Siberian Transport University

Artificial Intelligence in Electric Cars

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Project team:

Topicality:

Purposes:

1.

2.

3.

Plan

- Ecology and artificial intelligence
- Hybrid vehicles
- Electric cars
- Driverless vehicles
- Problems of AI
- Security problems of AI
- Batteries in electric cars
- Conclusion

Ecology and Artificial Intelligence

Relevance and challenges

- The problem of ecology in the modern world

Plan

- Disasters
- Statistic
- Areas of Use of AI

Disasters

- Earthquake in Haiti

Happened in 2010.

More than 200.000 dead.

Disasters

- Tsunami in the Pacific ocean

  Happened in 2004.

  More than 300.000 dead.

Disasters

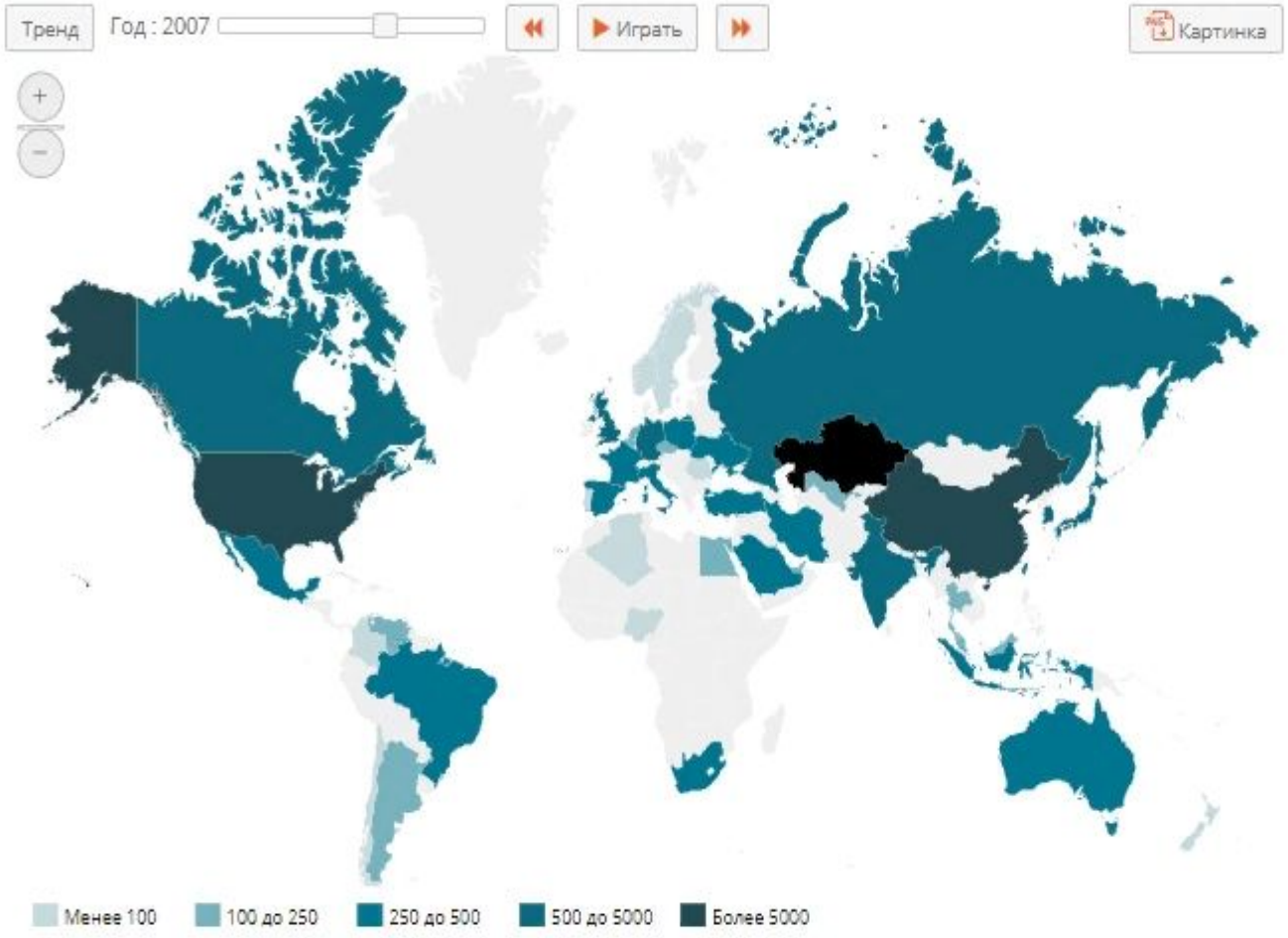
- Chernobyl accident

Happened in 1986.

About a million dead

Statistic

8,5 billion t of CO_2 emissions in 2017



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Единицы: MtCO2 Максимальный

Китай	6,552
Соединенные Штаты	5,802
Россия	1,591
Индия	1,255
Япония	1,186
Германия	784
Канада	582
Великобритания	531
Южная Корея	518
Иран	493
Италия	451
Мексика	434

