

THE PREDICTION OF ELECTRIC VEHICLE OWNERSHIP IN CHINA

Background

With the promoting of national industrial policies, Chinese electric vehicle industry will develop rapidly in the future. The historical data about the number of electric vehicle ownership is shown in Table 1.

Table 1. Number of electric vehicle in China (2008-2013)

| Year | Electric vehicle ownership |
|------|----------------------------|
| 2008 | 2,000 |
| 2009 | 7,300 |
| 2010 | 14,500 |
| 2011 | 22,659 |
| 2012 | 35,450 |
| 2013 | 53,092 |

Data from Chinese automobile statistical yearbook.

Gompertz model

Use Gompertz model to predict the number of electric vehicle ownership:

$$C_t = \gamma \cdot e^{\alpha \cdot e^{\beta \cdot \text{GDP}_t}} \quad (1)$$

Where:

C_t —Electric vehicle per capita ownership;

GDP_t —Per capita GDP;

α , β —Undetermined coefficients;

γ —Saturation level parameter, $\gamma = 0.315$.

The conversion equation is :

$$\ln(\ln y - \ln C_t) = \ln(-\alpha) + \beta \cdot \text{GDP}_t \quad (2)$$

For $Y = \ln(\ln y - \ln C_t)$, $m = \ln(-\alpha)$, $X = \text{GDP}_t$,

The equation can be transferred to :

$$Y = m + \beta \cdot X \quad (3)$$

Linear regression

Using Origin software (OriginLab Co.) to fit the equation and got the parameter values:

$$m = 2.91295, \quad \beta = -1.19101 \times 10^{-5}$$

Result

The prediction result and tendency is shown in Table 2. It can be seen that in 2020 the number of electric vehicle will be nearly 600,000. It will also benefit the EOL electric vehicle market.

Table 2. Prediction number in future

| Year | Electric vehicle ownership |
|------|----------------------------|
| 2015 | 110,638 |
| 2016 | 153,014 |
| 2017 | 213,158 |
| 2018 | 298,986 |
| 2019 | 421,970 |
| 2020 | 598,947 |



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