

New SBPT Introduction Perspectives/Scopes/Example



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1. BEV/ZEV Roadmap

2. Service Scopes

- 3. Market Framework Example Netherlands
- 4. OEM Strategy Example Toyota

BEV/ZEV Roadmap Summary (1/2)

Regulations & resulting BEV/ZEV sales shares

- By 2050, countries committed to strive for carbon-neutral economies (China by 2060). To achieve this goal, the transportation sector needs to contribute significantly by turning vehicles in operation into BEVs/ZEVs by then. Consequently, ICE & hybrid vehicle sales need to be phased-out at least 10 years ahead of time and leading to pure BEV/ZEV sales markets by 2040 at the latest (with only few exceptions).
- Europe will be in the forefront from a regulation perspective:
 - EU-wide Diesel- & Petrol-ICE phase-out by 2035 (proposal with review & postponement options 9 EU member states have asked the commission for a specific date) and average 55% CO2 emission reduction by 2030 (requiring average BEV/ZEV sales shares of >50% by 2030)
 - European countries with individual de facto ICE bans (considering type approval regulation and alternatives to hard ICE bans, such as ICE taxes, BEV incentives and selected low-emission zones respectively ICE driving restrictions) with Norway by 2025, Netherlands by 2030, Sweden by 2035, etc.
 - UK ICE ban by 2030 (with exceptions for PHEVs and potentially HEVs during a transition phase)
- · China will be only a few years behind Europe from a pure regulation perspective:
 - expected NEV sales targets of >40% by 2030, >50% by 2035 and 100% by 2050 at the latest (if OEMs will continue to offer PHEVs and HEVs until 2050, which can be doubted)
 - expected CAFC targets of average 3.2 I/100km by 2030 and 2.0 I/100km by 2035 (WLTC test cycle) will leave room for only very fuel-efficient hybrid vehicles besides NEVs
- USA is tight to SAFE rules until 2026 (although challenged). For the timeframe from 2027 onwards, IHS Markit assumes that Biden's administration will at least go back to the MPG improvement levels which were desired by Obama's administration. Furthermore, IHS Markit works with the assumption that 5 states including California will ban ICEs by 2035. These assumptions support a BEV/ZEV trend towards 25-30% by 2030 and 45-50% by 2035.

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BEV/ZEV Roadmap Summary (2/2)

OEM reactions

- Minimum BEV sales shares of >50% in Europe, >40% in China and >25% in USA by 2030 lead to questions about the remaining technology shares, the
 complexity of platforms, portfolios and powertrains, the required investments to become successful with BEVs and the perspective of the financial markets to
 support these investments.
- Consequently, the tipping point for decisions towards an accelerated BEV roadmap or even a full BEV switch arrived in the board rooms of OEMs with big sales footprints in regulated markets. Jaguar, Opel, Fiat, Volvo, Mini, Bentley and Ford Europe announced ambitions to become BEV brands by 2030 (or earlier). Other brands strive to make BEVs the major propulsion system by then, such as Renault (90%), Porsche (80%), VW Europe (70%), Land Rover (60%), BMW (50%), Kia Europe (50%). BEV related announcements for 2035 seem to be self-evident in this context, such as GM's.
- OEMs with big sales footprints in less or non-regulated markets are yet hesitant to make the BEV move. While a big player like Toyota at least follows the electrification trend with a certain distance to the electrification leaders, RoW players like Suzuki, Isuzu, etc. might remain left in an uncertain ICE world.

Market & customer readiness

- Regulations enforce the move towards BEVs/ZEVs, OEMs plan according to or even beyond regulation compliance, but markets and customers need to be ready by the same time. Due to incentives, BEV price levels match the ones of ICEs and hybrid vehicles to great extend already today. IHS Markit expects that BEV prices will not be an obstacle by 2030, even if run-out incentives need to be compensated by BEV cost reductions. BEV ranges increase continuously and are at the edge of not being a restriction in most use cases. The coming decade will be time enough to overcome customers' range anxieties. The overall package with greater interior spaces, enjoyable driving performance, new software and applications will add to BEV's appeal to customers.
- Power grids and charging infrastructures are the key remaining and questionable factor in this context market by market. While an ambitious but feasible development path can be foreseen in China and USA, European markets face severe obstacles to support a regulation compliant electrification trend.

