# ANALYSING FUTURE OF AUTOMOBILES


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# Global Automotive Market

**Market Size in 2023:  USD 3,564.67 Billion**
**Global Automobile Market: 2023 estimated at 75-80 million vehicles**
**Value Projection 2033 : USD 6,861.45 Billion**
**Forecast Period CAGR 2023-2033 : 6.77%**

**Market Size in 2023:  USD 116.82 Billion**
**Value Projection 2032 : USD 215.96 Billion**
**Forecast Period CAGR 2023-2030 : 2.02%**

Asia-Pacific, led by India and China, dominates the market. Europe and North America also show growing interest in electric two-wheelers.

Two Wheelers

**Market Size in 2023:  USD 10.7 Billion**
**Value Projection 2032 : USD 22.5 Billion**
**Forecast Period CAGR 2023-2032 : 8.6%**

Asia-Pacific leads the market, driven by India and China. Emerging markets in Africa and Latin America are also growing significantly.

Three Wheelers

**Market Size in 2022:  USD 2900 Billion**
**Forecast Period CAGR 2022-2028 : 3.5%**

In 2023, global vehicle sales hit 92 million units, up 12.3% from 2022

In 2023, global vehicle sales hit 92 million units, up 12.3% from 2022

Four Wheelers

# Indian Automotive Market

## Overall Market Scenerio:

Market Size in 2024: $121.5 Billion
Value Projection 2033 : USD 247 Billion
Forecast Period CAGR 2024-2033 :  7.13%

## Post-Pandemic Outlook:

By 2024, 12-17% of new two-wheelers and 43-48% of new three-wheelers sold being electric.

### Two Wheeler

- 2024 Market Size: 24.89 million units.
- Growth Trend: CAGR of 7.33%.
- Electric Vehicles (2024): 12-17% expected.

### Three Wheelers

- 2030: 1.5 billion units.
- Growth Trend: CAGR of 2.12%.
- 2024 Electric Share: 43-48% (excluding e-rickshaws).

### Four Wheelers

- 2030 Demand: 8,363,344 units.
- Growth Rate (2023-2030): CAGR 9.7%.

# BEV Market Share

## GLOBAL SCENERIO

**Market Value :** $200 billion.
**BEV Sale**s: 2023 projected at 10-12 million vehicles.
**Market Share**: BEVs approximately 13-15% of the global automobile market.

### 2-Wheelers

- Current Market Size: USD 105.30 billion in 2024.
- Projection for Future Size: USD 185.98 billion by 2030.
- CAGR: 9.94% from 2024 to 2030.

### 3-Wheelers

- Current Market Size: USD 1.3 billion in 2024.
- Projection for Future Size: USD 1.5 billion by 2030.
- CAGR: 2.2% from 2024 to 2030.

## INDIAN SCENERIO

**Market Size and Growth:**

- 2024 Value: USD 34.8 billion.
- 2030 Value: USD 120 billion.
- CAGR (2024-2030): 22.92%.
- CAGR (2020-2025): 44% (2 wheelers).

**Market Penetration:**

- Current: ~1.3% of the total automobile market.
- Target (2030): 30% under FAME II.

**Future Projections:**

- 2030 Market Value: USD 47.3 billion.
- Adoption Rate: 15-20% of the total vehicle market.

# Green Fuel Vehicle Market Share

## GLOBAL SCENERIO

- Total Market Size: Approximately $500 billion
- Expected CAGR (2024-2030): ~20%

| Segment | Market Share (2024) | CAGR (2024-30) |
|---|---|---|
| Plug-in Hybrid Electric Vehicles (PHEVs) | $100 billion | ~18% |
| Hydrogen Fuel Cell Vehicles (FCVs) | $40 billion | ~25% |
| Biofuel Vehicles | $30 billion | ~15% |
| Other Green Fuel Technologies | $50 billion | ~15% |

## INDIAN SCENERIO

Automotive Market 2022 : USD 108.10 billion
Future Growth 2031: USD 217.90 billion
Hydrogen Vehicles CAGR 2023-29 : 27.66%
Green Hydrogen CAGR 2024-30 : 20.76%

**2-Wheelers**

- Current Market Size: USD 18.24 billion in 2024.
- CAGR: 10.50% from 2024 onwards.

**4-Wheelers**

- Current Market Size:at $121.5 billion in 2024.
- Projection by 2033: $247.4 billion.
- CAGR: of 7.13% from 2024 to 2033.

