

# PENDEKATAN JKR KE ARAH PENGUNAAN KENDERAAN DAN JENTERA PEMBINAAN ELEKTRIK.

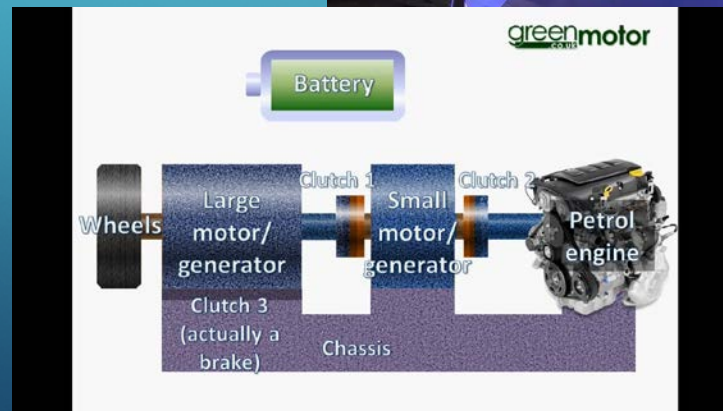
DI KETUAI OLEH :

BAH. PEMBANGUNAN KUARI & PENGURUSAN ASET :

1. IR ZULKIFLI B. AHMAD
2. CHE HASHIM B. AWANG
3. IR ELMEIZAL B. JAMALUDIN

JKR WOSYOP PERSEKUTUAN :

1. IR AZMAN B. ILYAS



1 engine, 2 motors,  
3 clutches, lots of batteries...



# LATAR BELAKANG

Jabatan Kerja Raya (JKR) Malaysia melalui Woksyop Cawangan Kejuruteraan Mekanikal (WCKM) adalah agensi teknikal yang mempunyai kepakaran dalam kerja-kerja penyenggaraan aset kerajaan seperti kenderaan dan jentera berat.

WCKM juga bertanggungjawab membekalkan kenderaan dan jentera berat dalam operasi harian jabatan dan juga misi bencana.

Mengambil kira perkembangan industri automotif yang semakin dinamik, Dasar Automotif Nasional (NAP) 2014 telah menekankan supaya perkembangan industri automotif di Malaysia adalah selari dengan arah aliran teknologi masa hadapan dan menggalakkan pelaburan ke dalam teknologi automotif hijau seperti penggunaan Kenderaan Elektrik.

The background is a dark blue gradient. In the four corners, there are decorative white line-art patterns resembling circuit traces or fiber optic paths, with small circles at the end of the lines.

# **Maklumat Ringkas Berkenaan Aktiviti Terkini Penyediaan Kertas Putih**

## **Penggunaan Kenderaan & Jentera Elektrik Dalam Industri Pembinaan**

## MAKLUMBALAS DARIPADA MESYUARAT DAN PERBINCANGAN YANG TELAH DILAKSANAKAN

**Mesyuarat Kumpulan  
Pakar  
Jentera Dan Automotif  
Menggunakan Elektrik  
Bil. 1/2018 Pada 8hb.  
Februari 2018.**

**Bertujuan membincangkan dan mendapatkan maklumat berkenaan :**

Perkembangan Penggunaan "*Energy Efficient Vehicle*" (EEV) daripada beberapa agensi kerajaan antaranya :

UTEM – Memberi input write-up tentang kajian yang university telah lakukan berkaitan R&D kenderaan EEV/EV

JPJ – Memberi input tentang akta baru berkaitan kenderaan EV di Malaysia (Safety Act/Authority Autopilot)

KeTTHA / GreenTech Malaysia – Maklumat berkaitan polisi "*Low Carbon Mobility*" (LCM)

**Mesyuarat Bersama  
Pihak  
MiTi Dan Mai Pada 2hb.  
Mac 2018**

**Bertujuan mendapatkan pandangan daripada MiTi dan MAI(Malaysian Automotif Institute) dimana “JKR Ke Arah Penggunaan Kenderaan Elektrik”**

**Malaysian Automotif Institute(MAI)**

Pihak MAI berpandangan melalui kajiannya, bahawa penggunaan kenderaan elektrik secara global akan berlaku pada tahun 2040. Berdasarkan laporan daripada OPEC, pengeluaran minyak akan menurun pada 2040 dan dijangkakan wujud infrastruktur yang lengkap bagi penggunaan *BEV(Battery Electric Vehicle)*.

Dijangkakan evolusi penggunaan “*Energy Efficient Vehicle*” adalah berperingkat – peringkat bermula daripada *ICE( Internal Combustion Engine)* ke *Hybrid Electric Vehicle (HEV)* dan penggunaan *PHEV(Plug In Hybrid Electric Vehicle)* dijangka dari tahun 2020 sehingga ke tahun 2030. Selepas tahun 2040 dijangka BEV akan digunakan sepenuhnya secara global dimana pada masa ini infrastruktur-infrastruktur telah lengkap.

Malaysia tidak boleh mengikut beberapa negara maju seperti di eropah yang telah menggunakan kenderaan – kenderaan elektrik dimana beberapa faktor perlu diambil kira seperti pengeluaran minyak oleh Petronas dan pengeluaran kenderaan oleh Proton dan Perodua.

Pihak MAI juga berpandangan akan wujud teknologi-teknologi baru yang wujud selari dengan perkembangan “*Energy Efficient Vehicle*” seperti jalan-jalan raya yang bersesuaian bagi laluan kenderaan – kenderaan elektrik, “*Charging Station*”, “*Battery*” dan sebagainya

### **MiTi**

Pihak MiTi juga berpendapat akan merujuk kepada evolusi atau perkembangan “*Energy Efficient Vehicle*” daripada *HEV* sehinggalah ke peringkat *BEV* dimana infrastruktur yang berkenaan telah lengkap sepenuhnya. Pihak MiTi juga menjelaskan tiada lagi “*Time – Line*” atau perancangan ke arah penggunaan kenderaan elektrik secara menyeluruh.

**Mesyuarat  
Kumpulan Pakar  
Jentera Dan  
Automotif  
Menggunakan  
Elektrik Bil.  
2/2018 Pada 8hb.  
Mac  
2018**

### **Malaysian Green Technologies**

Pihak Green Tech. memaklumkan sebanyak 234 stesen pengecas telah dipasang dan terdapat sebanyak 800 ++ EV berdaftar di Malaysia. Merujuk kepada “*National Electric Mobility Blueprint*” Green Tech. yang merupakan agensi KeTTHA menasarkkan sebanyak 100,000 kenderaan elektrik menjelang tahun 2020. Pihak Green Tech. juga menyediakan khidmat perunding dari segi penyediaan spesifikasi dan jenis EV dalam urusan jual dan beli EV. Tiada khidmat perunding dari segi penyelenggaraan dan baik pulih EV.

Satu seminar bagi menyemak semula TOR bagi “*Low Carbon Mobility*” akan diadakan dan dijemput Ir Zulkifli Ahmad untuk menyertainya.

### **Jabatan Pengangkutan Jalan**

- Pihak JPJ memaklumkan bahawa draf Dasar Pengangkutan Negara 2018 – 2030 dalam peringkat pembangunan oleh pihak Kementerian Pengangkutan Malaysia.