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Service Scopes

The sales-based powertrain forecast is available for 11 markets and 2 other regions with focus on vehicle electrification (scope 1) or with powertrain details (additional scope 2).

Deliveries	Forecast S	Forecast Specifications		Market Coverage		
Forecast explanations	Scope 1	Additional scope 2		Americas	Europe	Asia
 Forecasts are delivered together with the following background information as well as with complementary expert discussions via online video meeting. Market framework OEM strategy assessments OEM regulation compliance assessments BEV price and range positioning Charging infrastructure assessments (USA and China) Forecast data Timeframe 2021-2033 (current + 12 years) 	Vehicle OEM Brand Nodel Segment Body type Platform Program SOS EOS Powertrain Fuel type Alternative propulsion system	Engine Platform Program Cylinders Displacement Power (kW) Torque (Nm) Aspiration Fuel system Cylinder deactivation (yes/no) Valve actuation 48V (yes/no) Px definition Transmission Design Forward speeds Driveline Battery Battery capacity Battery type		 USA (Canada upon request) 	 UK Germany France Italy Spain Norway Netherlands Sweden Other EU 	 China Other World

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Netherlands | Summary | Topline Framework

Framework Factor	IHS Markit Premises 2021	Effect on Topline Trend
Politics & Legislation	 Prime Minister Mark Rutte's centrist four-party government stepped down in full on 15 January 2021 after a parliamentary investigation regarding welfare benefits for families The outgoing government will continue as a caretaker administration until the already-scheduled 17 March election. The slightly premature end to the regular administrative term appears to be mainly a symbolic political gesture. It is unlikely to change significantly the overall political dynamics and parties' prospects in the upcoming vote. The March 2021 election is likely to result in multi-party coalition government. Despite the currently heightened levels of political fragmentation and instability, a negative impact on the Netherlands' investment environment seems highly unlikely 	202520302035TrendImage: Constraint of the second seco
Economics	 Dutch economy among the best performers in Western Europe in 2020, with GDP in third quarter down by just 2.9% compared with fourth quarter 2019 Despite the expected elevated public deficits in 2020–21, Dutch government finances are in a healthy position to absorb the shock. Public debt at the end of 2019 declined to less than 50% of GDP, the lowest since 2007. The new EU-UK trade deal, agreed in December, is very thin, causing friction to trade. The UK is among the most important bilateral trade partners for the Netherlands. 	2025 2030 2035 Trend ⊘ ⊖ ⊖ Change ⊗ ⊘ ⊖
Society & Mobility	 Dutch population has grown from 15 million in 1990 to above 17 million in 2019, but growth rates began to slow already. After peaking in the late 2030'ies, the population is expected to decline Younger and middle-aged population groups are shrinking, a knock-on effect for driving licenses can be expected Dutch population is highly urbanized (urbanization rate above 90%) Home office became standard amid COVID-19, and this trend might perpetuate High acceptance of alternative and public transportation (only temporary setback due to COVID-19) 	2025 2030 2035 Trend $\bigcirc \bigcirc \bigcirc \bigcirc$ Change $\bigcirc \bigcirc \bigcirc \bigcirc$
Automotive Market Structure	 Due to low market entry price, B and C Segment models dominate the market. Used car sales reached a remarkable level (~ 2 m), competing against the entry sector of the new car market VW remains market leader. Increased competition, with Kia challenging established European brands. Vivid company car market, with clear focus on electrification (Diesel share already negligible). Private leasing becoming popular in the lower segments. Openness for new players like MG or Polestar. 	

