

STRATEGIES TO DRIVE THE USE OF ELECTRIC CARS BY PEOPLE IN BANGKOK AND ITS VICINITY

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Introduction

Statement and Significance of the Problem

Present Thailand and all over the world are facing power shortage problems due to rapid population, social and economic expansion causing the use of a lot of resources and tends to increase continuously every year Fossil fuel energy (oil, coal, natural gas) It is one of the limited natural resources. Once used up, it cannot be replaced. Because the geological processes that produce fossil fuels take millions of years to occur. This, coupled with various tensions around the world, resulted in higher oil prices. Therefore, many countries are turning to alternative energy to reduce the use of those resources. Another important factor in cars used today is fuel consumption. which is one of the fossil fuels, the cars will Burning oil produces carbon dioxide. If there is a large amount will result in a house condition. Glass is the main cause of global climate change causing global warming problems. Including creating air pollution, causing PM2.5 dust , which is a problem that is extremely destructive to health.

According to the World Health Organization (WHO), long-term noise pollution Traffic that is higher than 53 decibels (dB) can result in negative health effects, such as causing high blood pressure. which noise level occurs Throughout Asia and the big city of Oceania like Bangkok Ho Chi Minh City Jakarta Hong Kong Manila Melbourne Singapore _ and Seoul on average at 76 decibels or almost 4 times the appropriate sound level and in addition to traffic congestion that affects noise pollution It affects air pollution problems as well. which the pollution problem It is the top environmental problem. of Bangkok Especially the problem of particulate matter smaller than 10 microns (PM 10) caused by black smoke emitted from the exhaust pipes of diesel engines. Including air pollution from particulate matter less than 2.5 microns in size (PM 2.5), which, according to the Pollution Control Department, found that In January 2020, there was PM 2.5 dust that exceeded the standard for 23 days out of 31 days. The excess PM 2.5 value was measured from 51-104. micrograms/cubic meter, which when PM 2.5 is from 51 micrograms/cubic meter This means that it begins to negatively affect health. (Pollution Control Department , February 2020) to reduce these problems. Electric vehicles therefore become a new alternative that helps reduce Pollution affects the environment and human health. From the situation, a trend has been created to conserve automotive energy and the environment. around the world, as can be seen from various measures in many countries, such as the adoption of an environmental labeling model for new cars in the United States to provide consumers with access to the energy consumption and environmental impact of their cars through their smartphones. goal setting Greenhouse gas emission standards (Emission Standard) for new cars in the country. European Union Subsidies or preferential tariffs for new, greener vehicles in Japan, making the price of high-energy-efficient vehicle technology competitive with price of internal combustion engine technology Including providing financial support for research and development related to electric vehicle technology, etc. It also encourages car manufacturers around the world to turn Come back to pay attention and invest in the development of electric vehicle technology seriously. to be able to sell more widely in the future for Thailand Electric vehicle technology is considered an alternative vehicle of the century. that began to play an important role in the automotive industry in the

past The government sees that the issue of energy prices international competition for energy resources environmental issues and Climate change because of energy production and consumption. will be a problem with more violence in the future This will affect the welfare of the people and the ability to Economic competition is inevitable. As a result, the Ministry of Energy has prepared a 20 -year energy conservation plan (2011-2030) with the essence of measures to promote the use of energy-efficient vehicles. high e.g., mandatory energy efficiency labeling Enforcement of minimum performance benchmarks Enforcement of tax measures to control carbon dioxide emissions to encourage production and distribution of vehicles with higher efficiency, etc.