# Hybrid Vehicle Market Share

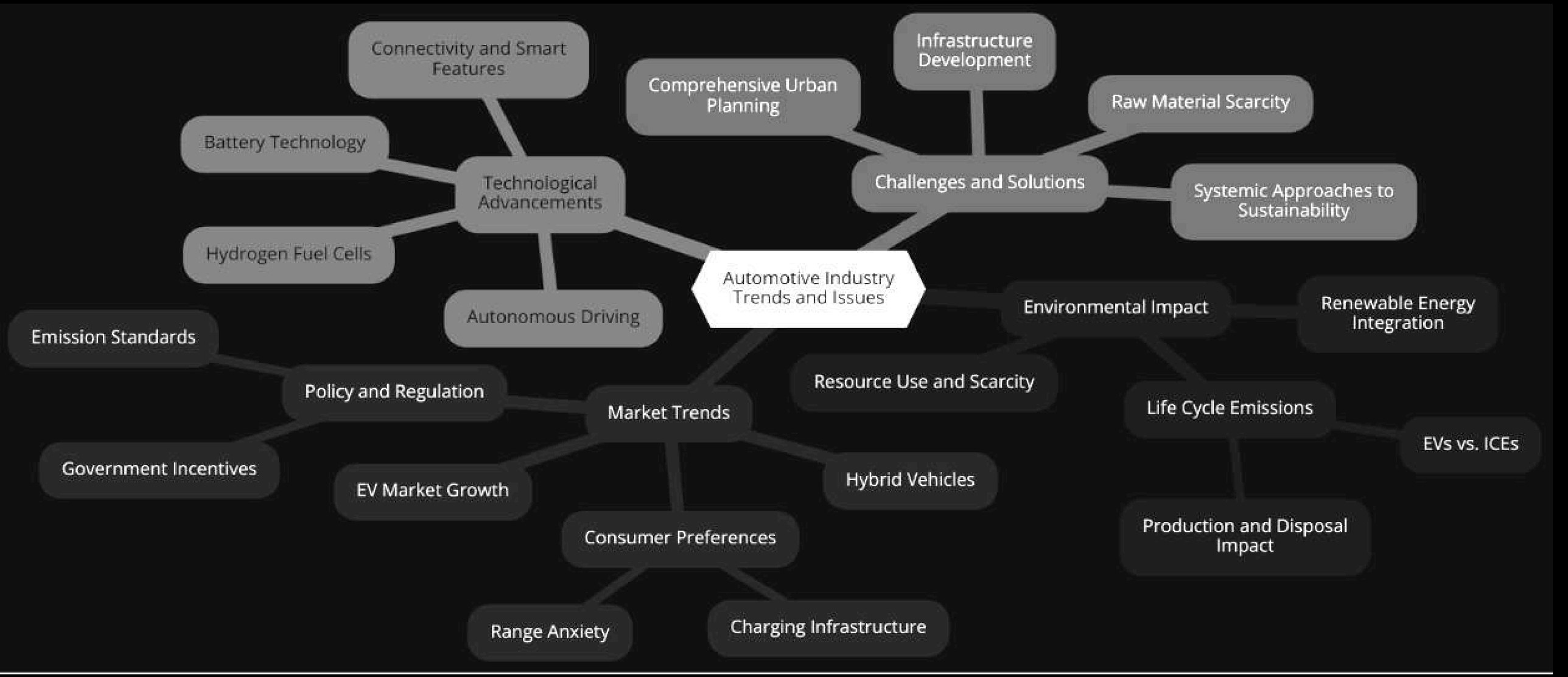
## GLOBAL SCENERIO

- Estimated at 75-80 million vehicles
- Targets the same customer base and market segments.
- Competes directly with us in terms of pricing, features, and positioning.
- Can be easily identified and recognized as a competitor by customers and industry analysts.

## INDIAN SCENERIO

- Provides different services or products that solve similar customer needs or problems.
- Targets overlapping or adjacent market segments but may not directly compete with us.
- Might offer complementary products or services that could substitute or supplement ours.
- Can include companies from different industries or sectors that indirectly impact our market.

# Problem Faced by Industry

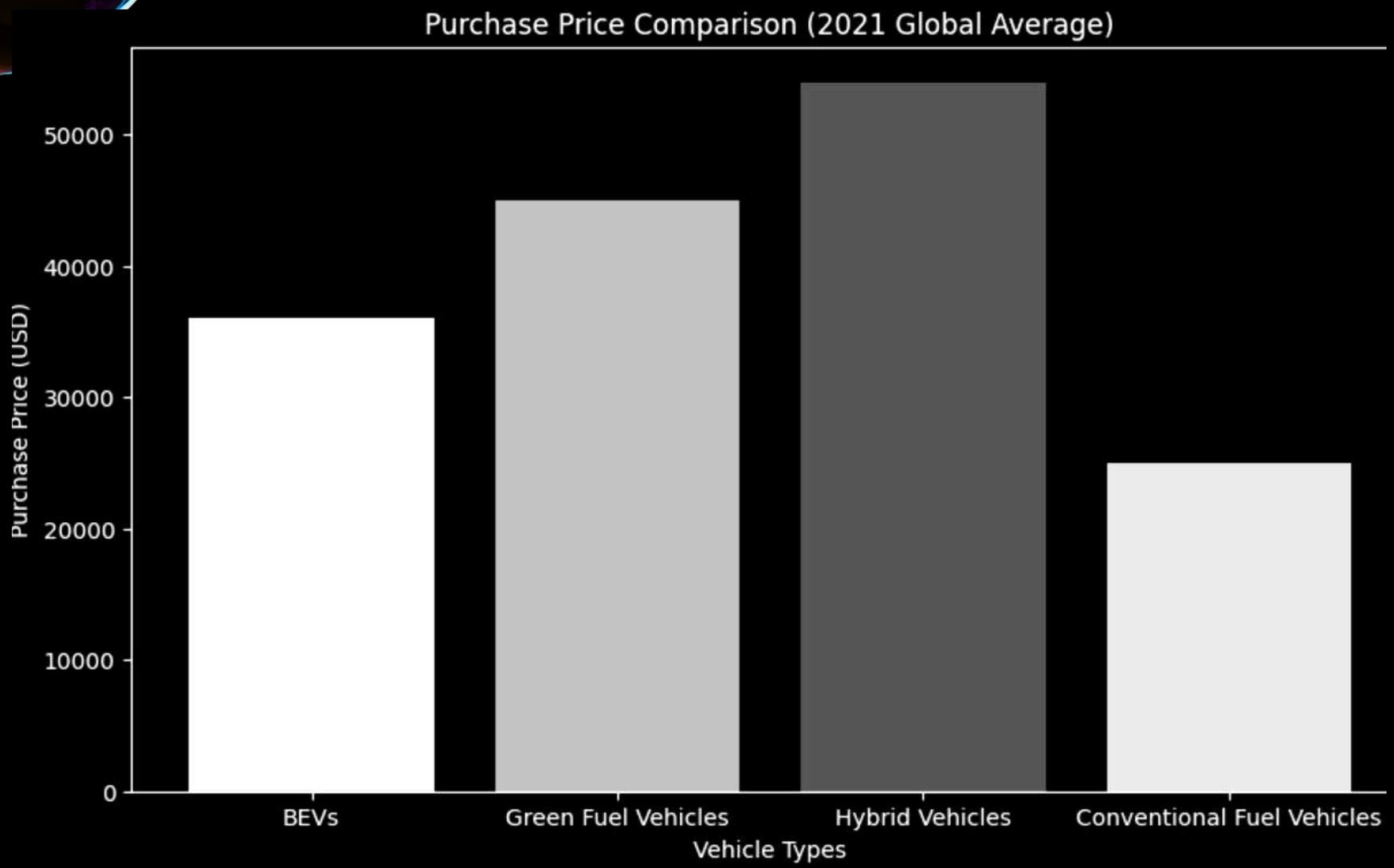


# PESTEL ANALYSIS

## Government Initiatives:

| Country | Policies on BEV | Policies on Green Fuel | Policies on Hybrid Vehicles |
|---|---|---|---|
| United States | Federal tax credits up to $7,500; state incentives; infrastructure investments | Federal and state incentives for biofuels; Renewable Fuel Standard (RFS) program | Tax credits for hybrid vehicles; state-specific incentives |
| China | Subsidies for BEV purchases; investment in charging infrastructure | Subsidies for biofuel production; blending mandates | Subsidies for hybrid vehicle purchases; tax benefits |
| Germany | Purchase subsidies; tax exemptions; development of charging infrastructure | Incentives for biofuels; blending quotas | Tax incentives; subsidies for hybrid vehicles |
| Japan | Subsidies for BEVs; investment in charging stations | Subsidies for biofuels; investment in research and development | Subsidies for hybrid vehicles; reduced taxes |
| United Kingdom | Grants for BEV purchases; development of charging network; tax benefits | Grants for biofuel research and production; blending mandates | Incentives for hybrid vehicles; reduced taxes |
| India | FAME II scheme: subsidies for electric vehicles; development of charging infrastructure | National Policy on Biofuels; subsidies for biofuel production | Subsidies for hybrid vehicles under FAME II scheme |