**Mesyuarat  
Dalam  
Kumpulan  
Kenderaan Cepak  
Tenaga (EEV)  
Bil. 1/2018 Pada  
16hb.  
Mac 2018.**

**Makluman status terkini kepada ahli EEV  
Daripada Bah. Pembangunan Kuari Dan Pengurusan Aset,  
Unit Inovasi Dan Penyelidikan Dan JKR Woksyop  
Persekutuan.**

The background is a blue gradient with white circuit board patterns in the corners. The top-left and bottom-left corners feature a dense network of lines and nodes. The top-right and bottom-right corners feature a sparser network of lines and nodes.

# **SENARIO KENDERAAN ELEKTRIK DI MALAYSIA**

**Kementerian Tenaga, Teknologi Hijau Dan Air (KeTTHA)** melalui agensinya *Green Tech.* menyasarkan lebih daripada 200,000 kenderaan elektrik digunakan di Malaysia menjelang tahun 2030 dibawah pelan induknya untuk mengurangkan pencemaran udara.

*“Malaysian Green Technology Corporation”* telah menerbitkan *“National Electric Mobility Blueprint”* yang menyasarkan pada tahun 2020 penggunaan :

- 100,000 kereta elektrik
- 100,000 motosikal elektrik
- 2,000 bas elektrik
- 125,000 stesen pengecas

The infographic features a green and white color scheme with the title 'NATIONAL ELECTRIC MOBILITY BLUEPRINT' in bold green letters. Below the title, it states 'Positioning Malaysia as the 'Electric Mobility Marketplace'' and 'Malaysian Green Technology Corporation'. A central red circle lists targets for 2020: 100,000 electric cars, 100,000 electric motorcycles, 2,000 electric buses, and 125,000 charging stations. The background includes images of the Malaysian flag, a power line tower, and a blue electric car. On the left, there are partial statistics: '1.7 mil', 'by 25%', 'y 2020', 'h:', 'vestment', 'om', 'dition', 'y 69%', '64%', 'cities'. On the right, there are sections for 'ENERGY SUP' and 'ELECTRIC MOE' with bullet points: 'Increasing effi...', 'sources by 100...', 'fuel to electrici...', 'Improve electr...', 'through off-pe...', 'usage', 'Pioneering larg...', 'batteries for er...', '(second life)', 'Enhance local r...', 'eler...', 's', 'Pro...', 'aw n', 'gro...', 'lob'.

Government incentives for plug-in electric vehicles



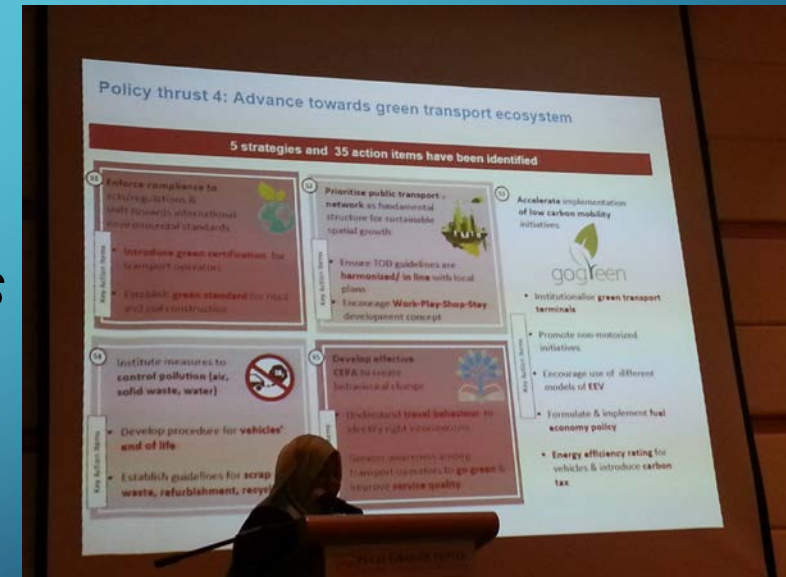
The screenshot shows a mobile news article with a status bar at the top displaying signal strength, Wi-Fi, 53% battery, and 1:20 PM. The article title is 'Plan targets to make Malaysia marketing hub for EVs by 2030'. The sub-headline reads 'Malaysia expected to become the marketing hub for electric vehicles (EVs) by 2030, which is the country's main target under the National Electric Mobility Blueprint (EMB)'. The main heading is 'ELECTRIC MOBILITY BLUEPRINT' followed by 'Plan targets to make Malaysia marketing hub for EVs by 2030'. The text includes a quote from Johor Baru: 'Malaysia is expected to become the marketing hub for electric vehicles (EVs) by 2030, which is the country's main target under the National Electric Mobility Blueprint (EMB). Energy, Green Technology and Water Ministry secretary-general Datuk Seri Dr Zaini Ujang said the plan focused on three main sectors, namely EV development for transport and private ownership, EV ecosystem and EV economy. "EMB is part of the government's efforts to introduce EVs to replace diesel or petrol (vehicles) to reduce dependency on fossil fuel as well as greenhouse gas emission," he said during his speech at Universiti Teknologi Malaysia, Skudai, near here, yesterday. "It is also aimed at making Malaysia the marketing hub for electric vehicles, with a target of 100,000 electric cars, 125,000 charging stations, 2,000 buses and 100,000 motorcycles on the road by 2030, and indirectly reduce carbon dioxide emission in the transportation sector." Bernama'. The source is cited as 'Source: Bernama' and the post date is 'Posted on : 15 August 2017'. A red arrow icon is visible in the bottom right corner.

# KEMENTERIAN PENGANGKUTAN MALAYSIA

KPM dalam peringkat pembangunan polisi “ **Green Transport Ecosystem**” yang termaktub Dalam **Draf Dasar Pengangkutan Negara 2018 – 2030**.

Diantara kandungannya ialah :

- *Introduce green certification for transport operators*
- *Establish green standard for road construction*
- *Develop procedure for vehicle end of life*



*- Accelerate implementation of low carbon mobility initiatives*

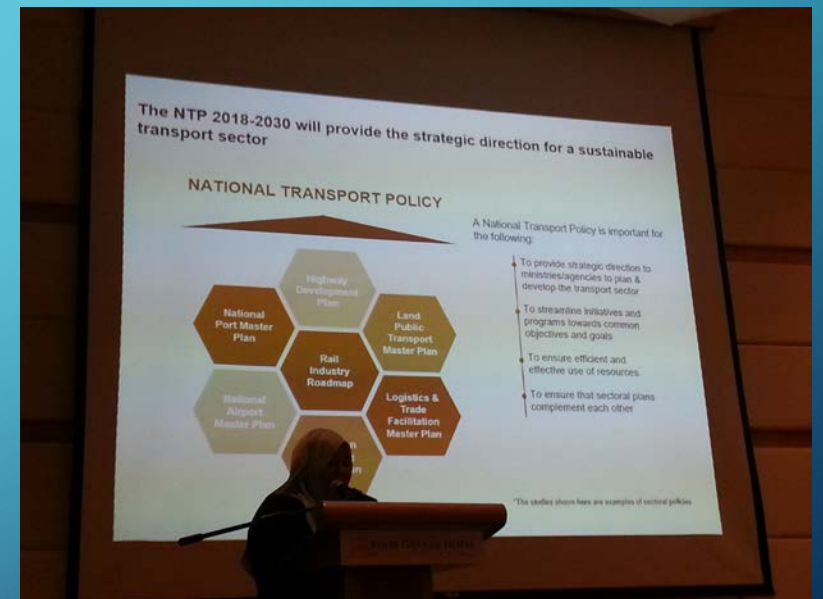
*- Institutionalise green transport terminals*

*- Promote non motorized initiatives*

*- Encourage use of different models of EEV*

*- Formulate & Implement fuel economy policy*

*- Energy efficiency rating for vehicle & introduce Carbon Tax.*



Bengkel TOR Bagi Pembangunan “ Low carbon Mobility Blueprint”

**The National Highway Traffic Safety Administration** adopted the Society of Automotive Engineers' levels for automated driving systems, ranging from complete driver control to full autonomy.