for the operation of Thailand Based on the State Survey of SDGs Goal 13.(2017) found that there is an integration of climate change policy/strategy/plan implementation. This is an operation by many agencies according to the 20th National Strategic Framework. (2017 - 2036) in Strategy 5 – Building Growth on the Quality of Life that is Friendly to Environment The 13th National Economic and Social Development Plan (2023-2027) aims to develop high-value economies that are friendly to the environment and sustainable way of life. Master Plan for Climate Change 2015-2050 Draft Climate Change Adaptation Plan and roadmap for reducing greenhouse gas emissions of the country 2021-2030 by sector in order to achieve the goal of reducing greenhouse gas emissions of 20% by the year 2030 (Policy Office and the Natural Resources and Environment Plan , 2017) and on March 24, 2021, the National Electric Vehicle Policy Committee has set a target by the year 2035 (2035), motorists can register new vehicles only. Zero Emission Vehicle (ZEV) 100% (Mobility & Vehicle Technology Research Center (MOVE), 2021) Thailand's Carbon Dioxide Emission Situation in 2021 It was found that the electricity generation sector emitted the most, followed by the industrial sector, the transportation sector, and other economic sectors, respectively (Office of the Energy Policy and Planning Office). Ministry of Energy , 2021). Therefore, urgent measures to reduce greenhouse gas emissions in the energy and transportation sectors were assessed as the most potent measures. by setting a goal to reduce the amount of greenhouse gases in the amount of 113.00 million tons of carbon dioxide equivalent (Mt-CO₂ eq) (Office of Natural Resources Policy and Planning And the environment , 2017) makes Thailand start to focus on clean energy. Or more renewable energy (Renewable Energy) , therefore assigned the Ministry of Energy to prepare an energy conservation plan 2015 - 2036 (Energy Efficiency Plan: EEP 2015) and included measures to promote electric vehicles as one of the energy conservation measures transport the goal is to promote energy conservation by promoting the use of electric vehicles in 2016. 2035 total of 1.2 million vehicles (Department Alternative Energy Development and Energy Conservation , 2015) because electric vehicles use renewable energy that is environmentally friendly instead of fuel in the country's transportation system. Does not cause pollution such as particulate matter less than 2.5 microns in size (PM 2.5) as well as having the opportunity to develop into a modern automotive industry (Next Generation Automotive)

The problem of capital cities around the world is facing traffic congestion. especially in Bangkok Ranked 33, the city with the most congested traffic in the world and the 3rd. in Asia in 2019, if counting only in Asia, it will be found that Thai people spend 90 hours on the road per year. (INRIX, 2020) causing air pollution and PM 2.5 dust problems from vehicle exhaust, soot and dust from construction The solution to these environmental and pollution problems is emissions reduction efforts. which if considering the current car type Begin to see more and more electric cars being brought to the road. It shows the interest and confidence of consumers towards electric cars instead of buying gasoline-powered combustion vehicles. In the future, we will see an increase in the number of uses of electric cars. by leaps and bounds due to the development of electric vehicle technology, such as batteries motor drive system and intelligent control systems, etc., resulting in reduced production costs. Electric vehicle prices

are therefore competitive with combustion vehicles. together with the increase in the number of charging stations and knowledge and understanding of electric vehicle technology of the people Electric cars are therefore no longer a matter of distance. next

Thailand, despite not announcing the termination of the production of gasoline cars, still supports the production policy. And import electric cars according to the needs of the people and to reduce global warming. Reduce pollution in the air today Consumers are increasingly interested in owning electric vehicles. which can be seen from that hybrid electric car has been very popular in addition, at present, some department stores have begun to set up electrical outlets for cars. electric plug-in hybrid systems (PHEVs) to support such vehicles The above shows a trend in A future where users of gasoline-powered cars will switch to electric cars instead. Thailand has started to put policies to support electric cars to come true, such as There is a conservation plan. Energy B.E. 2558 - 2579 Government measures announcement On April 1, 2022, to support the use and production of electric vehicles, including car subsidies. and pick-up trucks at 70,000-150,000 baht/car and motorcycles at 18,000 baht/car. 2. Reduce excise tax on cars from 8% to 2% and pick-up trucks to 0%. 3. Reduce import duty on cars manufactured differently. country and import the whole car (CBU) up to 40% for cars until 2023. And there is a cabinet resolution Approving the principle of drafting a Royal Decree (Decree) to reduce the annual tax for vehicles powered solely by electric power according to the Motor Vehicle Act B.E. annual tax For electric-powered vehicles only registered between October 1, 2022 and September 30, 2025, down 80% of the rate set according to the annual tax rate at the end of the Motor Vehicle Act B.E. 1979 (amended by the Motor Vehicle Act (Chor. 14) B.E. 2550) for a period of 1 year from the date of registration. For this reason, the researcher is interested in studying "Strategies for driving the choice of electric cars of the people in Bangkok and its vicinity" to know the factors affecting the promotion of the choice of electric cars of the people.