Robot for garbage sorting

Robots-fish

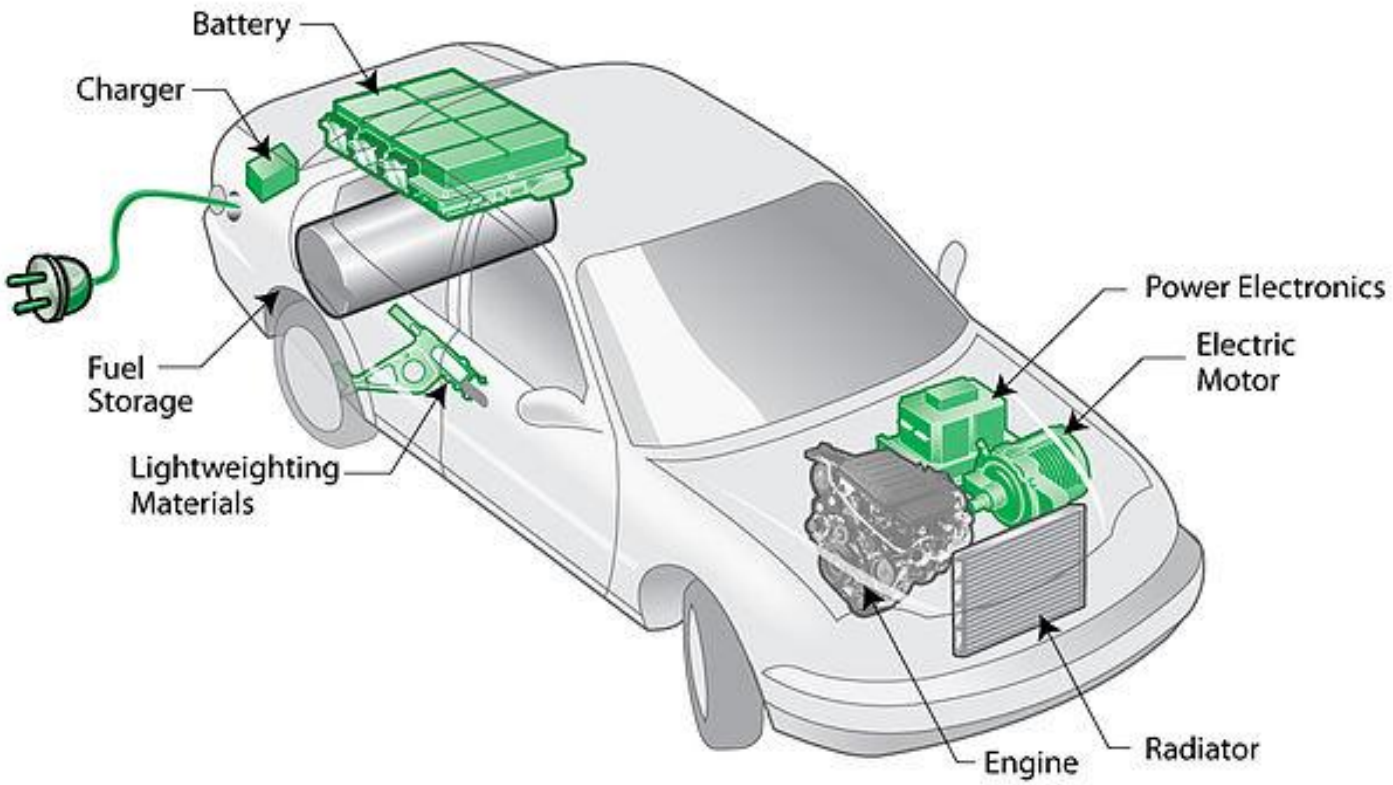
Robots in industry

Conclusion

- The environment is becoming more pollution from cars every year.

