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# Exploring the Path: EV Conversion as a Sustainable Future for Classic Cars in Bangkok

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## Abstract

This study explores the potential of electric vehicle (EV) conversion as a sustainable pathway for classic cars in Bangkok. The research addresses the growing environmental challenges of urban pollution and carbon emissions while preserving the cultural and historical value of vintage automobiles. Using a mixed-methods approach, data were collected from surveys and in-depth interviews with classic car owners, mechanics, and policy experts. Quantitative data were analyzed to identify decision factors such as cost, environmental awareness, technological feasibility, and government incentives, while qualitative insights highlighted emotional attachment, social perception, and long-term value preservation. The findings reveal that the willingness of classic car owners to adopt EV conversion depends largely on financial support mechanisms, technical infrastructure, and trust in conversion quality and safety. Moreover, policy alignment with national sustainability goals plays a crucial role in shaping adoption trends. The study concludes that EV conversion represents not only a technological transition but also a socio-cultural opportunity to merge heritage preservation with environmental innovation. Recommendations are proposed for policymakers, automotive industries, and local communities to establish guidelines that encourage EV retrofitting of classic cars, contributing to Bangkok's vision of cleaner mobility and a more sustainable urban future.

**Keywords:** EV conversion, classic cars, sustainability, Bangkok, policy guidelines

## 1. Introduction

Air pollution is a pressing environmental issue globally, with urban centers like Bangkok facing acute challenges due to severe traffic congestion and high fossil fuel consumption. The widespread use of internal combustion engine (ICE) vehicles significantly contributes to

greenhouse gas emissions and harmful pollutants. While electric vehicle (EV) technology offers a sustainable solution, its adoption in Thailand, especially within the classic car community, remains limited. Classic cars hold immense sentimental and historical value, but their preservation is at odds with environmental goals. The transition to electric power for these vehicles is hindered by high conversion costs and inadequate infrastructure.

This research addresses the gap in understanding the factors that influence classic car owners' decisions regarding EV conversion. It explores the feasibility of converting these

vehicles safely and cost-effectively, aiming to contribute to clean energy promotion and long-term air pollution reduction in Thailand.

### 1.1 Research Objective

To analyze the important factors affecting the decision of car owners to modify classic cars into electric cars.

To propose guidelines to promote the modification of classic cars into electric cars that are consistent with Thailand's pollution reduction policy.

## 2. Literature review

This research integrates core concepts from automotive technology, consumer behavior, and sustainability. The global automotive sector is undergoing a significant transition, shifting from internal combustion engines (ICEs) to electric vehicles (EVs), driven by policies like the EU's plan to ban new ICE sales by 2035. EV conversions are presented as a sustainable strategy to reduce carbon emissions and minimize waste while preserving the cultural value of classic cars. Theoretical frameworks, including the Theory of Planned Behavior (TPB), the Technology Acceptance Model (TAM), and Green Consumer Behavior Theory, explain the role of attitudes, perceived usefulness, and environmental concerns in EV adoption. Critically, studies on consumer decision-making, such as that by Waenphet et al. (2021), found that marketing factors (specifically product quality, price, and service process) and consumer behavior are the most significant elements affecting the decision to use a service. This finding is highly relevant, demonstrating that the marketing mix and behavioral factors are essential drivers in consumer decision-making, which directly parallels the assessment classic car owners make regarding the cost, technology, and service of EV conversion. Empirically, previous studies confirm that conversion reduces emissions, improves efficiency, and is 30–40% cheaper than purchasing new EVs (Smith et al., 2019; Williams et al., 2021; Johnson et al., 2018; Brown et al., 2020).

## 3. Methodology

This study used a mixed-methods design, collecting data (Dec 2024 - Feb 2025) from 30 in-depth interviews and 100 online questionnaires from Thai consumers in Bangkok (aged 20+, with EV purchasing power). The validated instruments (Cronbach's Alpha > 0.85) were a semi-structured interview guide and a 5-point Likert scale questionnaire exploring five key areas: price, technology, environmental awareness, government support, and infrastructure. Data was analyzed using Thematic Analysis for qualitative themes and descriptive statistics (mean, SD) for quantitative trends.

## 4. Results

The analysis of data from 100 questionnaire respondents and 30 interviewees revealed several key factors influencing the decision to convert classic cars to EVs. The majority of respondents were male (58%), aged 31-45 (47%), with a monthly income over 50,000 baht (63%) and a bachelor's degree or higher (72%).

#### 4.1 Quantitative Data Analysis

The questionnaire results, summarized in Tab. 1, show that Environmental Awareness (Mean = 4.30) is the highest-rated factor, indicating that concern for sustainability is a primary driver.