Research Question

1. What is the demand of people in Bangkok to use electric cars?
2. What are the factors that affect the decision to choose an electric car?
3. What should be the strategy to promote the use of electric cars by the people in the future?

Research Objectives

1. To study the needs and analyze factors affecting people's decision to use electric cars in Bangkok and its vicinity.
2. To study factors affecting people's decision to use electric cars in Bangkok and its vicinity.
3. To propose a strategy to drive the people's choice of electric cars in Bangkok and its vicinity.

Research Hypothesis

1. Personal factors Attitude factors of accepting technology and social and environmental responsibility factors Affecting the decision to buy electric cars of people in Bangkok and its vicinity.
2. Marketing mix factor is an additional factor that affects people's decision to buy electric cars in Bangkok and its vicinity.

Scope of the Study

1 . Scope of content: This study is mixed research to study factors affecting the decision of people in Bangkok and its vicinity to choose electric cars by the year 2035 and propose strategies to drive people to turn to Choose to use more electric cars in the future.

2 . Area Boundaries: Bangkok and its vicinity, Thailand

3 . Population extent and population groups:

The qualitative population consisted of in-depth interviews consisting of people involved in policy formulation and policy implementers from both the public sector. private sector and public sector for example Representative of the Electricity Generating Authority of Thailand Representative of the Energy Policy and Planning Office Representative of the National Electric Vehicle Policy Committee, Thai Electric Vehicle Association electric vehicle manufacturers and electric charging station service provider will select a specific sample of 15 people.

Quantitative population Use query by questionnaire The group of respondents is people aged between 18-65 years old and have their own income. who live or work in Bangkok and its vicinity The exact number is unknown. Therefore, the calculation formula of Taro Yamane was used to obtain a sample of 400 people. It was a random sampling.

4 . Duration Scope: This study lasted 10 months.

From April 2026 to January 2024

Significance of the study

1. Know the needs and factors that affect the decision to use electric cars of the people in Bangkok and its vicinity.

2. Know the environment of driving the use of electric cars.

3. Strategies to drive people's choice of electric cars.

4. Relevant agencies, both public and private, use the information as a guideline for development in terms of policies, economy and technology to encourage more people to choose electric cars.

5. causing environmental changes in a better direction Because it increases the opportunity to make more alternative energy choices. Make the problem of climate change and air pollution be solved sustainably.

Definition of term

Strategies (Strategy) refers to methods or plans for driving the choice of electric cars of the people in Bangkok and its vicinity, carefully thought out. has a stepwise nature Be flexible according to the situation Avoid various obstacles until the goal can be achieved "Newly registered cars All electric vehicles by 2035 (ZEV 100% in 2035)" as defined by the National Electric Vehicle Policy Committee.

Vehicle: ZEV means vehicles that do not cause pollution from driving. which currently consists of 2 types of vehicles: Battery Electric Vehicle (BEV) is a propulsion system that uses only battery power. And can be plugged in to charge from the outside or Plug-in and Fuel Cell Electric Vehicle (FCEV) brings hydrogen into the fuel cell. To cause a chemical reaction to cause electricity to be used to drive and release water only.

A review of relevant literature to be used as a basis for analyzing factors influencing.

