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(DIS)ADVANTAGES IN USING OF FOSSIL FUEL AND GREEN ENERGIES FOR ELECTRICAL VEHICLES

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KEYWORDS

**internal combustion motor, electric&hybrid vehicle,
pollutions, waste materials**

REDUCING VEHICULAR EMISSIONS

- is a key element for mitigating the risks of climate change.
- Vehicles based on internal combustion engines have been perceived as close to their development limits,
- While the electric power devices are in developing.

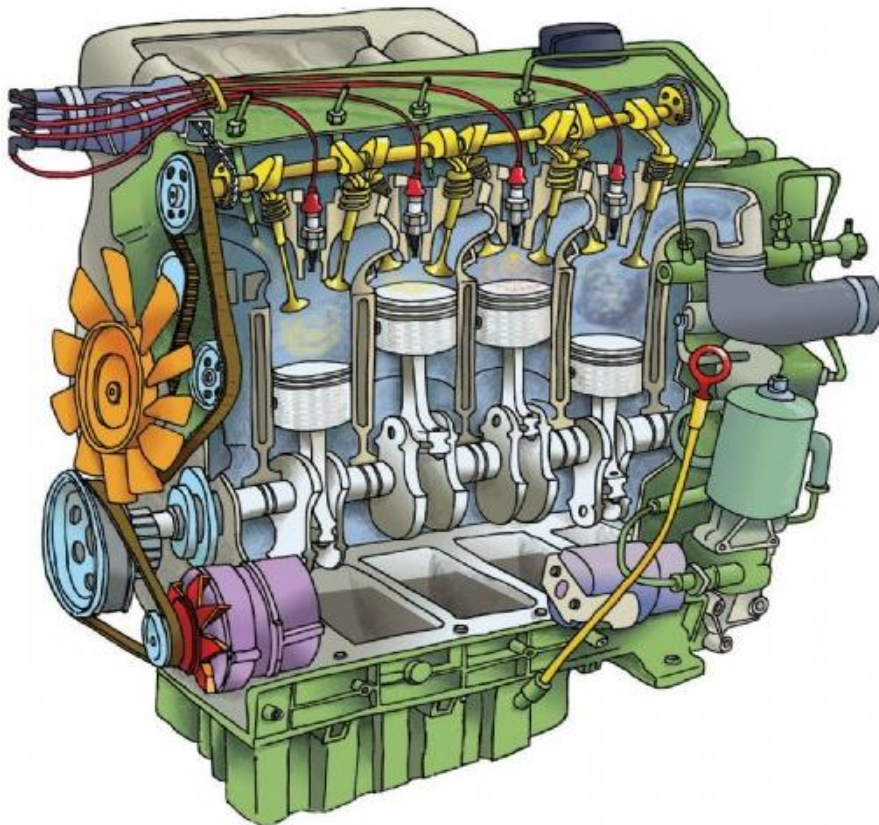
FOCUS ON ALTERNATIVE VEHICLE TECHNOLOGIES

- **At lot of academic and public discussions put the focus on alternative vehicle technologies (e.g. electric cars) and fuels (fuel cells and hydrogen).**

FUEL MOTORS

- **The fossil fuel motors were developed at second half of XIX century, as the revolutionary invention.**
- **These motors exist as Otto or Diesel engine.**
- **Both of them produce high emission of carbon dioxide (CO₂).**
- **In nowadays, one of the main disadvantage of these motors is considered to make high emission of CO₂.**

MOTOR WITH INTERNAL COMBUSTION AND EXHAUST OF GASES



CONTEST OF EXHAUST GASES

Exhaust gases from combustion engines almost consist of: CO, CO₂, nitrogen, moisture (in vapor state), various hydrocarbons, etc.