Hybrid Vehicle

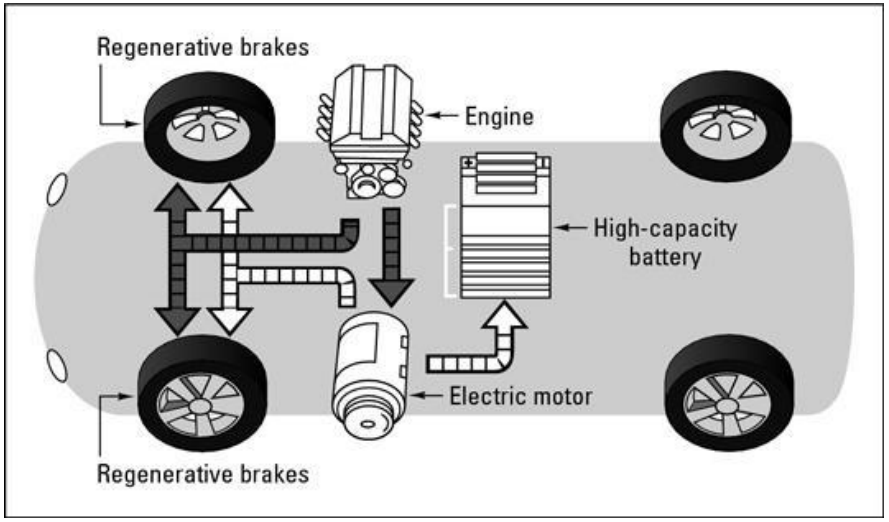
Definition of Hybrid Vehicle



- more than one power source
- power sources are connected together

Types of Hybrid Engines

parallel hybrid circuit



-sources work in couple or separately

sequential hybrid circuit

- The engine transmits energy to the electric motors

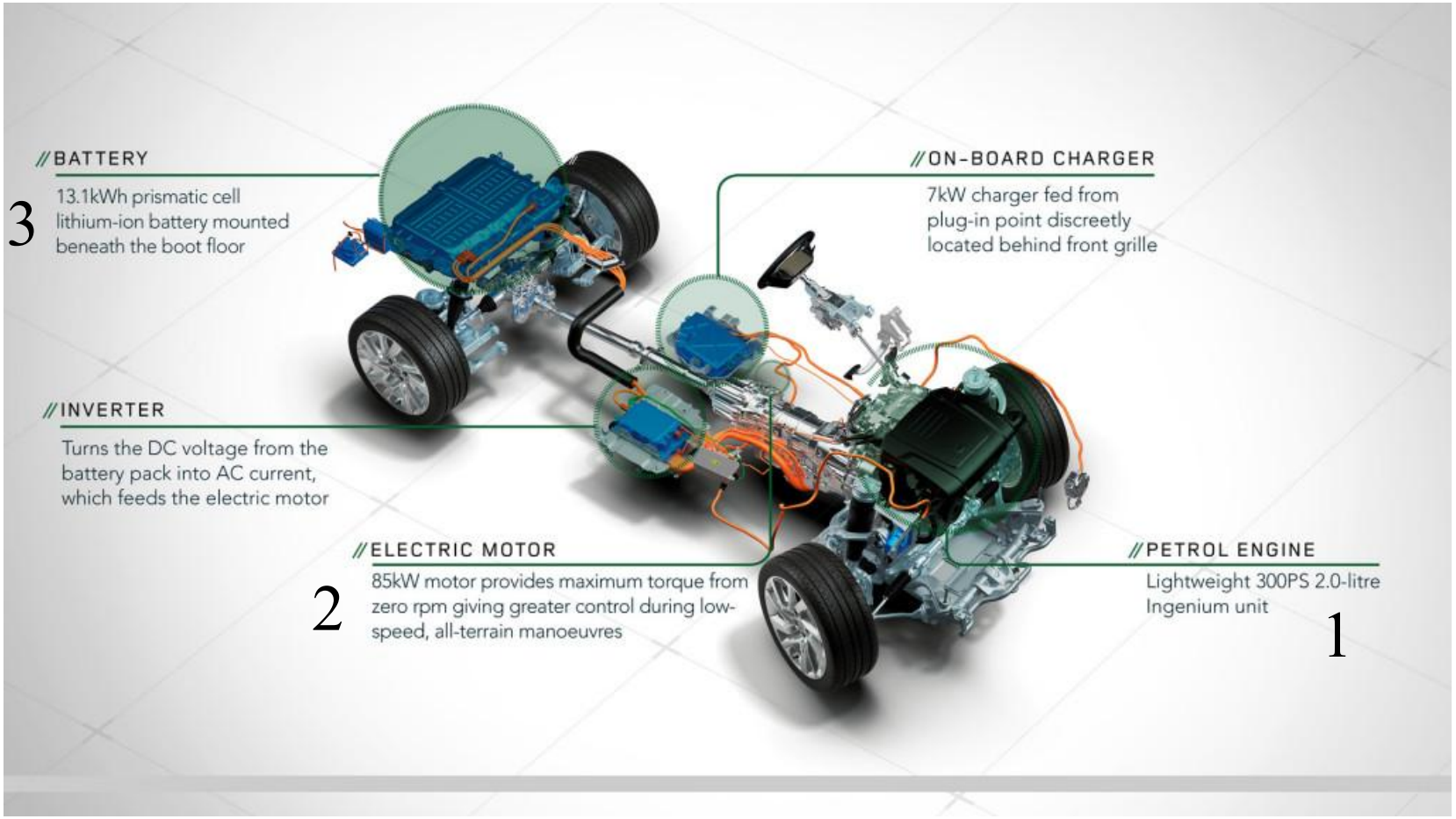
Range Rover Sport P400e

Main view

Back view

At the time of charging

Order of Main Parts



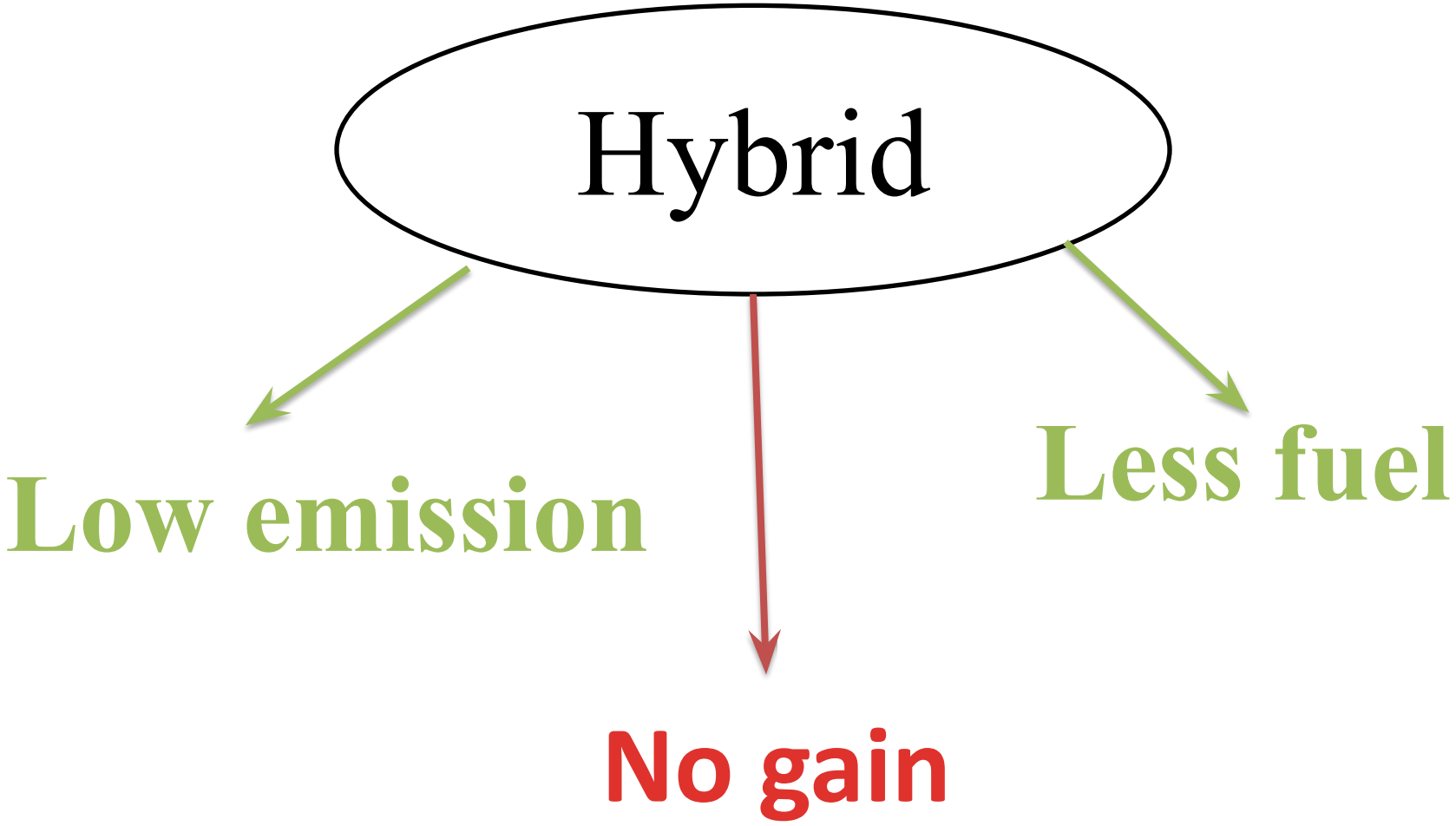
1) 2.0-liter engine
2) electric motor
3) lithium-ion batteries

- 8 hours from a regular outlet
- 50 km using only an electric motor

Compare-Table

	Range Rover Sport P400e (hybrid)	Range Rover Sport (usually vehicle)
Fuel consumption (liters per hundred)	~ 3(↘)	~ 10 (↗)
Environmental pollution	↘	↗
Price (in millions rub.)	~7 (↗)	~5,3 (↘)
Maintenance cost	↗	↘