**Level 0 (No Automation) :**

Drivers are the only ones behind the wheel of these vehicles. No operational functions are automated, leaving the operator fully responsible for complete and sole control of brake, steering, throttle, and motive power at all times

**Level 1 (Driver Assistant Required) :**

This driver-assistance level means that most functions are still controlled by the driver, but a specific function (like steering or accelerating) can be done automatically by the car.

**Level 2 ( Partial Automation Options Available ) :**

*A vehicle has at least two primary control functions that work together, such as adaptive cruise control in combination with lane centering.*

**Level 3 ( Conditional Automation ) :**

*Drivers can elect — but don't have to — to turn over control of all safety-critical functions under certain traffic or environmental conditions. However, drivers can't completely check-out; they're expected to be available for occasional control.*

#### **Level 4 ( High Automation) :**

*This is what is meant by "fully autonomous." Level 4 vehicles are "designed to perform all safety-critical driving functions and monitor roadway conditions for an entire trip." However, it's important to note that this is limited to the "operational design domain (ODD)" of the vehicle—meaning it does not cover every driving scenario.*

#### **Level 5 ( Full Self-Driving Automation) :**

*The car that can handle all driving tasks and go anywhere. No human, no steering wheel, no pedals. Climb in, tell it where you want to go (if it doesn't already know from reading your calendar), and get back to looking at your phone.*

## **INSENTIF KERAJAAN**

Insentif yang diberikan adalah pengecualian 100% duti import kepada pemegang francais kereta hibrid dan pengecualian 100% duti eksais ke atas kereta hibrid CBU baru. Dengan adanya insentif ini, Kerajaan mensasarkan harga jualan kenderaan elektrik dan hibrid akan mampu dibeli oleh segenap lapisan masyarakat.

## CADANGAN :

1. Harga BEV tidak melebihi RM 80,000.00 sebuah dan 5 tahun waranti dari pengeluar.
2. Rebate diberikan untuk 200,000 BEV yang pertama sehingga tahun 2025
3. Cukai import untuk "*Spare-Part*" BEV dimansuhkan.
4. Insentif dari pihak kerajaan berkaitan pemasangan "*Super Charger*" di rumah – rumah bagi pemilik BEV.

BIL.	AGENSI	PERANAN / TUGAS
1.	<p><b>Ministry Of International Trade And Industry (MITI)</b></p> <p><b>Agensi :</b> Malaysia Automotif Institution(MAI)</p>	<p>Merancang, menggubal dan melaksanakan dasar-dasar pelaburan, pembangunan perindustrian dan perdagangan luar Negara.</p> <p>Berperanan untuk mendapatkan maklumat dari segi teknologi, strategi pemasaran dan sebagainya dalam industry automotif.</p>
2.	<p><b>Kementerian Pengangkutan Malaysia(KPM)</b></p> <p><b>Agensi :</b> Jabatan Pengangkutan Jalan(JPJ)</p>	<p>Membangunkan, merancang dan menggubal dasar – dasar yang berkaitan dengan sistem pengangkutan di Malaysia.</p> <p>Melaksanakan dasar – dasar serta akta-akta yang telah ditetapkan oleh KPM</p>
3.	<p><b>Kementerian Tenaga, Teknologi Hijau Dan Air(KeTTHA)</b></p> <p><b>Agensi :</b> Green Technology Corporation</p>	<p>Memastikan pelaksanaan dasar-dasar pembangunan industri tenaga, air dan teknologi hijau secara berkesan</p> <p>Melaksanakan pelaksanaan dasar – dasar oleh KeTTHA</p>
4.	<p><b>Universiti Teknikal Malaysia Melaka(UTeM)</b></p>	<p>Memberi latihan dalam penyediaan tenaga pakar.</p>
5.	<p><b>Proton / Perodua</b></p>	<p>Pengeluaran Kenderaan</p>

The background is a blue gradient with white circuit-like lines in the corners. The lines are composed of straight segments and small circles, resembling a printed circuit board or a network diagram. They are located in the top-left, top-right, bottom-left, and bottom-right corners.

# **Perancangan Aktiviti Dan Peranan JKR Ke Arah Penggunaan Kenderaan Elektrik Dalam Industri Pembinaan**

# PERANAN JKR ADALAH SEBAGAI *AGENSI TEKNIKAL KE ARAH PENGGUNAAN & PENYELENGGARAAN KENDERAAN ELEKTRIK (EEV /EV).*

## Perancangan :

JUN 2018



### 1. PENGUMPULAN MAKLUMAT :

Agensi –Agensi Kerajaan Yang Berkaitan :

- MiTi
- MAI
- KeTTHA
- GreenTech.
- JPJ
- UTEM
- Perodua/Proton

### 2. ANALISA MAKLUMAT :

- Penyediaan Kertas Putih
- Pembentangan Kertas Putih
- Penerimaan Maklumbalas
- Pemurnian Kertas Kerja

PK CKM - KP - KSU

### 3. PERSEDIAAN

- Kemudahan infrastruktur yang memenuhi piawaian antarabangsa untuk kerja-kerja penyelenggaraan
- Tenaga kerja yang bersesuaian dan kompeten untuk kerja-kerja penyelenggaraan
- Kemudahan untuk mendapatkan alat ganti dan harga yang berpatutan
- Mendapat kemudahan latihan secara berterusan bersesuaian dengan peredaran teknologi semasa.
- Pembangunan SOP dalam penyelenggaraan kenderaan elektrik.

## **PERUBAHAN JKR WOKSYOP :**

**JKR woksyop merupakan sebuah jabatan di bawah Cawangan Kejuruteraan Mekanikal yang dilengkapi dengan peralatan dan kakitangan mahir dalam bidang automotif. Antara fungsi JKR Woksyop adalah menyelenggara, membaiki dan melupuskan kenderaan – kenderaan kerajaan.**