AIR POLLUTION



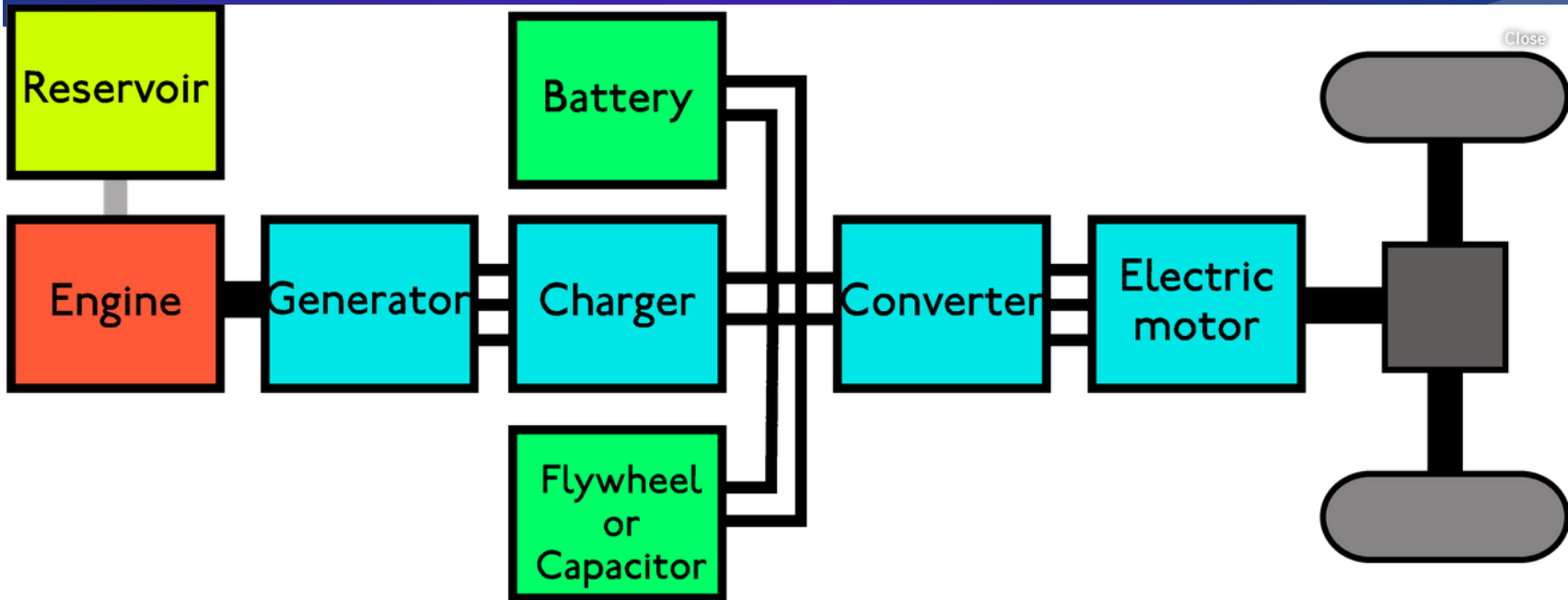
**One smogy day over New York a) and contribution
on air pollution from jet engine b)
THERE ARE SOME OPINIONS THAT BALGRADE HAS
PRETTY POLLUTED AIR**

POWER FOR ELECTRIC VEHICLES

The electric vehicles (EVs) may be powered as electrically only or hybrid system. The initial design of EVs is patented at the end of XIX century.

There are two principal solutions for EVs design, next slides, which design (construction) continuously is in development.