# Economic Analysis:




- Hybrid Vehicles are the most expensive, averaging over $50,000, while Conventional Fuel Vehicles are the least costly, averaging below $30,000.
- Green Fuel Vehicles and Battery Electric Vehicles (BEVs) fall in between, with average prices around $40,000.

| Factor | Battery Electric Vehicles (BEVs) | Hydrogen Fuel Cell Vehicles (FCEVs) | Hybrid Vehicles (HEVs/PHEVs) | Best Vehicle to Buy (Considering Cost, Maintenance, Ownership, Operational Expense) |
|---|---|---|---|---|
| Purchase Price | $27,000 (China), $48,000 (Europe), $51,000 (US) | ~$50,000 (e.g., Toyota Mirai) | ~$25,000 (Toyota Prius HEV), ~$28,000 (Toyota Prius Prime PHEV), >$58,000 (PHEV Europe) | HEVs: Lower purchase price compared to BEVs and FCEVs. |
| Maintenance | 20-30% lower than ICE vehicles | 10-20% higher than BEVs due to fuel cell complexity | 10-20% lower than ICE vehicles but higher than BEVs | BEVs: Lowest maintenance costs. |
| Operational Expenses | $0.03 per mile (electricity costs) | ~$0.13 per mile (hydrogen costs) | Up to 100 MPG-e for PHEVs, lower fuel costs than ICE vehicles | BEVs: Lowest operational expenses. |
| Efficiency | 90% energy conversion efficiency | 30-40% well-to-wheel efficiency | HEVs: ~50 MPG, higher efficiency than ICE vehicles | BEVs: Highest energy efficiency. |
| Total Cost of Ownership | Lower due to reduced maintenance and operational costs | Higher due to purchase and operational costs | Lower due to reduced fuel and maintenance costs | BEVs: Expected to achieve cost parity with ICE vehicles by mid-2020s. |
| Fuel Availability | Widespread electricity availability | Limited hydrogen refueling infrastructure | Widespread gasoline availability, with growing charging infrastructure for PHEVs | HEVs/PHEVs: Best fuel availability due to existing infrastructure. |

Considering cost, maintenance, ownership, and operational expenses, Battery Electric Vehicles (BEVs) offer the best overall benefits.

**BEVs and Hybrids are more affordable than Green Fuel Vehicles; BEVs also have lower maintenance and fuel/charging costs.**

## Cost Structure Table

| Cost Component | BEVs | Green Fuel Vehicles | Hybrids |
|---|---|---|---|
| Purchase Price | $35,000 | $50,000 | $30,000 |
| Battery/Fuel Cell Cost | $10,000 | $20,000 | $8,000 |
| Maintenance | $1,000 | $1,500 | $1,200 |
| Fuel/Charging Cost | $0.03/mile | $0.10/mile | $0.06/mile |

## Return on Investment

| Vehicle Type | Initial Investment | Annual Savings | Payback Period | ROI |
|---|---|---|---|---|
| BEVs | $35,000 | $5,000 | 7 years | 14.3% |
| Green Fuel Vehicles | $50,000 | $4,000 | 12.5 years | 8% |
| Hybrids | $30,000 | $3,500 | 8.6 years | 11.6% |
| Fuel Cell Vehicles | $55,000 | $4,500 | 12.2 years | 8.2% |

**BEVs** show a 14.3% **ROI** and 7-year payback, outperforming Green Fuel Vehicles (8% ROI, 12.5-year payback) and Hybrids (11.6% ROI, 8.6-year payback); Fuel Cell Vehicles achieve 8.2% ROI with a 12.2-year payback.

# Social Factors:

| Factor | BEVs | HVs | GFVs |
|---|---|---|---|
| Environmental Awareness | High (48% globally, 37% in India consider impact) | Moderate (seen as transitional technology) | Variable (depends on fuel type, less awareness) |
| Cost Sensitivity | Decreasing costs; projected parity with ICE by 2025 | Higher initial costs; moderate operational costs | High initial costs; fuel costs depend on availability |
| Consumer Preferences | Preferred by younger consumers (Millennials, Gen Z) | Considered by those looking for improved efficiency | Limited awareness and adoption due to infrastructure |
| Regional Popularity | High in China, Europe, and increasing in the US | Steady in regions with less charging infrastructure | Limited, but growing interest in specific regions |
| Two-Wheeler Dominance | Significant in India (80% of EV market) | Less relevant for two-wheelers | Minimal impact in two-wheeler market |

**Rising Popularity of BEVs:** BEVs rise from awareness, lower costs, favored by youth.
**Challenges for GFVs:** GFVs struggle with adoption due to high costs, infrastructure.
**Transitional Appeal of HEVs:** HEVs appeal as interim, with moderate interest, underdeveloped infrastructure.