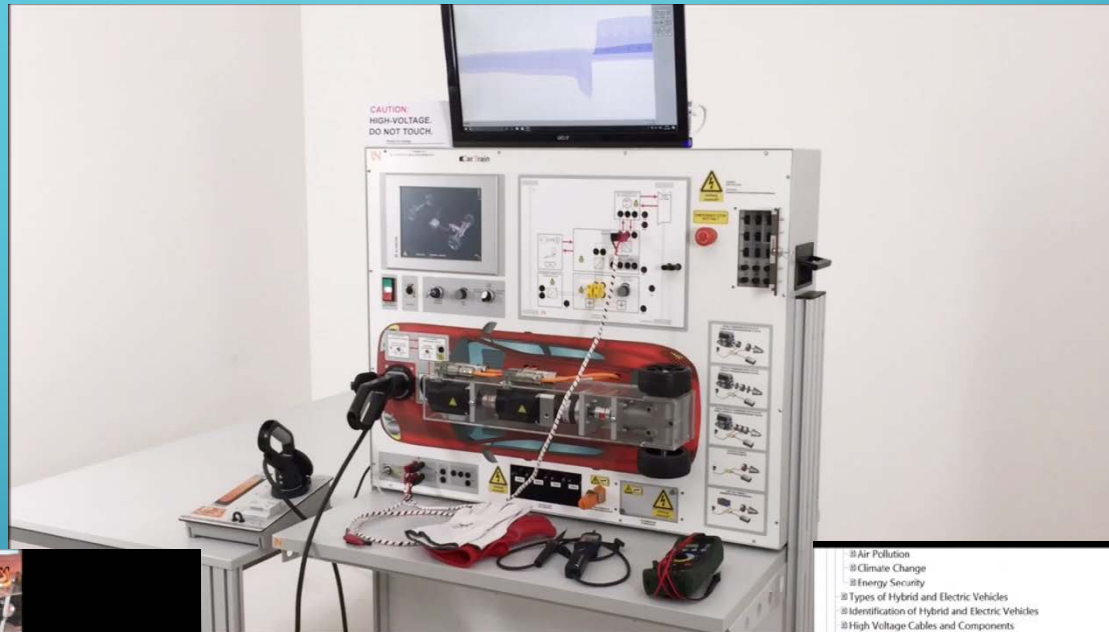
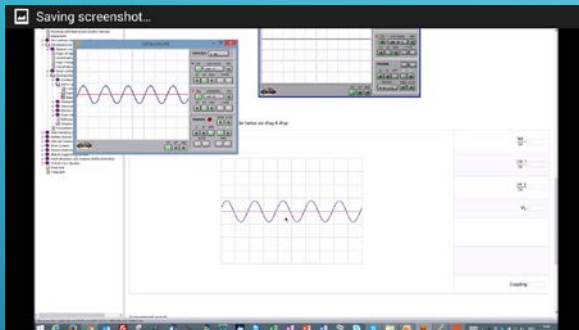
**Memandangkan JKR ke arah penggunaan kenderaan elektrik, JKR Woksyop dalam peringkat persediaan sebagai sebuah fasiliti untuk menyelenggara serta membaiki kenderaan – kenderaan elektrik.**

**Perubahan kemudahan infrastruktur serta perubahan kelengkapan peralatan penyelenggaraan yang terkini dan juga tenaga kerja yang kompeten serta terlatih amatlah diperlukan dalam menuju era penggunaan kenderaan elektrik.**

# DIAGNOSTIC TOOLS For HEV and BEV drive type.

To measuring and testing equipment such as oscilloscope, insulation tester, voltage tester and also visualization of energy flows.

To creates a culture of safety



Real charging included

- ▣ Air Pollution
- ▣ Climate Change
- ▣ Energy Security
- ▣ Types of Hybrid and Electric Vehicles
- ▣ Identification of Hybrid and Electric Vehicles
- ▣ High Voltage Cables and Components
- ▣ Classification of Hybrid and Electric Vehicles
- ▣ Drive configurations
  - ▣ Micro-hybrid system
  - ▣ Mild-hybrid system
  - ▣ Strong/Full hybrid system
  - ▣ Electric vehicle
  - ▣ Fuel cell vehicle
- ▣ Chapter Quiz
- ▣ Driving Modes of Hybrid and Electric Vehicles
  - ▣ Combustion engine
  - ▣ Series hybrid
  - ▣ Parallel hybrid
  - ▣ Series/parallel hybrid
  - ▣ Electric Vehicle
  - ▣ Fuel Cell Vehicle
  - ▣ Differences between hybrid and electric vehicles
- ▣ Chapter Quiz
- ▣ Precautions for Servicing
  - ▣ Safe Handling of High Voltage Systems
  - ▣ Hazards posed by Alternating Current
  - ▣ Intrinsic Safety of Vehicle High Voltage Systems
  - ▣ Typical Voltage Levels
  - ▣ Dangers of High Voltage
    - ▣ Current paths Through the Human Body