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Netherlands | Summary | Electrification Framework

Framework Factor	IHS Markit Premises 2021	Effect on xEV Trend
Bonus / Incentive	 Zero emission vehicles are profiting from lower taxes with notable impact on xEV shares. Exemptions for ZEVs for both registration tax (BPM) and yearly road tax (MRB) . PHEVs have lost their previous advantage CO2-related taxation on non-cash benefit on privately used (>500km per year) company cars (bijtelling). Simplified to two categories: zero emission vehicles and all others. Volatile dynamics due to regular adjustments of Tax framework for company cars (tax rate and price threshold for lower tax category revised multiple times). Subsidy programs for new and used private EVs started in 2020 (max. grant of €4,000). Budget not capable to keep up with applications. 	$\begin{array}{c c} 2025 & 2030 & 2035 \\ \hline BEV & \textcircled{\scalese} & \sca$
Malus / Taxation	 Very high taxes and a CO2 reactive anti-diesel tax system remain a burden for cars with conventional propulsion design. Especially Diesel cars suffered from Dutch Malus system, and the Diesel share dropped from around 30% in 2015 to just 4% in 2020 Registration tax based on WLTP-related CO2 values from mid-2020, brackets were adjusted to avoid a technical tax increase. Rising BPM tax burden especially for ICE models in lower segments, caused by adjustments in the lower tax brackets. Pressure will remain high for the A-Segment in particular Strong correlation between company car tax rules and demand patterns, especially fuel type choices 	2025 2030 2035 BEV Ø Ø Ø PHEV Ø ⊖ Ø HEV ⊖ ⊖ Ø
Restriction / Quota / Ban	 Netherlands have set 2030 as the targeted milestone for new passenger cars to become ZEV only. PHEVs have lost most of their previous advantages, no future support expected Detailed measures to reach the climate goals are coordinated by the climate council klimaatakkoord Amsterdam city government developed a Clean Air Action Plan, aiming at emission-free traffic by 2030 From 2025, 30 – 40 Dutch municipalities are expected to introduce zero emission zones for city logistics 	2025 2030 2035 BEV Ø Ø Ø PHEV Ø Ø Ø HEV Ø Ø
Charging Infrastructure	 Netherlands deemed to be front runner in development and roll out of charging infrastructure In addition to private/home charging, residents can request free public charging stations in various provinces and municipalities The Netherlands are equipped with a comparably dense EV charging network, with more than 64,000 charging points already in place (2,428 fast charging points (>22kW)) Current density of public charge infrastructure: ~ 4 xEVs per public charging point Dutch Government granted €5 million for investments bi-directional charging network (V2G) for EVs 	2025 2030 2035 BEV Ø Ø Ø PHEV Ø Ø Ø HEV ⊖ ⊖ ⊖

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Netherlands | Summary | Forecast Trends & Adjustments



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Toyota | Strategy Summary

- Toyota commits to a 2050 carbon-neutral plan with its 2050 "Beyond Zero Challenge" and the goal of reducing CO2 emissions 90% by 2050 from where they were in 2010.
- The company is very clear that it wants to pursue a multi- technology propulsion strategy taking into consideration different customers and regional ٠ conditions. The conviction prevails that the customer still choses his vehicle of choice – while other OEMs increasingly steer their offerings toward the regulatory market framework.
- By 2025, Toyota targets 40% of new vehicle sales to be electrified models, and by 2030 expects that to increase to nearly 70%. Toyota target 1 million zero emission vehicle sales by 2025 (previously 2030). Dedicated bZ model rollout.
- The emphasis is on a roll-out of their **full-hybrid** tech increasingly as a **cost optimized** • standard application. HEVs are seen as the most effective way to reduce emissions at a large scale. On top, and where necessary comes a PHEV offering which is technically related to the HEV system, thus enabling (cost) synergies.
- Despite continued caution about short-to mid-term BEV adoption, Toyota is developing a dedicated BEV platform GA-E.

