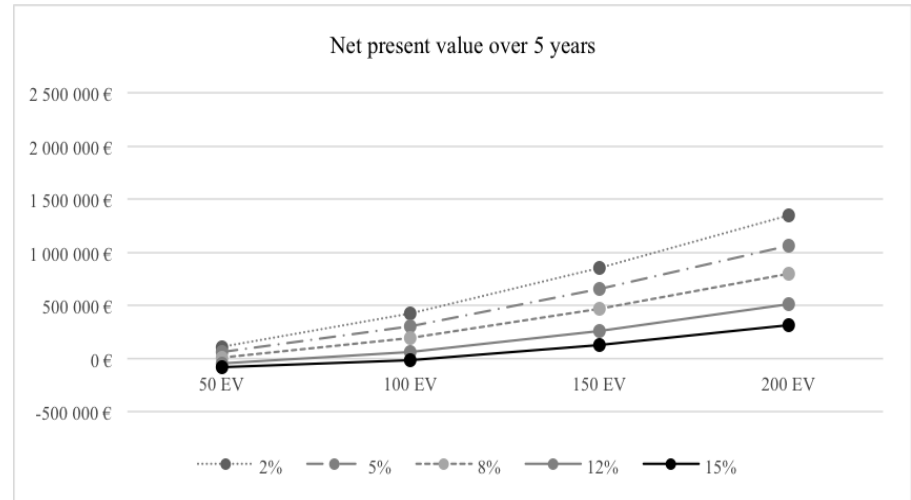
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Annual variable operating costs	€129,500	€259,000	€388,500	€518,000
Annual fixed operating costs	€131,540	€219,690	€283,840	€335,160
Annual operating balance	€140,960	€325,310	€533,660	€754,840
Annual investment depreciated (over 5 years)	€110,600	€221,200	€331,800	€442,400
Annual net profit depreciated (over 5 years)	€30,360	€104,110	€201,860	€312,440
Annual investment depreciated (over 7 years)	€93,286	€186,571	€279,857	€373,143
Annual net profit depreciated (over 7 years)	€47,674	€138,739	€253,803	€381,697

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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