CarTrain Course  
Hybrid/Electric Vehicles Specialist



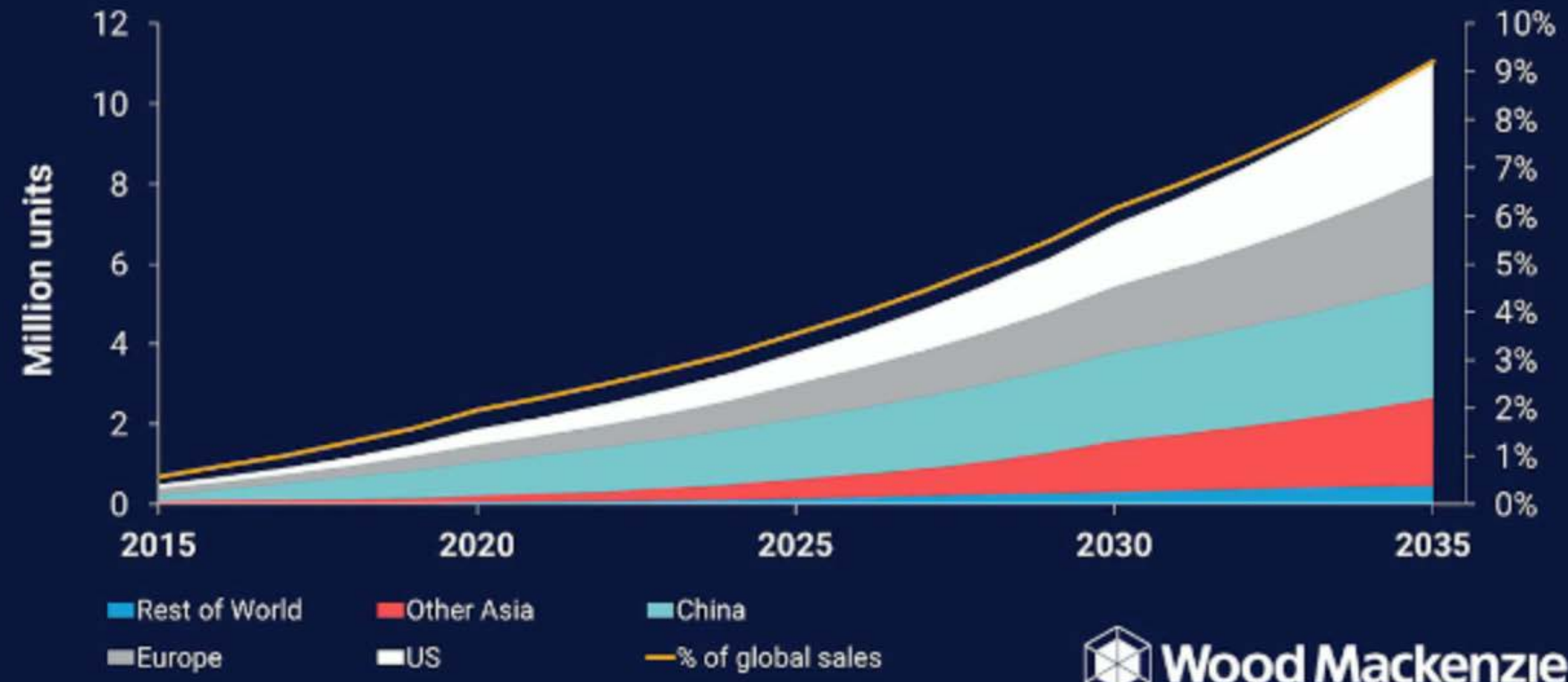
Course No. Version 1.0/08

# BILANGAN KENDERAAN JKR MILIK PERSEKUTUAN

JENIS KENDERAAN DAN LOJI	JUMLAH KENDERAAN DAN LOJI JKR
<b>KENDERAAN PENUMPANG</b>	
4WD	498
BAS MINI	2
BAS PENUMPANG	1
BOT LAJU	1
MOTOSIKAL 2 RODA	1
MPV	3
SALOON CAR	3
VAN	33
<b>LORI DAN KENDERAAN PENUMPANG</b>	
LORI 1 TON	141
LORI 3 TON	86
LORI (5 TON KEATAS)	51
LOW LOADER	9
MOBILE CRANE	2
PICK UP	48
TIPPER	155
TOW TRUCK	10
<b>JENTERA PEMBINAAN</b>	
AGRICULTURE TRACTOR	52
BACKHOE LOADER	88
COMPACTOR	3
DOZER	11
DUMPER	5
EXCAVATOR	2
MOTOR GRADER	86
ROAD PAVER	2
ROLLER	59
SHOVEL	97
<b>JUMLAH</b>	<b>1450</b>

# ANALISA DAN RAMALAN PENGGUNAAN KENDERAAN ELEKTRIK DUNIA

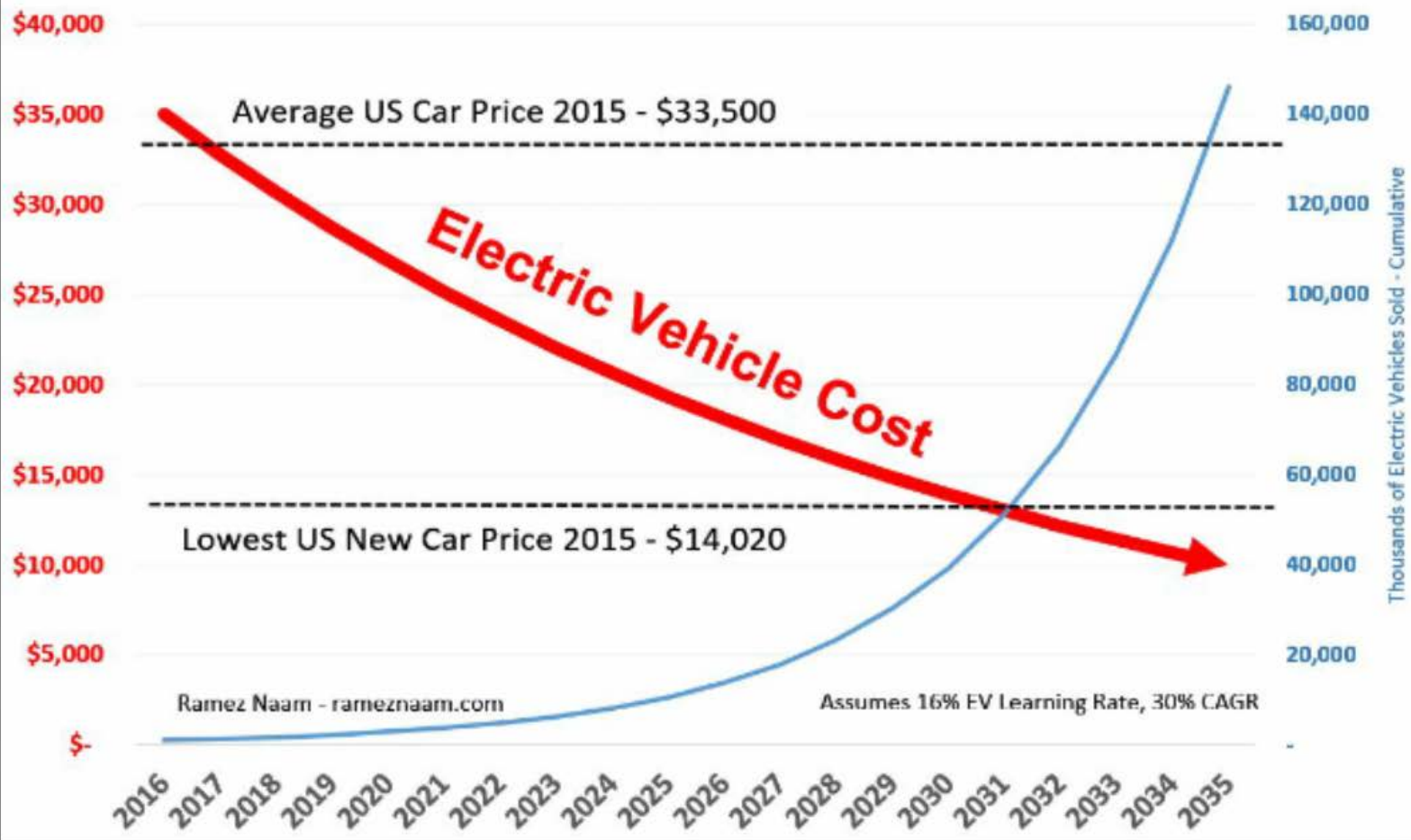
## Sales of electric vehicles to **2035**