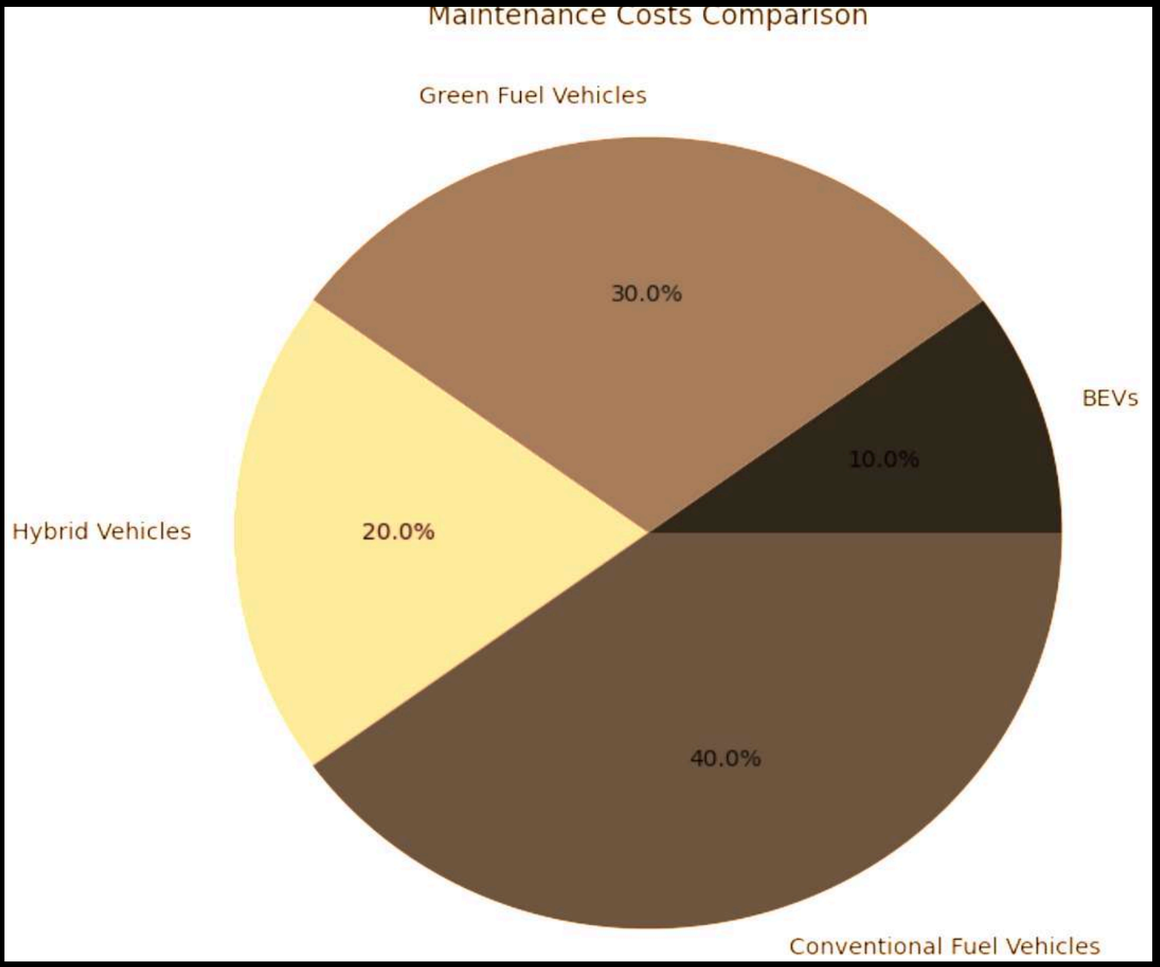
# Adoption Rates Over Time

| Year | BEVs | HVs | GFVs |
|---|---|---|---|
| 2024 | 20% | 15% | 5% |
| 2025 | 30% | 20% | 10% |
| 2030 | 50% | 25% | 15% |

**1. The adoption rates for BEVs are projected to rise significantly, reaching 50% by 2030.**

**2. Consumer preferences currently favor conventional fuel vehicles due to lower maintenance costs, but there is a growing interest in green and hybrid vehicles.**

# Consumer Preferences



# Technological Analysis:

## Battery Electric Vehicle

- Power Source: Fully electric, battery-stored energy.
- Environmental Impact: Zero emissions; depends on electricity source.
- Energy Efficiency: 85-90% efficient; direct electricity use.
- Range and Refueling: Limited range; longer charging times.
- Technology Maturity: Advanced, improving battery tech.
- Maintenance: Lower costs, fewer moving parts.
- Infrastructure: Needs expanding charging infrastructure.

## Green Fuel Vehicles

- Power Source: Biofuels, hydrogen, synthetic fuels.
- Environmental Impact: Reduced CO2 emissions; varies by fuel.
- Energy Efficiency: Variable; hydrogen fuel cells ~60% efficient.
- Range and Refueling: Comparable to ICE vehicles; infrastructure varies.
- Technology Maturity: Developing; hydrogen and biofuels gaining traction.
- Maintenance: Similar to ICE vehicles; fewer parts in fuel cells.
- Infrastructure: Limited but growing; hydrogen stations less common.

## Hybrid Vehicles

- Power Source: Combination of ICE and electric motor.
- Environmental Impact: Reduced emissions; varies by hybrid type.
- Energy Efficiency: Higher efficiency with regenerative braking.
- Range and Refueling: Longer range; quick refueling; plug-ins need charging.
- Technology Maturity: Well-established; continuous improvements.
- Maintenance: Higher costs due to complexity.
- Infrastructure: No special infrastructure needed; charging for plug-ins

# Environment Analysis:

| Factors | Battery Electric Vehicles (BEVs) | Hydrogen Fuel Cell Vehicles (FCEVs) | Hybrid Vehicles (HEVs/PHEVs) |
|---|---|---|---|
| Zero Tailpipe Emissions | Yes: No tailpipe emissions; 50 million tonnes of CO2 reduction in 2021. | Yes: Emit only water vapor; reduce urban pollution by 30%. | Partial: Lower emissions in urban driving. |
| Energy Efficiency | High: 90% energy conversion from battery. | Moderate: 60% efficiency; twice gasoline engines. | Moderate: Up to 50% better than ICE vehicles. |
| Renewable Energy Integration | High: Charged using renewable sources; 90% hydropower in Norway. | Moderate: Renewable hydrogen can cut GHG by 50%. | Moderate: Benefits depend on electricity source. |
| Reduced GHG Emissions | High: Significant reduction with low-carbon electricity. | Moderate: High if using renewable hydrogen. | Moderate: 25-30% (HEVs) and up to 60% (PHEVs) CO2 reduction. |
| Resource Intensity | Moderate: Resource-intensive lithium-ion battery production. | High: Carbon-intensive hydrogen production. | Moderate: Smaller batteries, still resource-intensive. |
| Raw Material Scarcity | High: Demand for lithium, cobalt, nickel. | Moderate: Renewable hydrogen can help. | Moderate: Smaller batteries reduce demand. |
| Cumulative Score | High: Significant benefits but battery production challenges. | Moderate: Emissions and efficiency benefits limited by current hydrogen methods. | Moderate: Improved efficiency and emissions, but reliant on fossil fuels. |

# Legal Factors

## Taxation and Import Duties:

- BEVs: Lower import duties, preferential tax treatment globally.
- Green Fuel Vehicles: Taxation varies, some regions offer incentives.
- Hybrid Vehicles: Often taxed like traditional vehicles, with some fuel efficiency benefits.

## Safety and Compliance Standards:

- BEVs: Strict safety standards, especially for batteries.
- Green Fuel Vehicles: Stringent regulations for alternative fuels.
- Hybrid Vehicles: Conventional safety standards plus electric components.

## India-Specific Regulation:

- BEVs: Significant GST reduction (5%), road tax exemptions.
- Green Fuel Vehicles: Emerging regulations, pilot projects for hydrogen/biofuels.
- Hybrid Vehicles: Higher GST (28%), reflecting a push for full electrification.