Conclusion



Electric Cars

PURPOSE

the electric car to present and the main characteristics to show

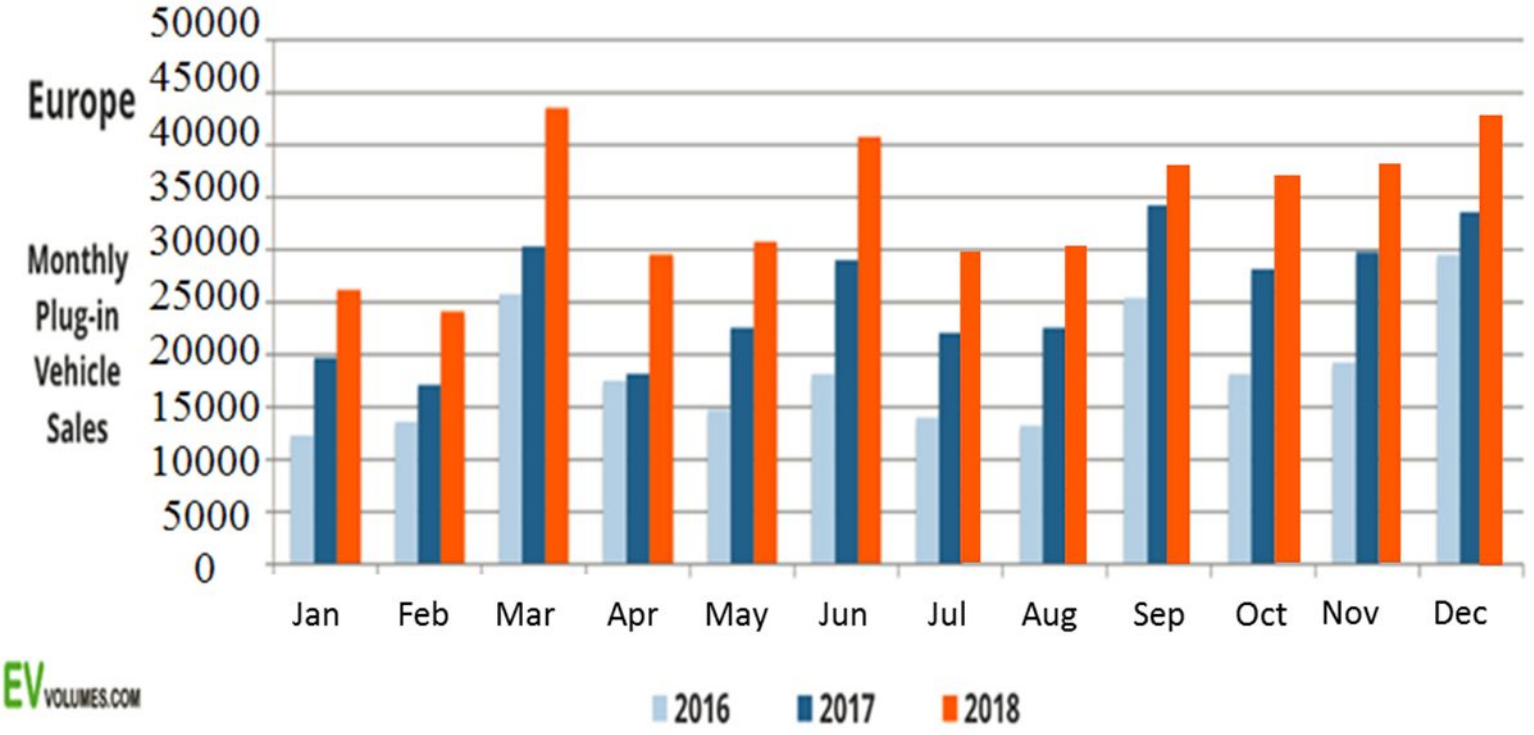
Tesla

Plan

First) To compare an electric car with a common car

Secondly) To tell about the job of Tesla Model S in winter

DYNAMIC OF SALES



In 2016 – 18750, In 2018 – 34000

COMPARISON of TESLA MODEL S40 WITH MERCEDES-BENZ C 43

Tesla Model S40 Mercedes-Benz C43

ACCELERATION AND ENERGY AND MAXIMUM SPEED

1)6,5 second’s 4,7 second’s

2)177 Km/h 250 Km/h

STOCK MOTION AND FUEL CONSUMPTION PER 100 KM

3) 335 kilometers 825 kilometers

4) 16 kilowatt 8 liters

JOB of TESLA MODEL S IN WINTER

Road stability

Battery

CONCLUSION

In conclusion I would like to say that electric cars have many advantages at the beginning of its development

DRIVERLESS VEHICLES

PLAN

1.The structure of driverless vehicles.

2. Top of the best driverless vehicles.

THE STRUCTURE of DRIVERLESS VEHICLES

RADAR COMPLEX

NECESSARY FOR:

Determining the range of speed and direction of the car.

PRINCIPLE OF JOB: The radiating antenna transmits a pulse of radio waves and the receiving antenna picks up the reflected signal.

THE STRUCTURE of DRIVERLESS VEHICLES

LIDAR-(light identification detection and ranking).

NECESSARY FOR: Creating a three-dimensional map of the area.

WORKING PRINCIPLE: Sends laser beams and then catches the reflected ones. And on their basis creates map.

THE STRUCTURE of DRIVERLESS VEHICLES

VIDEO CAMERA

REQUIRED FOR:

Definition of markings, signs, traffic lights and additional data on the position of the car in space.