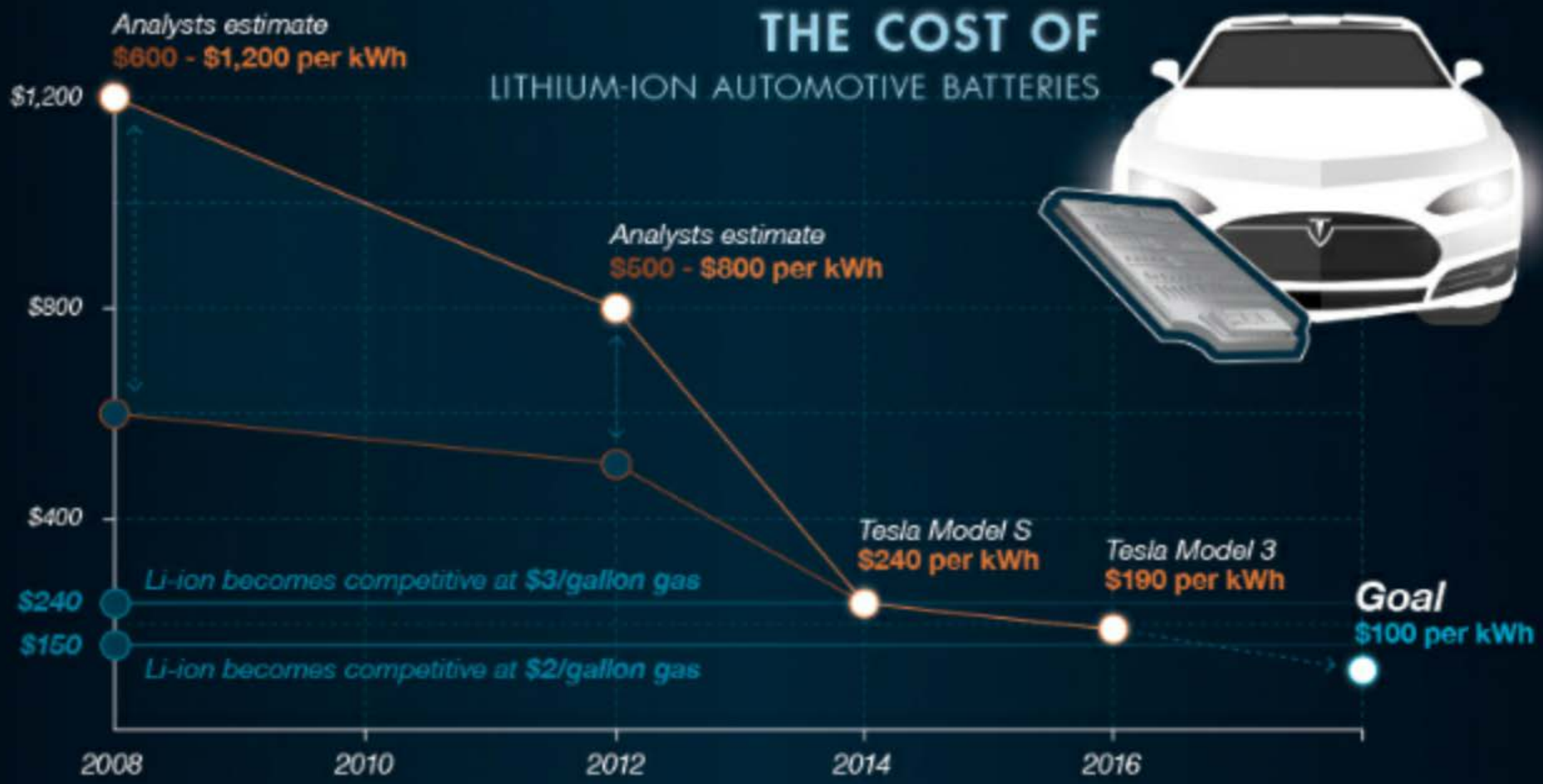
Source: Wood Mackenzie, Product Markets Service



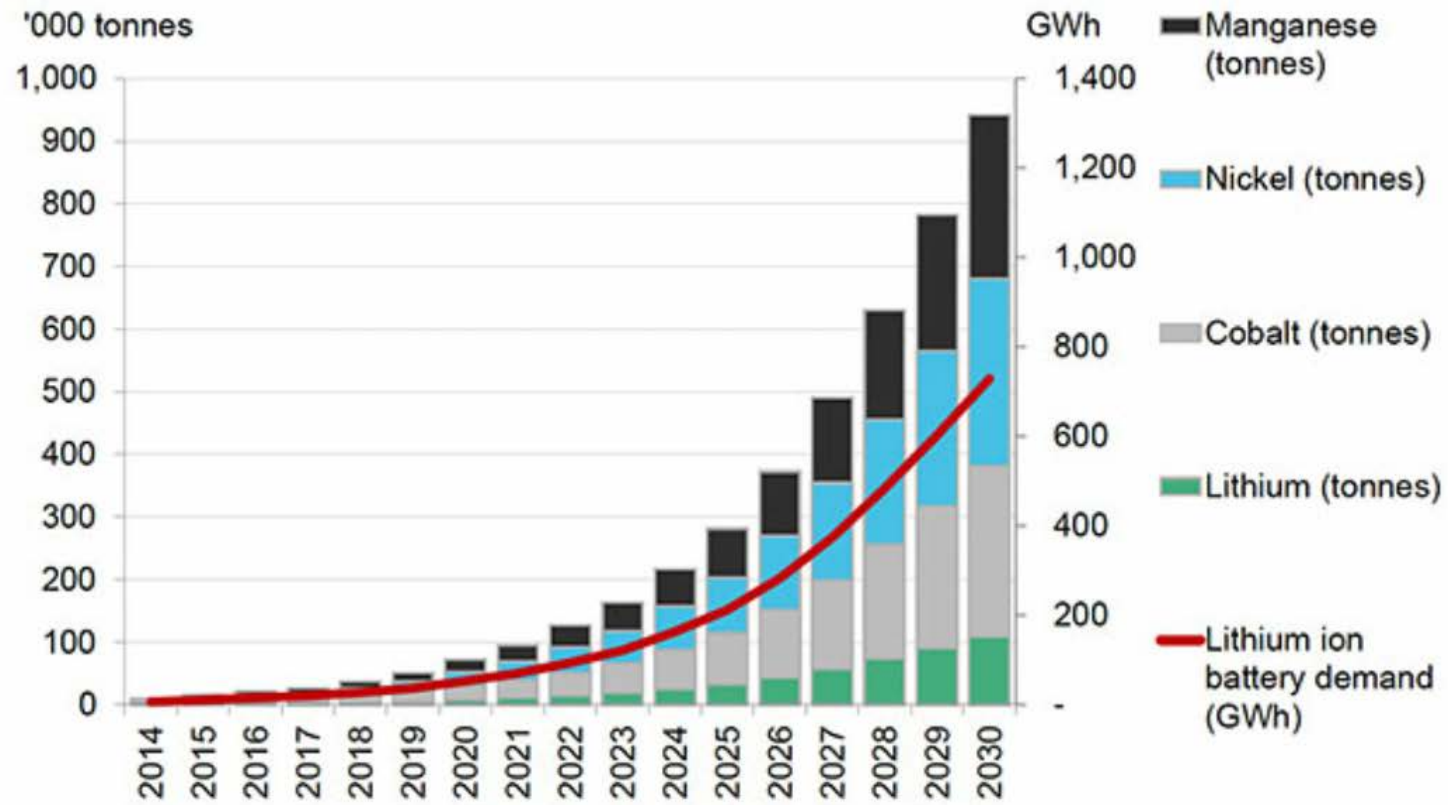
# Cost of 200 mile range EV



# THE COST OF LITHIUM-ION AUTOMOTIVE BATTERIES



**Figure 13: Global lithium-ion and materials demand forecast from EV sales, 2015–2030**  
 (thousands of tonnes, GWh)



Source: Bloomberg New Energy Finance

## Perbandingan Harga Antara BEV, PHEV & ICE

	BEV <i>Ford Focus Electric</i>	PHEV <i>Audi A3 e-tron</i>	ICE <i>Volkswagen Golf GTI</i>
German MSRP 2017 (incl. 19% VAT)	<u>34.900 EUR</u>	<u>36.900 EUR</u>	<u>33.800 EUR</u>
American MSRP 2017	29.120 USD	38.900 USD	29.915 USD
+ 7,5% sales tax (California)	+ 2.184 USD	+ 2.917,50 USD	+ 2.243,60 USD
- federal tax credit	- 7.500 USD	- 4.502 USD	not eligible
- state rebate (CA)	- 2.500 USD	- 1.500 USD	not eligible
= final purchase price	21.304 USD	35.815,50 USD	32.158,60 USD
	<u>(20.026 EUR)</u>	<u>(33.668 EUR)</u>	<u>(30.230 EUR)</u>

When comparing the final purchase prices of the three different car models of the C-segment, within the three propulsion categories, the PHEV Audi A3 e-tron appears to be the least affordable option out of the three given automobiles in both the German and Californian

: Marek Palinski Thesis On A Comparison Of Electric Vehicle And Conventional Automobiles: Costs and Quality Perspective, 2017