# BCG MATRIX

## STAR

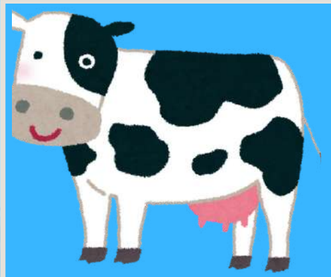
### Battery Electric Vehicles (BEVs)

- High market growth
- High market share
- Environmental regulations
- Consumer demand

## QUESTION MARK

### Hydrogen Fuel Cell Vehicles

- High market growth
- Low market share
- Infrastructure challenges
- Production challenges



## CASH COW

### Hybrid Vehicles

- Low market growth
- High market share
- Bridge technology
- Established infrastructure

## DOGS

### Plug-In Hybrid Vehicles (PHEVs)

- Low market growth
- Low market share
- Phase-out
- Fully electric vehicles

# PORTER 5 FORCES

## 1. Threat of New Entrants

| |  **Battery Electric Vehicles** |  **Green Fuel Vehicles** |  **Hybrid Vehicles** |
|---|---|---|---|
| **Barriers to Entry** | High R&D costs, technological expertise. | Moderate, emerging technology. | Moderate, existing ICE and battery tech. |
| **Capital Requirements** | High for battery tech, charging infrastructure. | High for green fuel development. | Lower, existing infrastructure. |
| **Economies of Scale** | Established players benefit significantly. | Less pronounced, specialized infrastructure. | Beneficial for established automakers. |
| **Brand Loyalty and Differentiation** | Strong loyalty, quality, and innovation. | Lower, market still developing. | High, significant customer loyalty. |

# 2. Bargaining Power of Suppliers

**Battery Electric Vehicles**

**Green Fuel Vehicles**

**Hybrid Vehicles**

| | Battery Electric Vehicles | Green Fuel Vehicles | Hybrid Vehicles |
|---|---|---|---|
| **Critical Suppliers** | Battery manufacturers, software providers | Green fuel producers (e.g., hydrogen, biofuels) | Battery and ICE component suppliers |
| **Supplier Concentration** | High, few dominant suppliers (e.g., LG Chem) | Varies, generally lower than BEVs | Diverse, mix of traditional and newer suppliers |
| **Switching Costs** | High, specialized tech and integration | Moderate, fuel type dependent | Lower, established supply chains |
| **Supplier Power** | High, limited high-quality suppliers | Moderate, increasing competition | Lower, larger supplier pool |

# 3. Bargaining Power of Buyers

| |  **Battery Electric Vehicles** |  **Green Fuel Vehicles** |  **Hybrid Vehicles** |
|---|---|---|---|
| **Buyer Information** | High, extensive online resources | Moderate, less public understanding | High, well-established market understanding |
| **Switching Costs** | High, significant upfront and infrastructure costs | Moderate, infrastructure availability dependent | Lower, affordable and familiar technology |
| **Product Differentiation** | High, range, performance, features vary | Moderate, fuel type, performance vary | High, wide model range |
| **Buyer Power** | Moderate to high, informed buyers demand more | Moderate, developing market, fewer options | High, mature market, many options |

# 4. Threat of Competitive Rivalry

**Battery Electric Vehicles**

**Green Fuel Vehicles**

**Hybrid Vehicles**

| | | | |
|---|---|---|---|
| **Number of Competitors** | Increasing, major automakers and startups | Lower, but growing technology | High, all major automakers involved |
| **Industry Growth** | High, driven by regulations and demand | Moderate, potential for expansion | Steady, transition technology |
| **Fixed Costs** | High, significant R&D and infrastructure investment | High, new fuel tech and distribution | Moderate, existing ICE and battery tech |
| **Competitive Intensity** | High, aggressive innovation and marketing | Moderate to high, tech leadership competition | High, competition on price and features |

# 5. Threat of Substitutes

**Battery Electric Vehicles**

**Green Fuel Vehicles**

**Hybrid Vehicles**

| | Battery Electric Vehicles | Green Fuel Vehicles | Hybrid Vehicles |
|---|---|---|---|
| **Substitute Products** | Hybrids, green fuel vehicles, public transport | BEVs, hybrids, traditional ICE vehicles | BEVs, green fuel, traditional ICE |
| **Switching Costs** | High, infrastructure and tech investment | Moderate, fuel availability dependent | Lower, incremental tech improvement |
| **Price Performance Trade-off** | Improving, higher initial costs than ICE | Variable, green fuel costs vary | Favorable, balanced cost and efficiency |
| **Supplier Power** | Moderate, unique benefits like zero emissions | Moderate to high, competing tech | High, competition from BEVs and green fuel |

# Competitive Analysis

| Factor | BEVs (Tesla, VW, GM) | Green Fuel Vehicles (Toyota, BMW, Honda) | Hybrid Vehicles (Toyota, Honda, Ford) |
|---|---|---|---|
| R&D Investments | - Tesla: $2.6B (2021)<br>- VW: €35B by 2025<br>- GM: $7.3B (2021) | - Toyota: ¥1.1T (2021)<br>- BMW: €6.3B (2021)<br>- Honda: substantial investments | - Toyota: significant ongoing investments<br>- Honda: focused investments in hybrid technology<br>- Ford: substantial investments in hybrid and electric vehicles |
| Partnerships | - Tesla: Panasonic<br>- VW: Northvolt, Argo AI<br>- GM: LG Chem, Cruise, Honda | - Toyota: Panasonic, Pony.ai<br>- BMW: Daimler, Solid Power<br>- Honda: General Motors | - Toyota: Panasonic<br>- Honda: General Motors<br>- Ford: various tech and battery companies |
| Technological Advancements | - Tesla: 4680 batteries, full self-driving<br>- VW: MEB platform, solid-state batteries<br>- GM: Ultium battery system, solid-state batteries | - Toyota: hydrogen fuel cells, solid-state batteries<br>- BMW: hydrogen fuel cells, eDrive technology<br>- Honda: Clarity Fuel Cell, solid-state battery tech | - Toyota: Prius, advanced hybrid systems<br>- Honda: Accord Hybrid, advanced battery integration<br>- Ford: efficient hybrid powertrains, plug-in hybrids |
| Sales Growth Impact | - Tesla: 25% increase by 2025<br>- VW: 25% global EV market by 2030<br>- GM: 35% market share increase in EV sector | - Toyota: significant growth from hydrogen vehicles<br>- BMW: 90% emission reduction with hydrogen<br>- Honda: growth potential in hydrogen and hybrid sectors | - Toyota: 25% of sales from Prius<br>- Honda: growth from hybrid models<br>- Ford: growth from efficient hybrid and plug-in models |