Personal car (Private Car) means a personal car registered with the Department of Land Transport as a type of personal car, no more than 7 seats, with 4 wheels that are not intended for trucking or hireling. and has no more than 7 seats.

Electric vehicle (EV) means a vehicle that uses an electric motor instead of an internal combustion engine from using fuel. It can use only electric power to transmit power. Powering the car to drive

An internal combustion engine vehicle (Internal Combustion Engine) refers to a vehicle that uses only the internal combustion engine to generate generating energy by refueling with benzene type fuel to deliver power to propel the vehicle.

Gasoline (Gasoline) means benzene type of oil that can only be used in gasoline internal combustion engine vehicles.

Accepting technology means accepting the use of technology and technology. which has components?

1. Understanding the difficulty of technology, it means knowing that new technology is not complicated.

2. Perception of benefits means knowing that electric cars will be useful in many ways.

3. risk perception It means understanding that new technology may have flaws. but accepted to use.

4. Social Influence refers to the surrounding society that influences the acceptance of that technology.

5. Attitude towards the use means the attitude towards the use of electric cars. that there will be changes for the better

Integrated Marketing Communication Refers to a form of marketing communication tool for electric passenger cars (EV). Consists of advertising, public relations, sales by sales staff promotion and direct marketing The details are as follows.

1. Advertising (Advertising) means communication by advertising the benefits. and the differences of electric passenger cars (EV) through various communication channels

2. Public relations (Public Relation) mean communication by media showing the image of electric passenger cars (EV) in a good direction from various activities.

3. Promotion (Sale Promotion) means communication using marketing activities such as discounts, exchanges, giveaways, or can try electric passenger cars (EV).

Linking products (Product Associations) means factors that cause links with electric passenger cars (EV), consisting of knowing the strengths of the product. There is a reason to buy, the price is acceptable. and can expand the product with details as follows.

1. Know the strengths of the product (Differential) refers to the electrical system that causes the propulsion of electric passenger cars (EV).

2. There is a reason to buy (Reason to buy) means that the needs of consumers meet the characteristics of electric passenger cars (EV).

3. Acceptable price (Positive Attitudes / Feeling) means the price of electric passenger cars (EV) is appropriate compared to the needs of consumers.

4. Expanding the product (Basis for Extensions) means consumers have confidence in electric passenger cars (EV), allowing consumers to agree to purchase. buy other products that comes from the same innovation as well.

Making a decision means making a decision to buy an electric passenger car (EV).

The buying decision process (The Buying Process and Decision-Making) Refers to those who have a decision-making process until they have opinions after purchasing a passenger car. electrical system (EV) with the following steps

1. The problem recognition stage (Problem Recognition) means to recognize problems caused by using combustion engine vehicles, such as high oil prices, loud engine noise, etc.

2. The information search stage (Information Search) means to find information about electric passenger cars (EV) to find options for decision making.

3. Evaluation of Alternatives means using reasons and emotions to determine the qualifications for evaluating the selection of electric passenger cars (EV).

4. Purchase decision (Purchase Decision) means deciding to buy an electric passenger car (EV) according to the specified qualifications .