THE STRUCTURE of DRIVERLESS VEHICLES

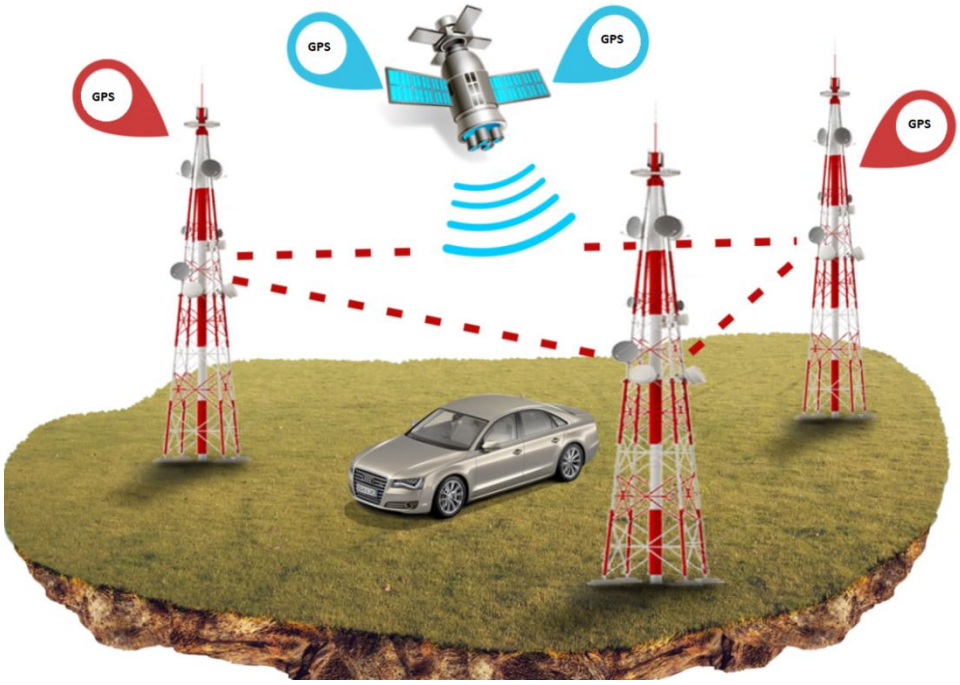
GPS SENSORS

NECESSARY FOR:

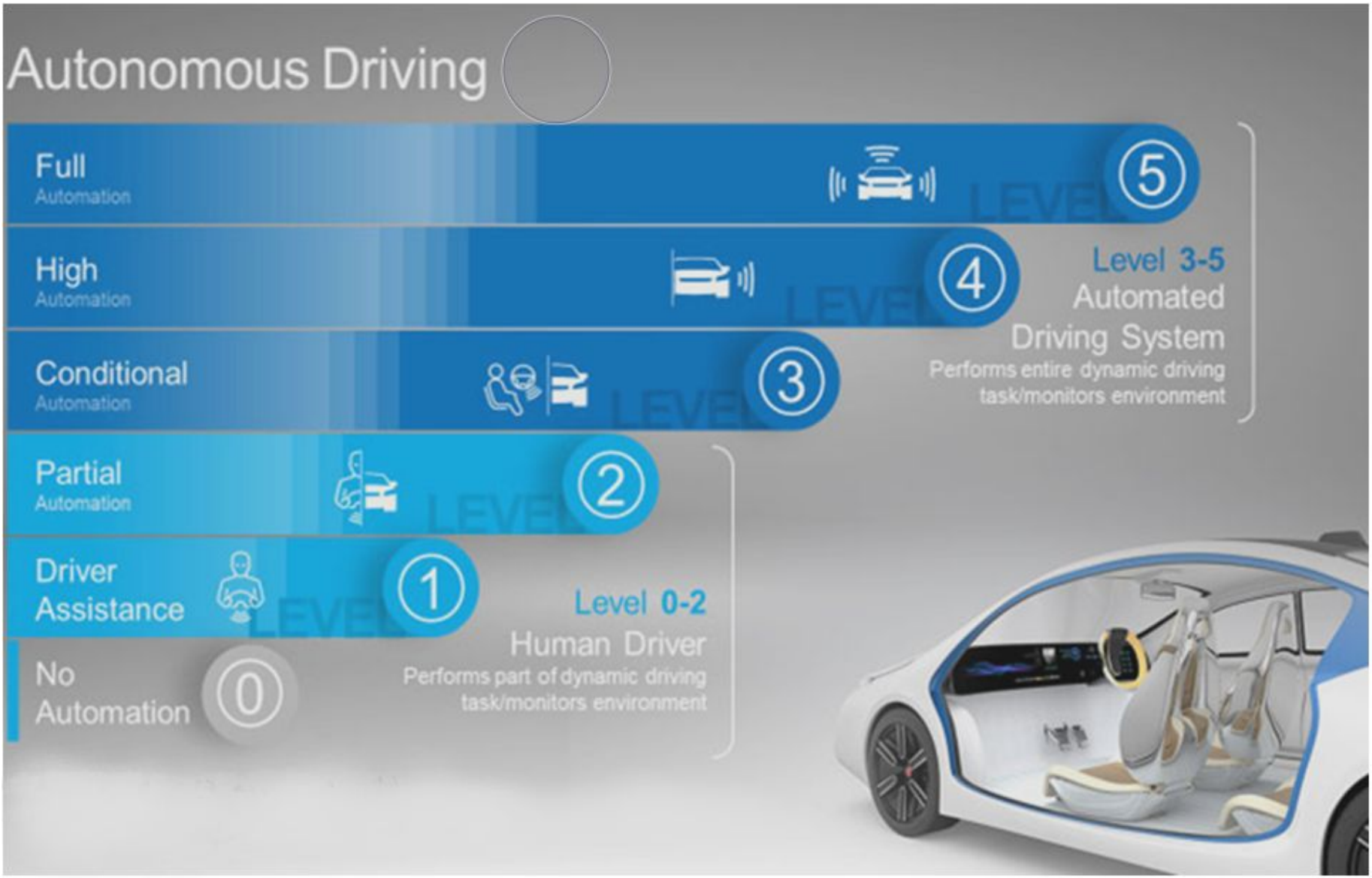
Correction of the route location.

WORKING PRINCIPLE :

Determine the location with the help of the satellite.