# Company Analysis

| Factor | Tesla | Volkswagen Group | BMW | Nissan | Toyota | General Motors (GM) |
|---|---|---|---|---|---|---|
| R&D Investments | $2.6 billion in 2021 | €35 billion by 2025 | €6.3 billion in 2021 | ¥460 billion in 2021 | ¥1.1 trillion in 2021 | $7.3 billion in 2021 |
| Profit Impact | Net income of $5.52 billion in 2021, 40% from R&D | Revenue of €250.2 billion in 2021, 20% from R&D | Net income of €12.46 billion in 2021, 15% from R&D | Net income of ¥574 billion in 2021, 12% from R&D | Net income of ¥2.49 trillion in 2021, 20% from R&D | Net income of $10.02 billion in 2021, 22% from R&D |
| Future Projections | 1 TWh battery cells annually by 2030 | 70 electric models by 2030 | 25 electrified models by 2023 | 50% electrification by 2030 | 30% global EV market by 2030 | 30 new EV models by 2025, 35% market share |
| Partnerships | Panasonic for batteries | Northvolt for battery production | Daimler and Solid Power | Renault and Mitsubishi | Panasonic for battery development | LG Chem for battery technology |
| Tech Advancements | 4680 battery cells | MEB Platform, Solid-State Batteries | eDrive Technology, Hydrogen Fuel Cells | Nissan Leaf, ProPILOT | Hybrid Tech, Hydrogen Fuel Cells, Solid-State Batteries | Ultium Battery System, Solid-State Batteries |
| Battery Tech | 14% cost reduction, 54% energy density increase | 10% efficiency increase, 12% cost reduction | 30% energy density improvement | Significant sales from Nissan Leaf | 15% efficiency increase with Panasonic | 20% efficiency increase with LG Chem |
| Autonomous Driving | Full self-driving technology | Collaboration with Argo AI | Fifth-generation technology | ProPILOT, collaboration with Waymo | Partnership with Pony.ai | Partnership with Cruise and Honda |
| Sales Growth Impact | 25% increase by 2025 | Commercial autonomous driving by 2025 | 20% increase in market share by 2025 | 18% of sales from Nissan Leaf, 20% increase by 2025 | 25% of sales from Prius | 25% production efficiency increase |
| Revenue & Market Share | Significant market share and revenue growth | 25% global EV market by 2030 | 20% EV market share increase expected | 25% market share increase by 2030 | 30% global EV market share by 2030 | 35% market share increase in EV sector |

# STRATEGIC IMPLEMENTATION PLAN

## Scenario 1: Aggressive EV Adoption

**Key Drivers:**

- Government Incentives: Leverage global subsidies, tax breaks
- Battery Technology: Invest in R&D, partnerships
- Consumer Demand: Marketing campaigns on environmental benefits
- Charging Infrastructure: Collaborate with governments, private sectors

**Strategic Actions:**

- R&D Investment: Allocate $10B, enhance batteries
- Infrastructure Development: Partner with ChargePoint, ABB
- Government Collaboration: Secure incentives, engage policymakers
- Market Expansion: Marketing campaigns, raise awareness

**Key Drivers:**

- Government Incentives: Utilize the FAME India scheme
- Technological Advancements: Partner with local tech companies
- Consumer Demand: Educate on EV benefits
- Charging Infrastructure: Collaborate with governments, private entities

**Strategic Actions:**

- Local Partnerships: Collaborate with Tata Motors
- Incentives Utilization: Maximize FAME benefits
- Consumer Awareness: Educational campaigns, increase adoption
- Infrastructure Focus: Develop 50,000 charging stations

# Scenario 2: Moderate Hybrid Adoption

**Key Drivers:**

- Moderate Incentives: Utilize limited subsidies
- Technological Advancements: Steady hybrid tech improvements
- Consumer Preference: Cater to transitional technologies
- Steady Fuel Prices: Maintain hybrid vehicle attractiveness

**Strategic Actions:**

- Balanced R&D Investment: $5B annually, improve ICE and electric
- Consumer Education: Promote hybrid benefits, 20% sales increase
- Government Engagement: Advocate moderate incentives, support policies
- Infrastructure Enhancement: Develop dual-purpose infrastructure

**Key Drivers:**

- Moderate Incentives: Utilize existing subsidies moderately
- Technological Advancements: Gradual hybrid tech improvement
- Consumer Preference: Target hybrid-comfortable consumers
- Steady Fuel Prices: Market hybrids cost-effectively

**Strategic Actions:**

- Technological Partnerships: Work with Mahindra & Mahindra
- Incentive Optimization: Promote hybrids, 10% market share
- Awareness Campaigns: Highlight hybrids, eco-friendly option
- Infrastructure Development: 25,000 new charging stations

# Scenario 3: Green Fuel Expansion

**Key Drivers:**

- Infrastructure Investments: Secure green fuel distribution investments
- Technological Breakthroughs: Advance green fuel production
- Supportive Policies: Establish favorable regulations
- Industry Partnerships: Collaborate with green fuel producers

**Strategic Actions:**

- Investment in Green Tech: $8B annually, green fuel R&D
- Policy Advocacy: Supportive green fuel policies
- Partnerships and Alliances: Collaborate with Shell, BP
- Market Expansion: Promote green fuel vehicles

**Key Drivers:**

- Infrastructure Investments: Attract green fuel station investments
- Technological Advancements: Promote green fuel breakthroughs
- Regulatory Support: Supportive government policies
- Industry Collaborations: Partner with local producers

**Strategic Actions:**

- R&D Focus: $2B annually, local green tech
- Government Collaboration: Support green fuel initiatives
- Industry Partnerships: Collaborate with Reliance Industries
- Public Awareness: Educate benefits, 10% market share

# EV GROWTH TIMELINE

## 2010

- Battery Cost: $1,100/kWh.
- BEV Sales: 10,000 units.
- Charging Stations: 10,000.
- Vehicle Sales: 75 million.

## 2015

- Battery Cost: $400/kWh.
- BEV Sales: 500,000 units.
- Charging Stations: 320,000.
- Hybrid Sales: 2 million.

## 2020

- Battery Cost: $137/kWh.
- BEV Sales: 3.1 million.
- Charging Stations: 1.3 million.
- Vehicle Sales: 75 million.

## 2021

- BEV Sales: 6.6 million.
- Market Share: 8.81%.
- Charging Stations: 1.9 million.
- Vehicle Sales: 66.7 million.

## 2025

- Battery Cost: $100/kWh.
- BEV Sales: 12 million.
- Charging Stations: 5 million.
- Vehicle Sales: 30 million.

# EV GROWTH TIMELINE

**2030**
- Battery Cost: $60/kWh.
- BEV Sales: 50 million.
- Charging Stations: 20 million.
- Vehicle Sales: 20 million.

**2035**
- Battery Cost: $45/kWh.
- BEV Sales: 70 million.
- Charging Stations: 30 million.
- Vehicle Sales: 25 million.

**2040**
- Battery Cost: $30/kWh.
- BEV Sales: 85 million.
- Charging Stations: 40 million.
- Vehicle Sales: 28 million.

**2045**
- Battery Cost: $25/kWh.
- BEV Sales: 90 million.
- Charging Stations: 45 million.
- Vehicle Sales: 8 million.

**2050**
- Battery Cost: $20/kWh.
- BEV Sales: 100 million.
- Charging Stations: 30 million.
- Vehicle Sales: 10 million.