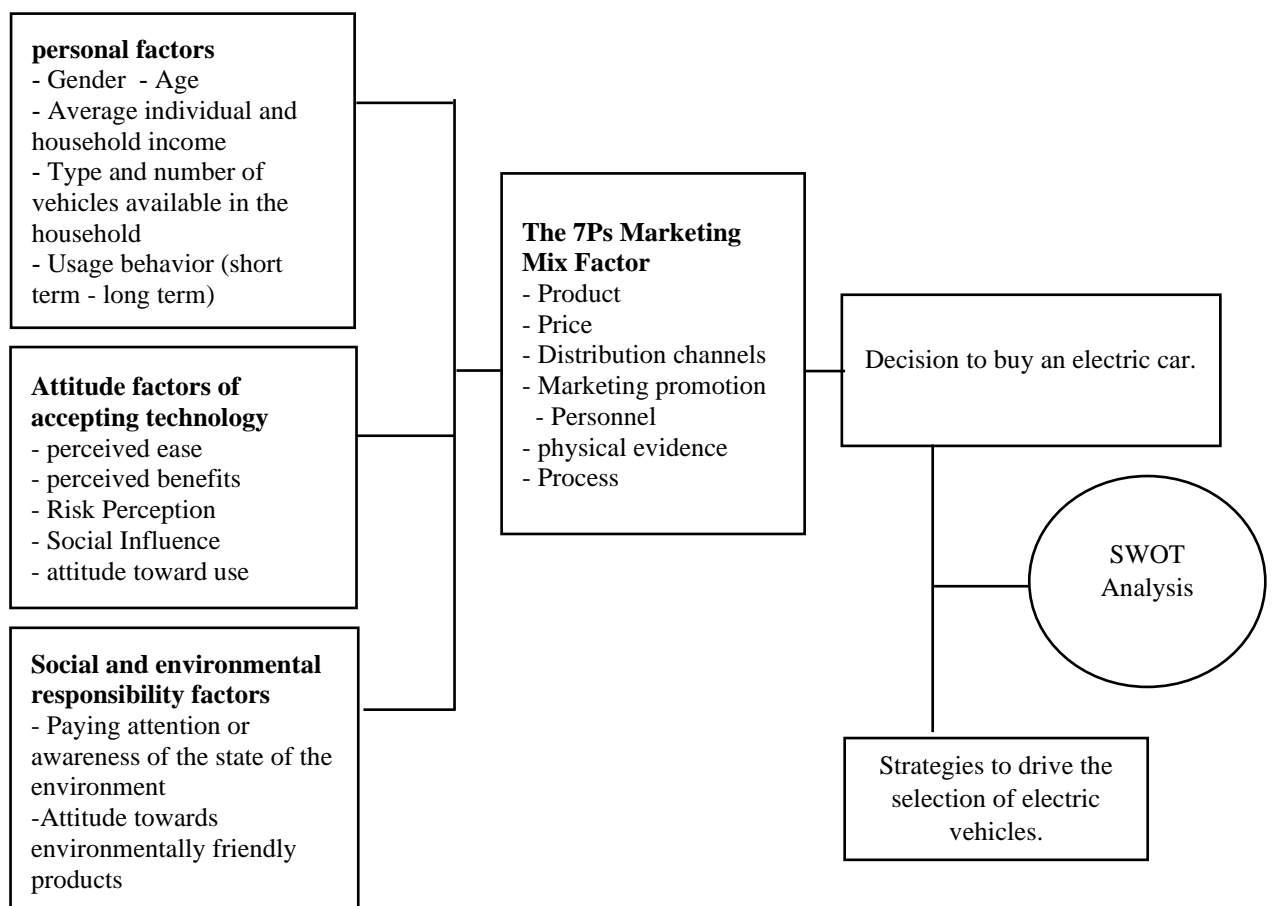
5. The behavior after purchase (Post purchase Behavior) means satisfaction after owning an electric passenger car (EV).

Theoretical Concept

A review of relevant literature to be used as a basis for the analysis of factors affecting Promote the use of electric vehicles and present strategies to drive the use of electric vehicles. of people in Bangkok and its vicinity meet the objectives of this study. It comprises of the following important issues:

1. Situation of electric vehicle usage in Thailand
2. Policies and development plans that promote the use of electric vehicles
3. Policies and development plans that promote Use of electric vehicles in Thailand
4. Theoretical concepts of public policy
5. Theoretical Concepts of Strategy
6. Marketing Mix Concepts and Theories (7P's)
7. Concepts and theories about innovation acceptance
8. Demographic Concepts
9. Theoretical concepts of human resource development
10. The concept of energy management and plans in Thailand
11. The 13th National Economic and Social Development Plan (2023-2027), the issue of renewable energy
12. Related Research
13. Conceptual Framework

Conceptual Framework



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