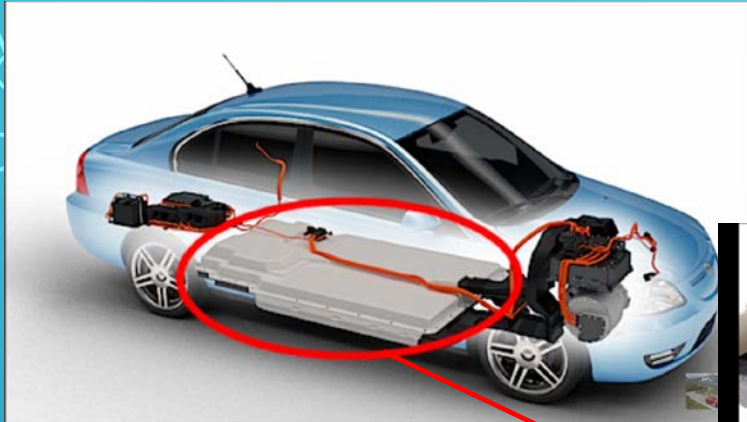
	<b>BEV</b> <i>Tesla Model S 90D</i>	<b>PHEV</b> <i>Porsche Panamera 4 E-Hybrid</i>	<b>ICE</b> <i>BMW 550i Gran Coupé xDrive</i>
German MSRP 2017 (incl. 19% VAT)	<u>110.920 EUR</u>	<u>109.219 EUR</u>	<u>98.200 EUR</u>
American MSRP 2017	94.000 USD	99.600 USD	94.200 USD
+ 7,5% sales tax (California)	+ 7.050 USD	+7.470 USD	+7.065 USD
- federal tax credit	- 7.500 USD	-7.500 USD	not eligible
- state rebate (CA)	-2.500 USD	-1.500 USD	not eligible
= final purchase price	91.050 USD <u>(85.589 EUR)</u>	98.070 USD <u>(92.188 EUR)</u>	101.265 USD <u>(95.192 EUR)</u>

In the segment of the full size luxury automobiles, the conventional BMW 650i Gran Coupé xDrive is the cheapest alternative in terms of the purchase price of the three given models. The following PHEV from Porsche and BEV from Tesla are about more than 10.000 EUR more expensive.

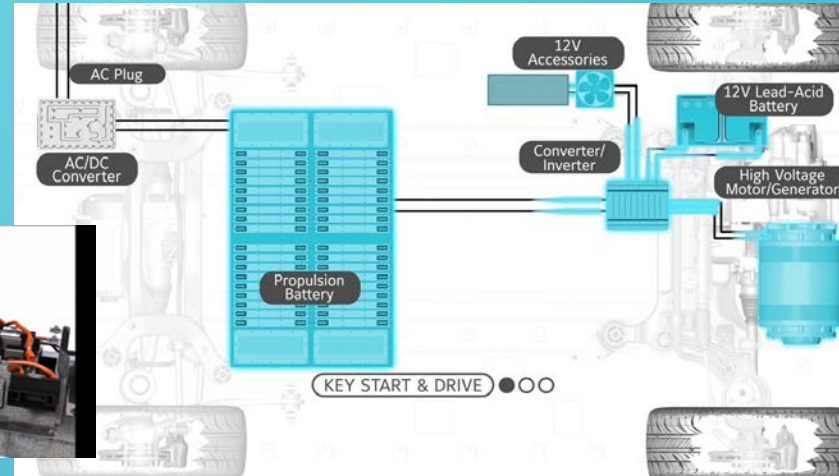
## The System Differences :

	HEV	PHEV	BEV
Drivetrain	Combination of ICE and Electric Motor	Combination of ICE and Electric Motor	Electric Motor
Battery Charging	<ol style="list-style-type: none"><li>1. By spinning an electric motor when the ICE is operating</li><li>2. Converting the vehicle kinetic energy into electric energy through regenerative brakes</li></ol>	<ol style="list-style-type: none"><li>1. By spinning an electric motor when the ICE is operating</li><li>2. Converting the vehicle kinetic energy into electric energy through regenerative brakes</li><li>3. Plugging in to a power source</li></ol>	<ol style="list-style-type: none"><li>1. Plugging in to a power source</li><li>2. Converting the vehicle kinetic energy into electric energy through regenerative brakes</li></ol>

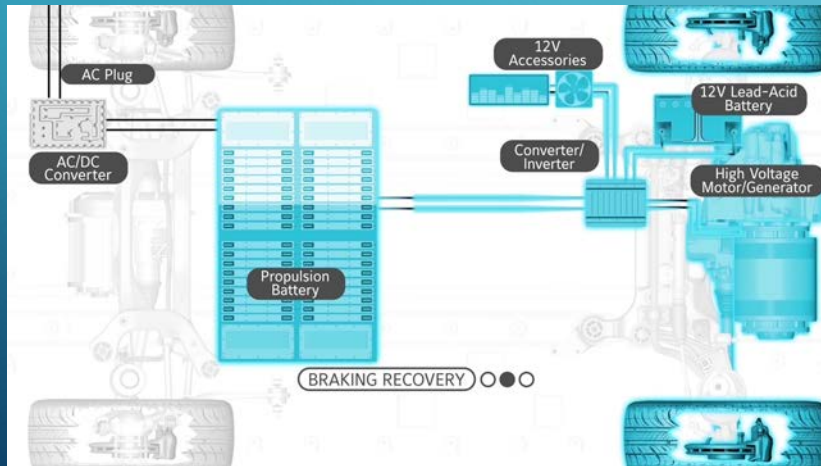
# BEV DIAGRAM SYSTEM :



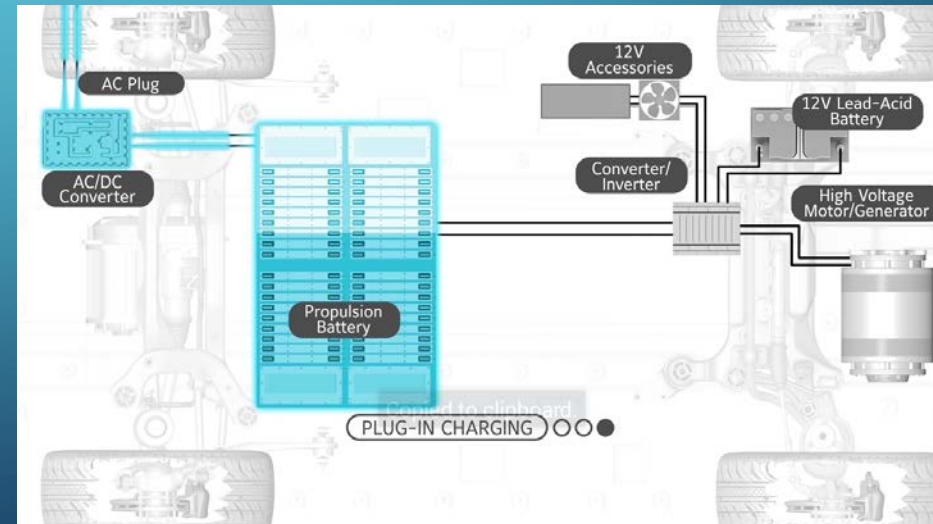
Battery



Key Start & Drive



Braking Recovery



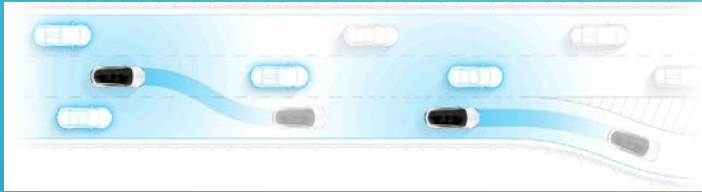
Plug – In Charging

# MAINTENANCE COST ?

BEV COMPONENT	PETROL VEHICLE COMPONENT
Lithium Ion Battery ( Validity 3 – 10 years )	Radiator
Electric Motor	Spark Plug
Converter/Inverter	Air Filter
Controller Unit	Transmission System....etc.