"Just as there are differences for each customer's preferences, the energy conditions in each area of the world differ, and so by having a menu with different vehicle electrification options, we believe we have a better chance at being chosen by the customer." Akio Toyoda – Toyota CEO 11.2020

- In-house solid-state battery development as the key lever to shape Toyota's perspective on EVs. It sees downsides with current li-ion technology to be a suitable option to scale and to guarantee customer satisfaction. However, affordable solid-state battery only expected post 2030, which shapes the company's propulsion system adoption curve.
- Toyota made the decision to follow the CASE strategy like many other OEMs. When it comes to autonomous driving, based on the concept of "Teammate," Toyota's primary focus is on how well it can support the driver and secure their safety. Toyota purchased Lyft's autonomous driving unit via its Woven Planet subsidiary to speed up development.
- Woven CORE and Woven Alpha create new business opportunities by focusing on a 'software-first' development process and software-defined ٠ architecture.



	Regional Focus		
Market Strategy	 Status Quo The group is present in all key market around the world. Toyota sells around 60% of global volumes in emission regulated markets, but 		
DAIHATSU	 also has a strong footprint in emerging markets. Outlook → The group is expected to remain in its current regions. Major volume growth is expected from China and South Asia, meaning product decisions will be shaped accordingly. → JV with BYD in China to develop BEVs and batteries for the market together → Expectation that Toyota will stay committed to the European market although the necessary BEV push does not fit Toyota's global powertrain aspirations 		
	Segment Focus		
Victe	 Status Quo Toyota as a group covers most vehicle segment and body types with a broad product offering across its brands. Outlook Toyota will remain in its core segments. However, an up-market development 		
Regional Global	can be expected with the new "Century Class" – range topping SUV. Furthermore, reset of Crown sub-brand to a new Crossover positioning. On the lower product range, Toyota begins to tackle opportunities with an all- new city-mover concept like the C+Pod.		

Market Strategy Status Quo and Outlook

Toyota | Market Strategy

Worldwide vehicle footprint – leadership in Japan and ASEAN regions

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Toyota | Brand & Product Strategy



	Brand Positioning	Strategic Outlook	Main Product Impact
Luxury		 Very limited presence in the luxury market with the Century sub-brand / vehicle. 	 Only one offering. Japanese Niche prestige project to continue, product yet without considerable volume impact New future SUV type luxury variant will be available
Premium	Niche offerings for	 Lexus to remain the leading premium brand of the group. Toyota Crown as a premium sub-brand of Toyota, below Lexus 	 Lexus to widen its offering with a small B-Segment SUV Lexus will offer dedicated BEV offerings, starting with a C-Segment SUV. PHEVs will be added to the line-up. Crown's traditional sedan bodytype to end, and instead to have SUV bodytype variant, "Crown Cross" to arrive in the future
Volume	GR as Sporty Toyota sub-brand CORR ASian markets bz as BEV Toyota sub-brand Down	 Toyota is putting increasing emphasis on its efforts to be an environmentally and socially responsible company, in line with changing consumer attitudes. Accelerating efforts in the EV space in which it has little presence for now 	 7 bZ branded BEVs announced by 2025 Focusing on popular SUV bodytype offerings Intending to look beyond the conventional vehicle ownership model for revenue generation to new types of ownership. Mobility services to meet the diversifying needs of customers, who are increasingly changing from car ownership to car use.
Entry	DAIHATSU	 Daihatsu to remain the entry level brand focusing on affordable vehicles and smaller segments. 	 Toyota's small-car division, which competes mainly with Suzuki and Honda in Japan and some markets in South Asia. Daihatsu catering to the mini-vehicle and small-car markets DNGA (Daihatsu New Global Architecture) will develop multiple models simultaneously to boost the number of common parts, helping lower costs and freeing up resources that could be shifted to pursuing varying regional/local needs.

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Toyota | Strategy Outlook





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Source: Toyota investor communication



Toyota | Platform Strategy



Complex platform architecture with older architectures running in parallel to new ones in different regions – new dedicated EV platforms to be launched



Platform Share of 2020 production

BEV only

Toyota | USP Areas



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▲ Positive ► Neutral ▼ Negative

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Toyota | Challenge Areas







Any questions, please email Automotive @ihsmarkit.com AsiaPacificAutomotive@ihsmarkit.com