CLASSES OF AUTOMATION



TOP OF THE BEST DRIVERLESS VEHICLES

FOURTH PLACE: NISSAN IDS CONCEPT

Radar: 4
LIDAR: 1
Camera: 5
GPS module: 1
Artificial Intelligence: No

THIRD PLACE: CHEVROLET NFR

Radar: 3
LIDAR: 2
Camera: 4
GPS module:2
Artificial Intelligence: Yes

TOP OF THE BEST DRIVERLESS VEHICLES

SECOND PLACE: LEXUS LS+

Radar: 6
LIDAR: 2
Camera: 4
GPS module: 2
Artificial Intelligence: Yes

FIRST PLACE: TESLA MODEL S CONCEPT

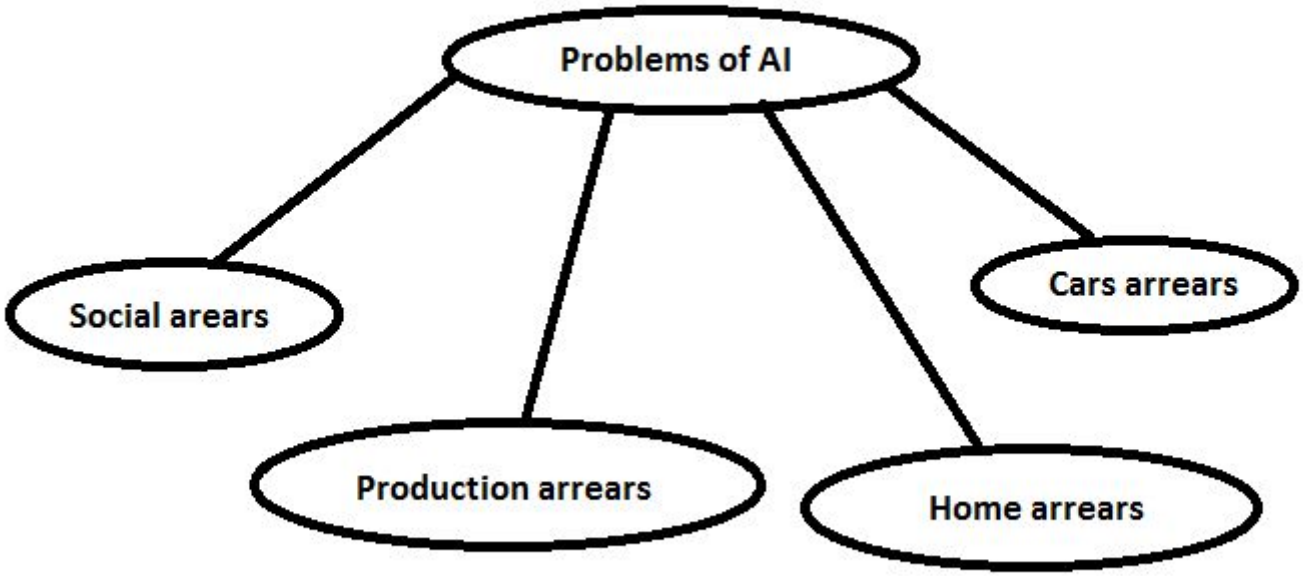
Radar: 6
LIDAR: 3
Camera: 8
GPS module: 2
Artificial Intelligence: Yes

COMPARATIVE TABLE

CAR MAKER	RADAR	LIDAR	VIDEO CAMERA	GPS MODULE	ARTIFICIAL INTELLIGENCE
NISSAN IDS CONCEPT	4	1	5	1	NO
CHEVROLET NFR	3	2	4	2	YES
LEXUS LS+	6	2	4	2	YES
TESLA MODEL S CONCEPT	6	3	8	2	YES

Problems of AI

Plan


Problems of AI
Social arears
Production arrears
Home arrears
Cars arrears

Social arrears

- creates jobs
- need specialists
- start taking jobs

Production arrears

- as operator assistants
- autonomous production
- damage to production

Home arrears

- expensive prices
- dangerous cases
- unnecessary

Cars arrears

- 357 million kilometers
- Tesla Model S
- Job of the car
- The Uber company
- travel to a red traffic

Conclusion

- young technology
- successful future
- great things and discoveries

Security problems of AI

Problems	Decisions
Human factor	• Dynamic position sensors in space • Improvement and increase of sensors
Weather conditions	• Improvement and increase of sensors • Improvement of lidar
Infrastructure	• Cartographic equipment for conventional machines • Improvement and increase of sensors • Improvement of lidars