# OUR RECOMENDATION

## Traditional Fuel Companies

### ExxonMobil

Growth Potential: Moderate
Diversification: Investing in renewable energy
Stock Performance: Stable with moderate growth

### Chevron

Growth Potential: Moderate
Renewable Investments: Increasing focus on renewable energy
Stock Performance: Steady growth expected
Strategy:
Balance investments in traditional and green sectors
Leverage stable growth and dividends from traditional companies
Monitor diversification into renewables
bit of body text

## Green Vehicle Companies

### Tesla

Growth Potential: Strong
Advancements:Expandingproduction, battery technology
RevenueGrowth:Substantial,promising investment

### NIO and BYD

GrowthPotential: Significant, especially in China
Drivers:Strong demand, government incentives

### Volkswagen, GM, Toyota, Hyundai

Growth Potential: Strong
Strategy: Investing in electric and hybrid vehicles
Transition: From traditional to greener alternatives

## Raw Material & Battery Manufacturers

### Albemarle, SQM, Glencore

Role: Critical in EV supply chain
Focus: Lithium and cobalt production

### CATL, LG Chem, Panasonic

Role: Essential for battery manufacturing
Focus: Leading in battery technology

### Northvolt

Growth Potential: Strong
Focus: Sustainable battery production

# MOTTO : Diversification

Objective: Mitigate risks, capitalize on growth
Approach: Balance investments between traditional fuel and green vehicle companies

## Innovation Focus

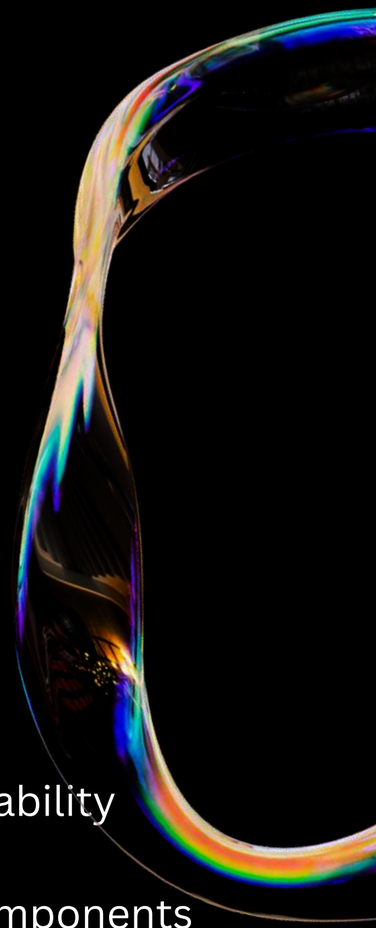
Objective: Prioritize strong R&D investments
Approach: Invest in companies with clear renewable strategies

## Market Trends

Objective: Stay ahead of regulatory changes and market trends
Approach: Continuously monitor and adjust strategies

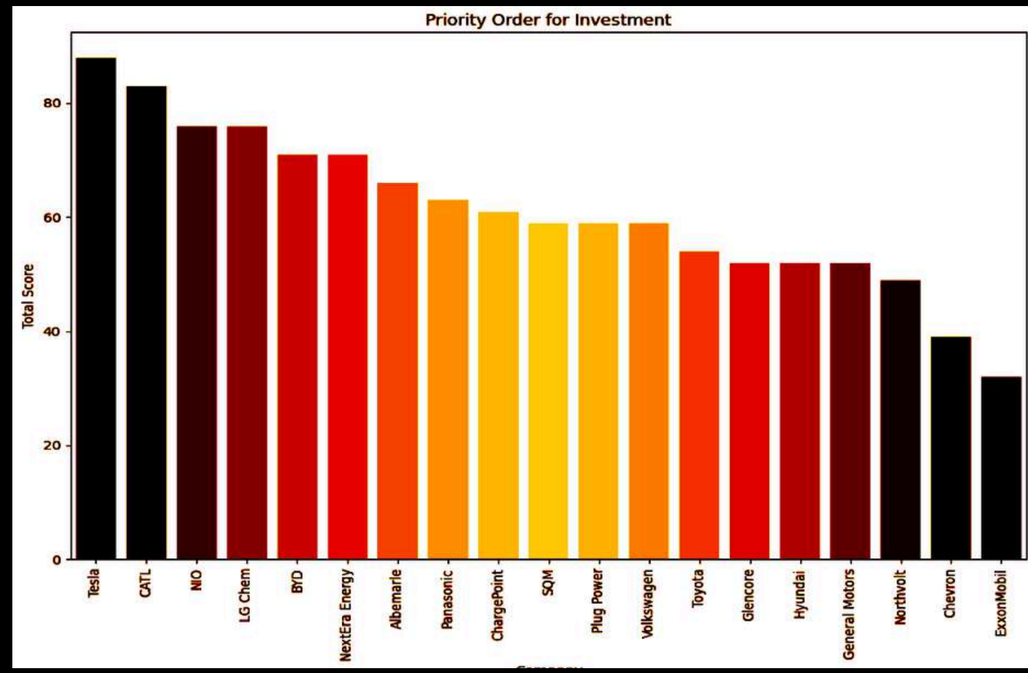
## Recommended Actions

Traditional Fuels: Maintain positions in ExxonMobil and Chevron for stability
Green Vehicles: Invest in Tesla, NIO, BYD for strong growth
Raw Materials: Focus on Albemarle, SQM, Glencore for essential EV components
Battery Tech: Invest in CATL, LG Chem, Panasonic, and Northvolt for cutting-edge technology

