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Small light Electric Vehicle – a blimp on the map or a small revolution?

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Abstract

Elbil Norge produces, service and sell the electric vehicle "The Buddy". The company has over 17 years experience with electric vehicles and over 600 electric buddies have already been sold in Norway. Despite international demand, Elbil Norge has chosen to focus on satisfying the Norwegian market and build up both knowledge and the company. However, an international program started early 2008 with the focus of establishing an international distribution network and increasing the production capacity by a tenfold, to 5000 vehicles per annum.

Who buys these vehicles? What battery technology is used, and what could be the market potential of a light number 2 vehicle? Are light vehicles simply a passing phase, or a way that over 4 million Europeans will make use of in the future?

1 Elbil Norge, The Company

Elbil Norge has sold electric vehicles since 1992. The company proved profitable in 2007 without any government funding. The current production facility at Økern, Oslo, has increased its production and can now deliver electric vehicles to the Norwegian market in just 7 days from ordering. Production level in 2008 will end just below 300 vehicles, and the company is now preparing for an international launch to satisfy the increasing international demand. An international distribution network is currently under development alongside increasing the production capacity to 5000 vehicles per annum.

2 The Electric Buddy as a concept

The Buddy is a mobility concept designed for city and short distance transport. It is a small sized zero emission electric vehicle with a purpose to provide an intelligent, fun and flexible transport solution. For almost 80 % of our customers, it plays the role of a number 2 vehicle for the household, but averages as much as 22 kilometers driven per household per day.

Questions which drive the development behind the Buddy are for example: "Do you really need a 2.5 ton vehicle to transport you 10 kilometers to work?", and "Why spend time and nerve wracking moments parking a vehicle that is over 4 meters in a tight parking space in the city"?

Buddy is available today, but intended and designed to give a solution for the future city transport:

- Energy efficient – Small and light, less use of energy
- Area efficient – Under 2,5 meters, sideways parking, takes up little space
- Electric – zero emissions

3 The Market

3.1 Battery Technology

Hope, predictions, and failing companies have created what have become the most difficult challenges within the electric vehicle industry; *overcoming myths*. Battery myths especially have proven to be the most difficult, and have caused the majority of the market to believe that electric vehicles are a thing of the future. Batteries are too expensive, drive length capacity is minuscule and cannot meet current market needs, cold weather kills the batteries, and that it takes too long top up the batteries. These are just some of the battery myths one has to face when communication to the market.

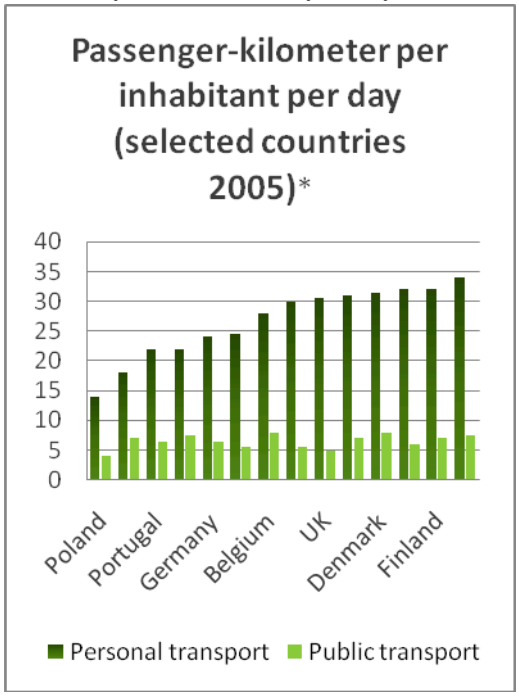
Is it a myth that an electric vehicle needs to have a driving range of at least 200 kilometers, or a charging time of less than 20 minutes?
The Buddy has since the beginning been equipped with twelve advanced lead-acid batteries. These maintenance free batteries have provided the customer with a driving range of approximately 40 and 80 kilometers which statistically covers over 95% of daily personal transport needs in kilometer[1]. It is also a fact that 30% of all car trips are less than 3 kilometers[2].

Charging the Lead-acid batteries can be done at any power level without damaging the batteries. One charging hour gives approximately ten kilometers driving distance. Approximately 65% of our customers charge the vehicle at home, 25 % at work, and the remaining 10 % charge both at home and at work. In most cases, home charging is done at night providing the Buddy with topped off batteries by next morning at the cost at approximately € 1.
Our focus is and has always been to provide solutions to our customers that are both reliable and cost efficient. Although the lithium-ion battery technology is expected to revolutionize the automotive industry, the fact remains that at a cost of approximately 2000 Euro per battery change (which is demanded approximately every 20,000 kilometers) the lead acid batteries has proven to be a good solution to meet the need of over 600 Buddy owners.

3.2 Personal Transport Needs

- The average passenger-kilometer per inhabitant per day in selected European countries is well below the estimated driving range of up to 80 km for a Buddy.

- In central districts and urban areas, Buddy's driving range should therefore be more than satisfactory for day-to-day driving.



[3] figure 1.1

3.3 Who drives and who buys?

Elbil Norge ltd. has sold electric vehicles for over 17 years to private persons, businesses and the government. The key characteristics of electric vehicle customers, divided by sector, have proven to be:

[1] "Bilhold og bilbruk i Norge", s.19, Den nasjonale reisevaneundersøkelsen 2005, TØI Rapport 856/2006
[2] "365 ting du kan gjøre for miljøet", s. 52, J.M Stenersens forlag as, 2. Opplag 2008
[2] Statistics Norway, Report; "Samferdsel og miljø 2007", p. 19.
[3]. Personal transport include taxis and an estimated share of personal transport of delivery trucks. Public transport is defined as buses, airplanes and railways (excl. subways).

Private sector
- Men & Women
- Households with 2 or more persons
- Age 30-60, working age
- Accessible off-street parking with charging
- Above average income
- Already has at least 1 car
- Higher education

Business sector
- Businesses with >10 employees
- Need for direct exposure
- Frequent city driving (meetings)
- Environmental identification (branding)
- Accessible parking with charging

Government sector
- Administration vehicle (municipalities)
- Politicians/Political representatives

For the European market in total, it is assumed that approximately 4 million cars (25% of total car sales) are sold as a number 2 car. A number 2 car is mostly used for shorter-distance-driving within or in connection with the city. City and work commuting, shopping, school and exercise etc.

Private sector

Estimated segment share 60% (2,4 million cars)

Business sector

Estimated segment share 35% (1,4 million cars)

Government sector

Estimated segment share 5% (0,2 million cars)

3.4 Market Incentives

There are currently over 2000 Electric vehicles registered Norway. Demand is high and supply is catching up. Despite well-functioning and popular vehicles, government incentives are still critical to up-keep demand and popularizing the electric vehicle as an own identity. The Norwegian government is currently providing the most incentives in Europe for electrically propelled vehicles:

- No VAT upon purchase
- Annual Vehicle Duty: NOK 380
- No duties paid in toll rings
- Free parking in municipal facilities
- No congestion charge
- Allowed driving in public transport lanes
- Four-year goal of 400 new refueling stations in Oslo before 2012 (100 in 2008)
- Three-year goal of 300 new refueling stations in Trondheim before 2011

4 Conclusion

We believe that future mobility is electric, and that the future market will include a larger product range of transportation means than what we see today. An electric light vehicle will be a natural transport supplement to any household by 2030. If the market will by 2030 will consist of 4 million light electric vehicles will remain to be seen, but we do already now see an increasing demand for a vehicle number 2 that is practical, flexible and fun!

Authors

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