Batteries in electric cars

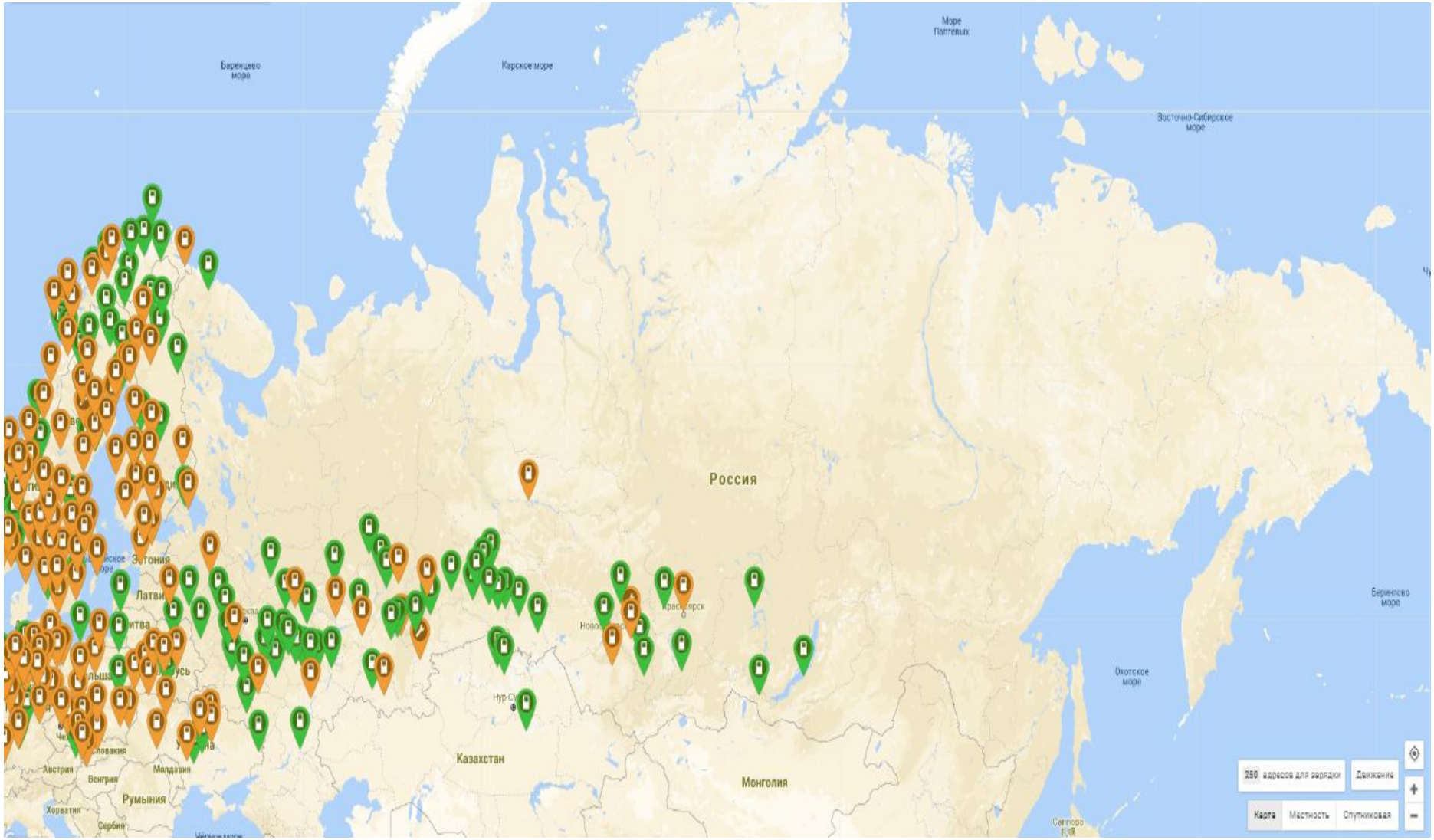
Plan

- *Battery charging problems.*
- *Types of batteries.*
- *Fourth-system interacting with the battery.*
- *Pros and cons of battery.*
- *What does the battery consist of.*