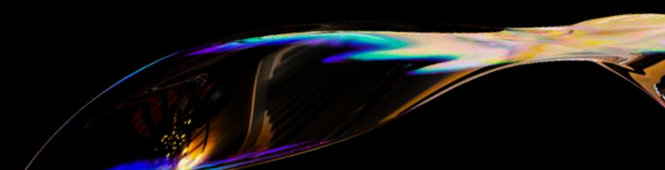


# Investment Analysis on Automobile Companies

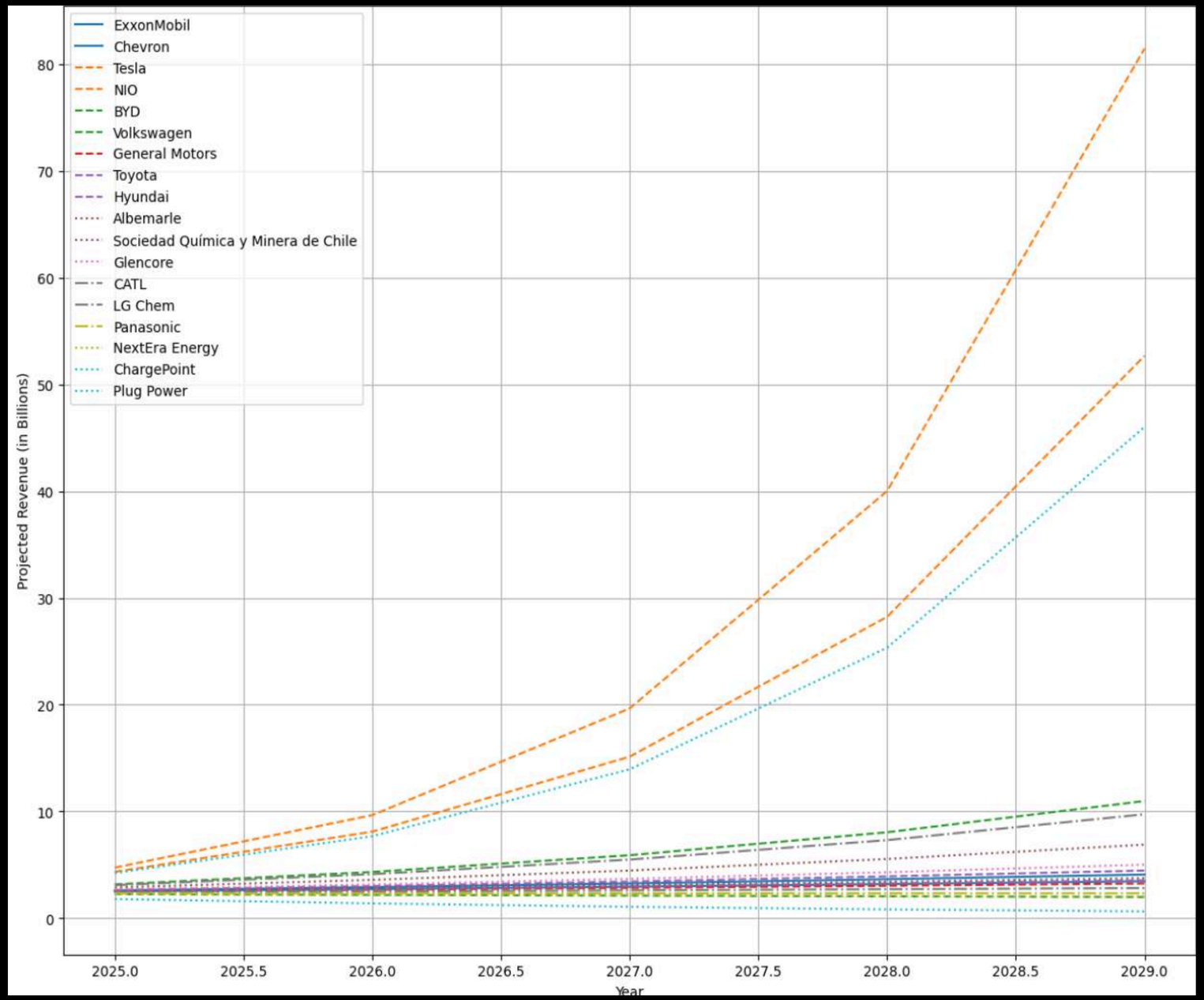
| | Stock Price Growth | Revenue Growth | Net Profit Margin | R&D Investment | Renewable/Green Tech | EV/Hybrid Market Share | Debt-to-Equity Ratio | ROE | Future Growth Projections | ESG Rating | Total Score |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ExxonMobil | 2 | 2 | 7 | 2 | 2 | 2 | 4 | 5 | 3 | 3 | 32 |
| Chevron | 3 | 3 | 6 | 3 | 3 | 3 | 5 | 5 | 4 | 4 | 39 |
| Tesla | 10 | 10 | 6 | 9 | 10 | 10 | 6 | 8 | 10 | 9 | 88 |
| NIO | 8 | 9 | 4 | 8 | 8 | 8 | 7 | 7 | 9 | 8 | 76 |
| BYD | 7 | 8 | 5 | 7 | 8 | 7 | 6 | 7 | 8 | 8 | 71 |
| Volkswagen | 6 | 5 | 5 | 6 | 7 | 7 | 5 | 6 | 6 | 6 | 59 |
| General Motors | 5 | 4 | 4 | 5 | 6 | 6 | 6 | 5 | 6 | 5 | 52 |
| Toyota | 4 | 4 | 7 | 6 | 5 | 6 | 4 | 6 | 5 | 7 | 54 |
| Hyundai | 5 | 5 | 5 | 5 | 6 | 5 | 5 | 5 | 6 | 5 | 52 |
| Albemarle | 8 | 7 | 7 | 7 | 8 | | 6 | 8 | 8 | 7 | 66 |
| SQM | 7 | 6 | 6 | 6 | 7 | | 6 | 7 | 7 | 7 | 59 |
| Glencore | 6 | 5 | 6 | 5 | 6 | | 6 | 6 | 6 | 6 | 52 |
| CATL | 9 | 9 | 7 | 9 | 9 | 9 | 6 | 8 | 9 | 8 | 83 |
| LG Chem | 8 | 8 | 7 | 8 | 8 | 8 | 6 | 7 | 8 | 8 | 76 |
| Panasonic | 6 | 5 | 6 | 7 | 7 | 7 | 5 | 6 | 7 | 7 | 63 |
| Northvolt | | | | 7 | 9 | 8 | | 8 | 9 | 8 | 49 |
| NextEra Energy | 9 | 8 | 8 | 8 | 8 | | 6 | 8 | 8 | 8 | 71 |
| ChargePoint | 7 | 8 | -8 | 8 | 8 | 8 | 7 | 6 | 9 | 8 | 61 |
| Plug Power | 8 | 8 | -10 | 8 | 8 | 8 | 6 | 7 | 8 | 8 | 59 |




Hence, we can conclude that TESLA emerges as the most promising company to bet on.



# Projected revenue 2025-2030




Last 10 year weighted mean of company's growth rates were taken into account to make an ajdjusted growth rates, on which the revenue forecast is predicted.
The highest weight was given to recent year growth rate.
The calculations are made on 2024 revenue.

NIO: 81.44 Billion USD
Tesla: 52.67 Billion USD
Plug Power: 46.01 Billion USD

will be the biggest 3 companies dominating the Automobile Industry by 2030.

# Appendix:


- Fortune Business Insights
- Mordor Intelligence
- IMARC Group
- MarketsandMarkets
- Custom Market Insights
- ResearchAndMarkets.com
- EMobility Plus
- Arizton
- CRISIL
- Verified Market Research
- TechSci Research
- GlobeNewswire
- Segmented Analysis
- Grandview Research
- Bain & Company
- LinkedIn
- U.S. Environmental Protection Agency (EPA
- U.S. Department of Energy
- China Association of Automobile Manufacturers (CAAM
- China Association of Automobile Manufacturers (CAAM
- German Federal Ministry of Transport and Digital Infrastructure
- Ministry of New and Renewable Energy, Government of India
- NITI Aayog - Government of India
- Hydrogen Council


# THANK YOU

for your time and attention

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