This is closely followed by Price and Value (Mean = 4.25), reflecting that the conversion must also be financially viable. Government Policies (Mean = 4.10) and Technology Knowledge (Mean = 3.85) were also rated highly, underscoring the need for supportive measures and better understanding of the technology. The lowest-rated factor was Infrastructure (Mean = 3.60), highlighting the lack of accessible charging stations as a significant practical barrier.

Figure 1. Conceptual structure of the EV

**Tab. 1: Quantitative Data Analysis from the Questionnaire**

Factor	Mean	SD	Opinion Level
Price and Value	4.25	0.65	High
Technology Knowledge	3.85	0.72	High
Environmental Awareness	4.30	0.61	High
Government Policies and Benefits	4.10	0.68	High
Infrastructure	3.60	0.75	Moderate

Source: Primary Data from Questionnaires

4.2 Qualitative Data Analysis In-depth interviews reinforced the quantitative findings. Key themes that emerged were:

Price: The high upfront cost of EV conversion is the main obstacle.

Technology: Many owners lack confidence in the safety and long-term efficiency of converted systems.

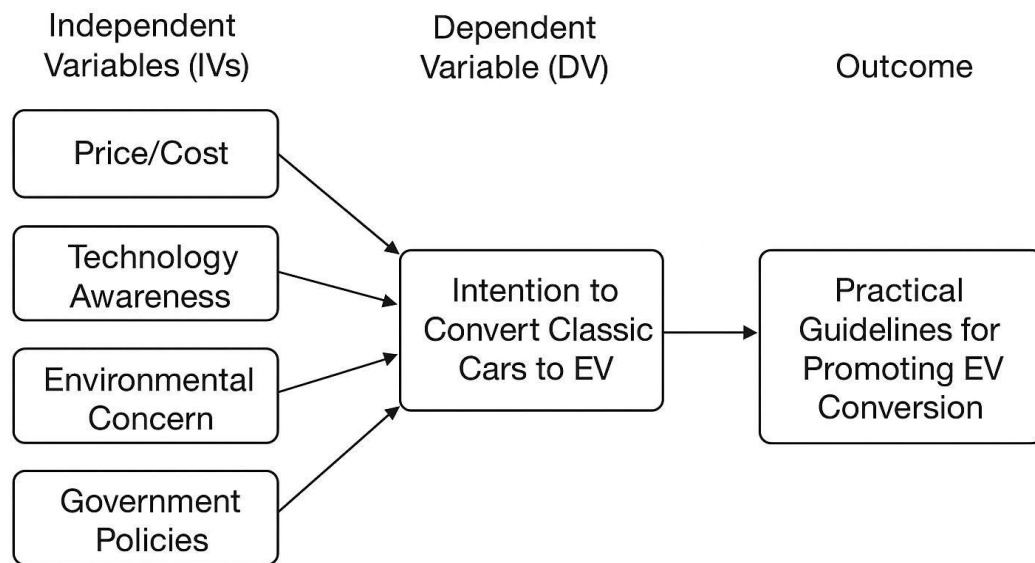
Environment: Concern for Bangkok's air pollution is a strong motivator.

Government Policy: Tax reductions or subsidies would significantly increase interest.

Infrastructure: The scarcity of charging stations causes hesitation and "range anxiety".

4.3 Conceptual Framework and Correlation The study's conceptual framework (Fig. 1) illustrates how independent variables influence the intention to convert, leading to practical guidelines. A correlation test found a significant positive relationship between income level and the intention to convert classic cars to EVs ( $r = 0.75$ ,  $p < 0.01$ ), confirming that financial capability is a critical factor

Figure 1: Conceptual structure of factors influencing EV conversion intention



## 5. Conclusion

This research confirms that the decision to convert classic cars to EVs in Bangkok is driven by a combination of environmental consciousness and financial pragmatism. While owners are motivated by a desire to reduce pollution, the high cost of conversion, lack of trust in the technology, and insufficient charging infrastructure remain significant barriers. The findings align with the Green Consumer Behavior Theory and the Technology Acceptance Model, showing that perceived value and environmental motivations are key to consumer decision-making. The results are also consistent with previous research that identifies cost and infrastructure limitations as major obstacles in Asia (Chua et al., 2021).

**5.1 Policy and Practice Recommendations** To promote the conversion of classic cars to EVs, the following actions are recommended: **Government Support:** Establish subsidies or tax incentives to lower the financial burden on owners.

**Education and Training:** Launch programs to build knowledge and trust in EV conversion technology, safety, and maintenance.

**Infrastructure Expansion:** Accelerate the development of a robust and accessible public charging network throughout Bangkok.

**Public-Private Partnerships:** Foster collaboration between government agencies, technology providers, and conversion garages to streamline services and improve access.

**5.2 Research Limitations** This study's limitations include its geographical focus on Bangkok, which may not represent views from other parts of Thailand. The sample size of 100 for the quantitative analysis may not be sufficient to generalize to all classic car owners nationwide.

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