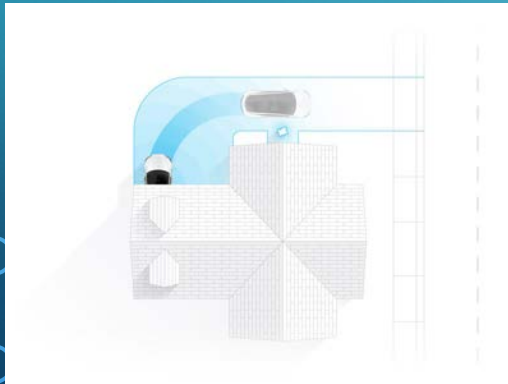
## “Auto Pilot”

An autopilot is a system used to control the trajectory of an aircraft/vehicle without constant 'hands-on' control by a human operator being required. Autopilots do not replace human operators, but instead they assist them in controlling the aircraft/vehicle. This allows them to focus on broader aspects of operations such as monitoring the trajectory, weather and systems. [\[1\]](#)



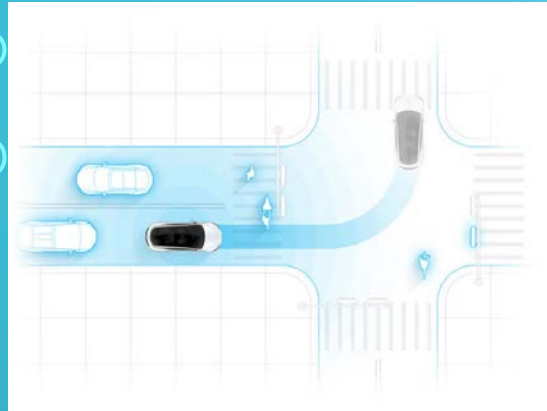
*On-Ramp to Off-Ramp*

Once on the freeway, the vehicle will determine which lane you need to be in and when. In addition to ensuring you reach your intended exit, Autopilot will watch for opportunities to move to a faster lane when you're caught behind slower traffic. When you reach your exit, your vehicle will depart the freeway, slow down and transition control back to you.



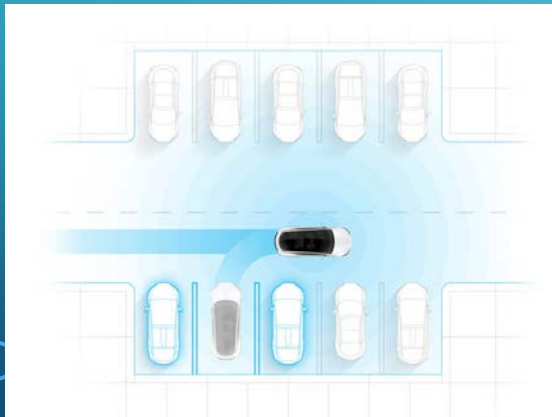
*Smart Summon*

With Smart Summon, your car will navigate more complex environments and parking spaces, maneuvering around objects as necessary to come find you.



All you will need to do is get in and tell your car where to go. If you don't say anything, your car will look at your calendar and take you there as the assumed destination. Your car will figure out the optimal route, navigating urban streets, complex intersections and freeways.

*From Home*



When you arrive at your destination, simply step out at the entrance and your car will enter park seek mode, automatically search for a spot and park itself. A tap on your phone summons it back to you.

*To Your Destination*



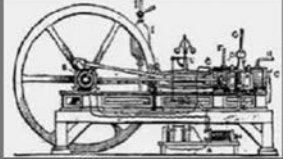
With the new vision cameras, sensors and computing power, your car will navigate tighter, more complex roads.

*AutoSteer*

# PENGGUNAAN TENAGA HIJAU UNTUK PENJANAAN TENAGA ELEKTRIK

Tenaga elektrik yang dihasilkan daripada penggunaan tenaga – tenaga daripada persekitaran untuk mengecas kenderaan elektrik antaranya ialah :

- a) Tenaga Solar daripada sinaran cahaya matahari
- b) Tenaga Keupayaan daripada angin, ombak laut dan aliran sungai yang deras untuk memutarakan turbin (tenaga kinetik) untuk menjana tenaga elektrik.
- c) Tenaga getaran daripada landasan keretapi, kapal terbang dan jalanraya.
- d) Tenaga bunyi daripada persekitaran seperti kawasan pembinaan, jalanraya, Kawasan perindustrian dan sebagainya.



www.crankshaft.com

"The first person to experiment with an **internal combustion engine** was the Dutch physicist Christian Huygens, about 1680. But no effective gasoline-powered **engine** was developed until 1859, when the French engineer J. J. Étienne Lenoir built a double-acting, spark-ignition **engine** that could be operated continuously."



### Internal Combustion Engine (ICE), 1680 until now ( almost 338 years ! )

### Electric Vehicle (EV), 2003 until now ( ...15 years )




Latest EV Model.....

## **KESIMPULAN :**


**Daripada beberapa siri mesyuarat yang dilaksanakan, pihak JKR perlu secara berterusan memantau perkembangan terkini teknologi kenderaan elektrik dari peringkat HEV, PHEV sehingga ke BEV, memandangkan JKR merupakan agensi teknikal bagi pihak kerajaan.**

**JKR WOKSYOP juga perlu bersedia dari segi penyediaan infrastruktur – infrastruktur, tenaga mahir dan separuh mahir yang kompeten serta penyediaan *Standard Operating Procedure(SOP)* bagi penyelenggaraan kenderaan serta jentera elektrik. Selain daripada itu juga pihak JKR juga perlu didedahkan dari segi teknikal sehinggalah ke peringkat penyediaan spesifikasi serta pengujian-pengujian yang perlu dilakukan dalam menyelenggara kenderaan elektrik.**



**JKR Woksyop akan memainkan peranan yang penting dalam pengurusan serta menyelenggara kenderaan-kenderaan elektrik bagi pihak kerajaan di masa akan datang.**

**Kerjasama diantara pihak – pihak yang berkaitan perlu diteruskan dalam merealisasikan serta menuju ke arah penggunaan kenderaan serta jentera yang berkuasa elektrik sepenuhnya merujuk kepada “ *NATIONAL ELECTRIC MOBILITY BLUEPRINT* ” dan DASAR PENGANGKUTAN NEGARA, 2018 – 2030.**



The background is a blue gradient with white circuit-like lines in the corners. The lines are composed of straight segments and small circles, resembling a network or data flow diagram.

# Maklumbalas Serta Pandangan Ahli Mesyuarat Yang Hadir

The background is a blue gradient with white circuit-like lines in the corners. The text is centered in a bold, yellow font with a black outline.

**SEKIAN,  
TERIMA KASIH**