Battery Charging Problems

Supercharger

Battery Charging Problems



Superchargers location map

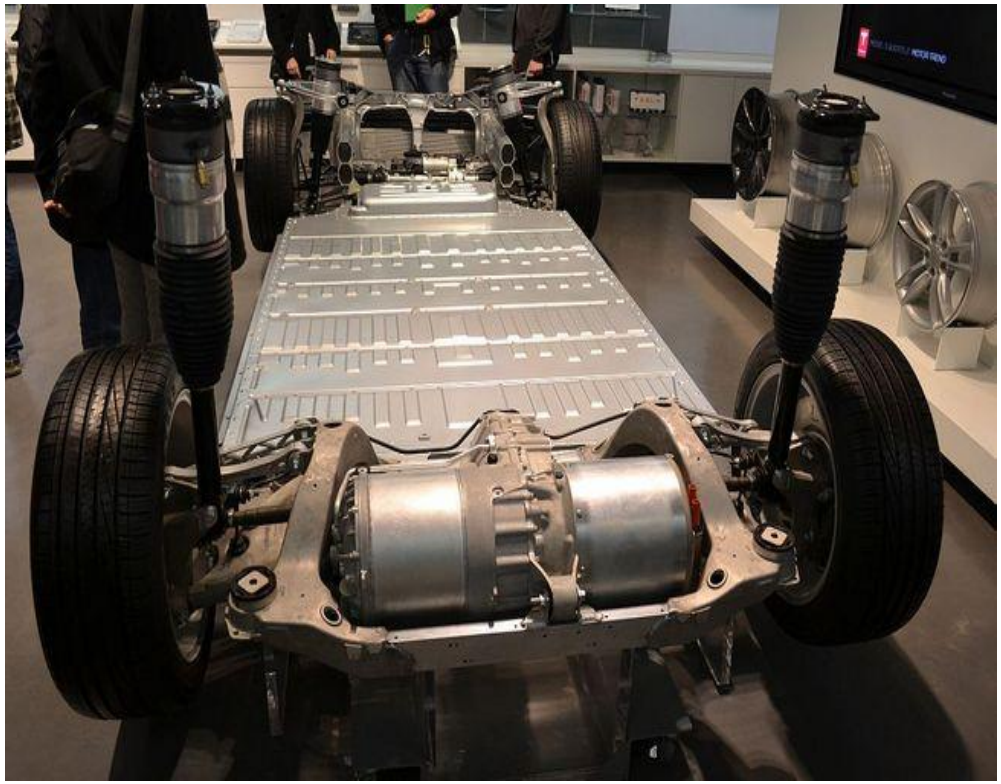
Types of Batteries

Alkaline AKB Low antimony Helium

Types of Batteries

Tesla Roadster

Types of Batteries



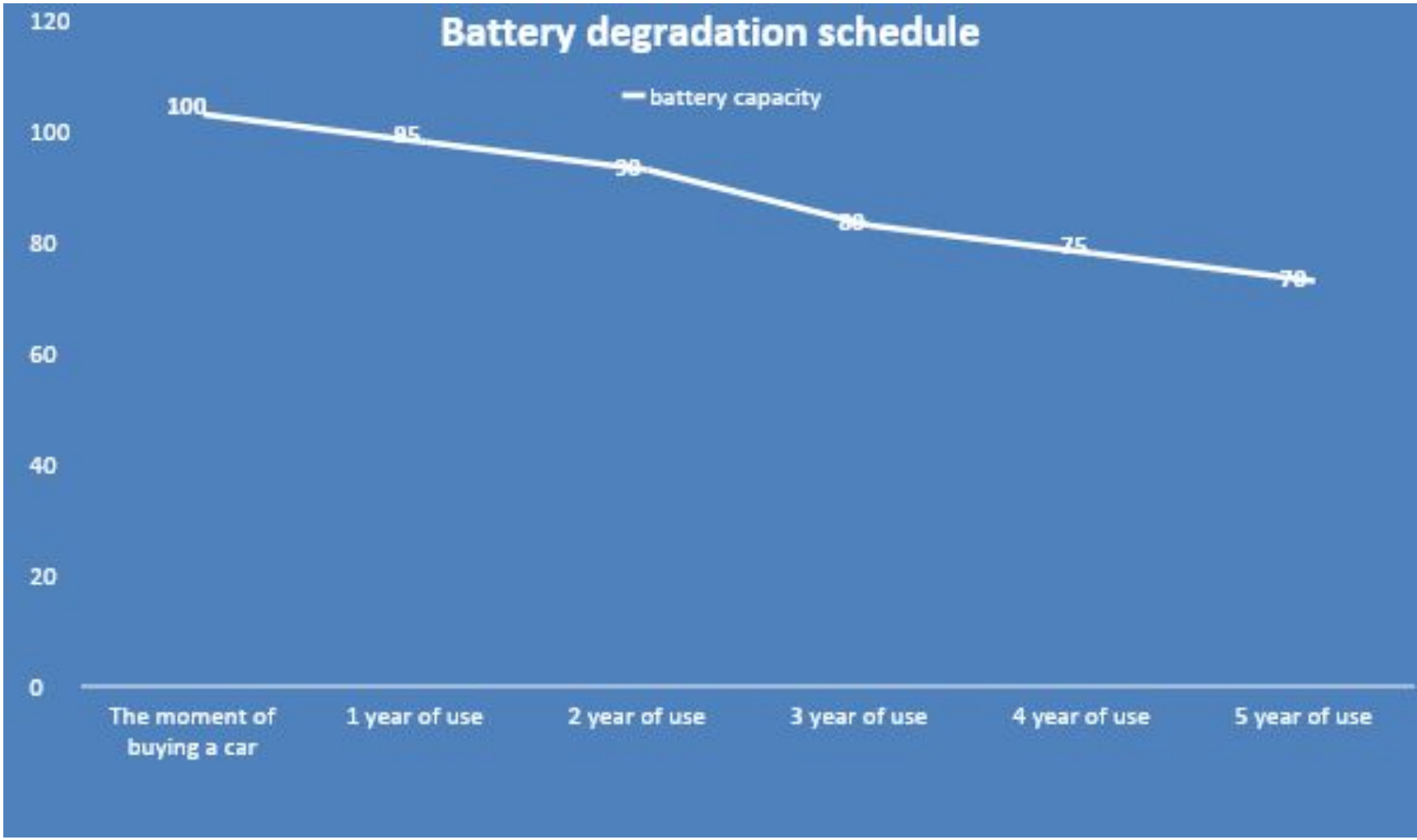
Power reserve = 1000km

Weight = 960kg

Volume = 200 kW * h

Lithium ion batteries of Tesla Roadster

Fourth-system Interacting with the Battery



Battery degradation schedule

Pros and Cons of Battery

Pros

- Reducing harmful exhaust fumes.
- After the termination of the use of the battery, it can be used in the power supply system of your home.

Cons

- The battery degrades over time and its capacity decreases.
- It is difficult to find a station for charging an electric vehicle.

What does the battery consist of

Tesla Model S battery

What does the battery consist of.

Tesla Model S Battery without protective cove

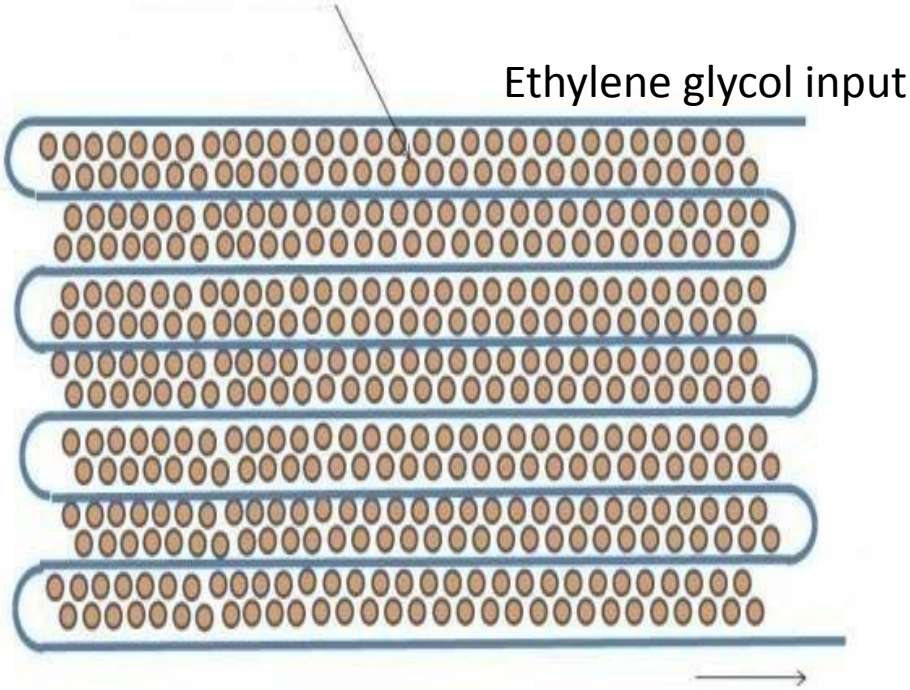
What does the battery consist of.

Battery packs

Elements installed in packs

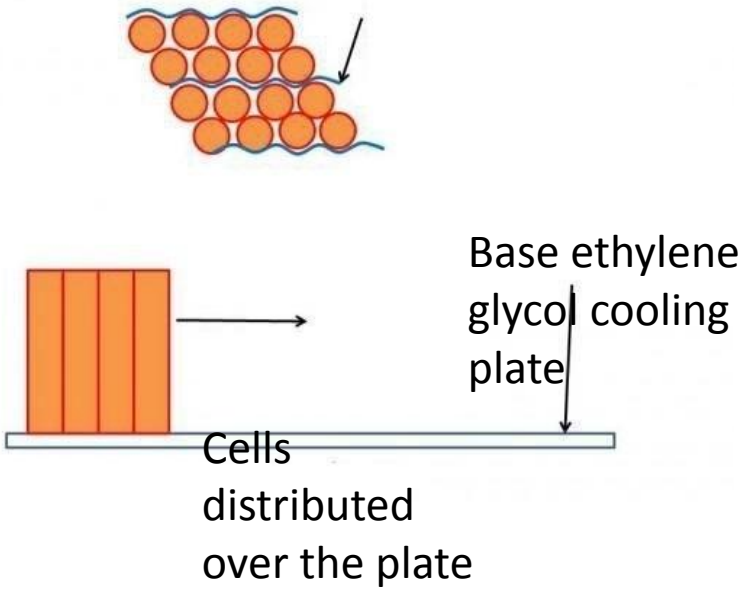
What does the battery consist of.

Battery circuit of Tesla Model S



Battery cooling configuration of Tesla Model S

Thin cooling fins.
Pass between cells
and connecting



General conclusion

- studied the question
- pluses and minuses
- successful future
- great things and discoveries

Thanks for your time