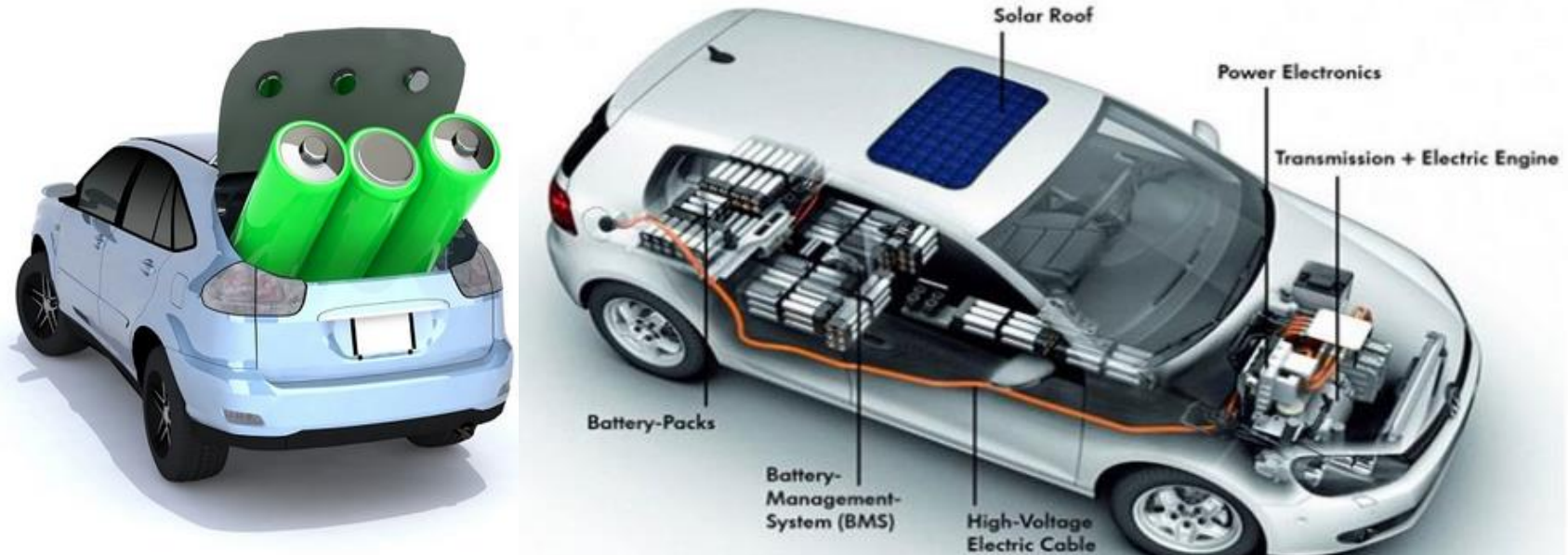
SERIES HYBRID POWER-TRAIN, Fig. 3a),



The engine powers the battery, battery powers the motor, and motor is connected to the driveshaft, thus providing necessary power to wheels,

BATTERY ELECTRIC CAR (BEV)

runs only on a battery



Scetch of battery in an electric car a) and positions of batteries at bottom of car b)

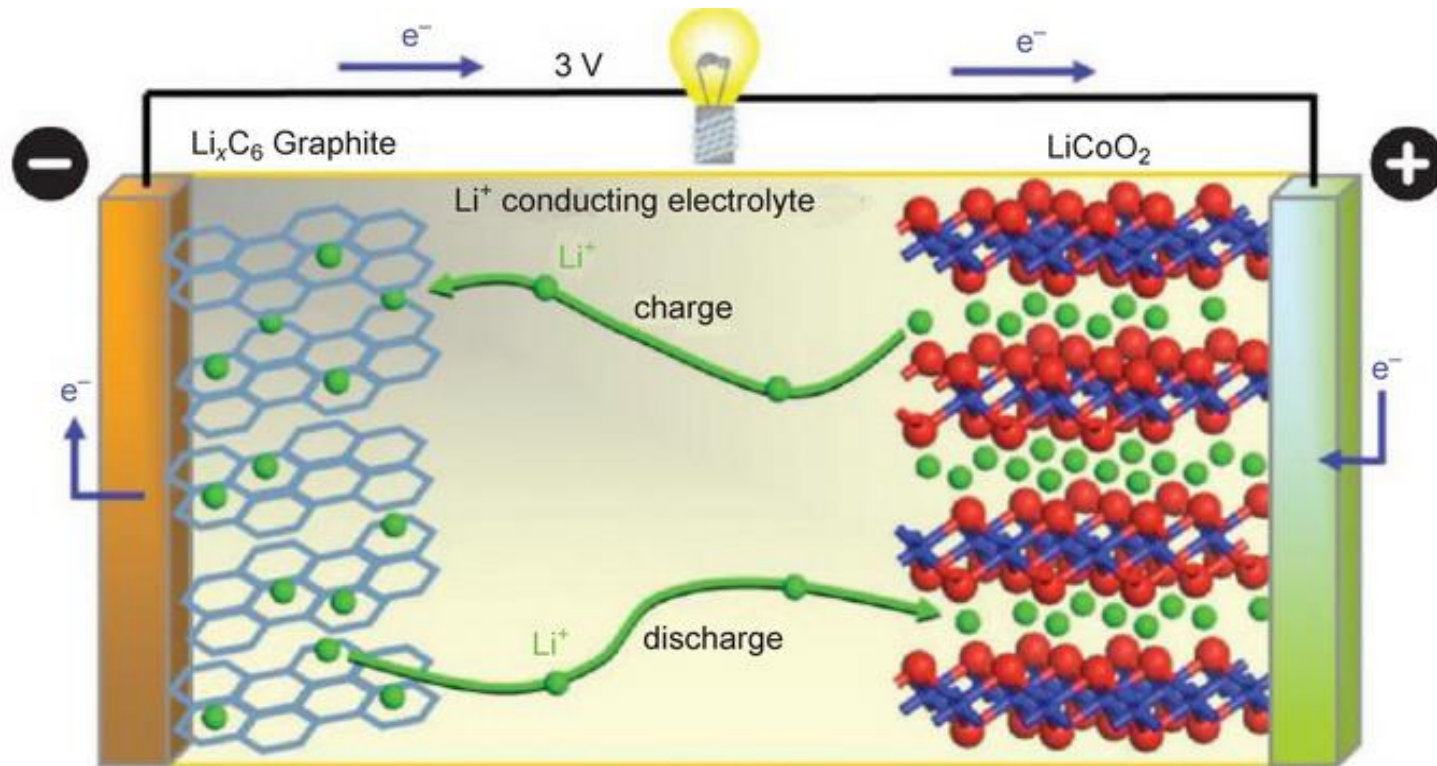
Weight of batteries (over 400kg) is a serious problem!

ENERGY SOURCES

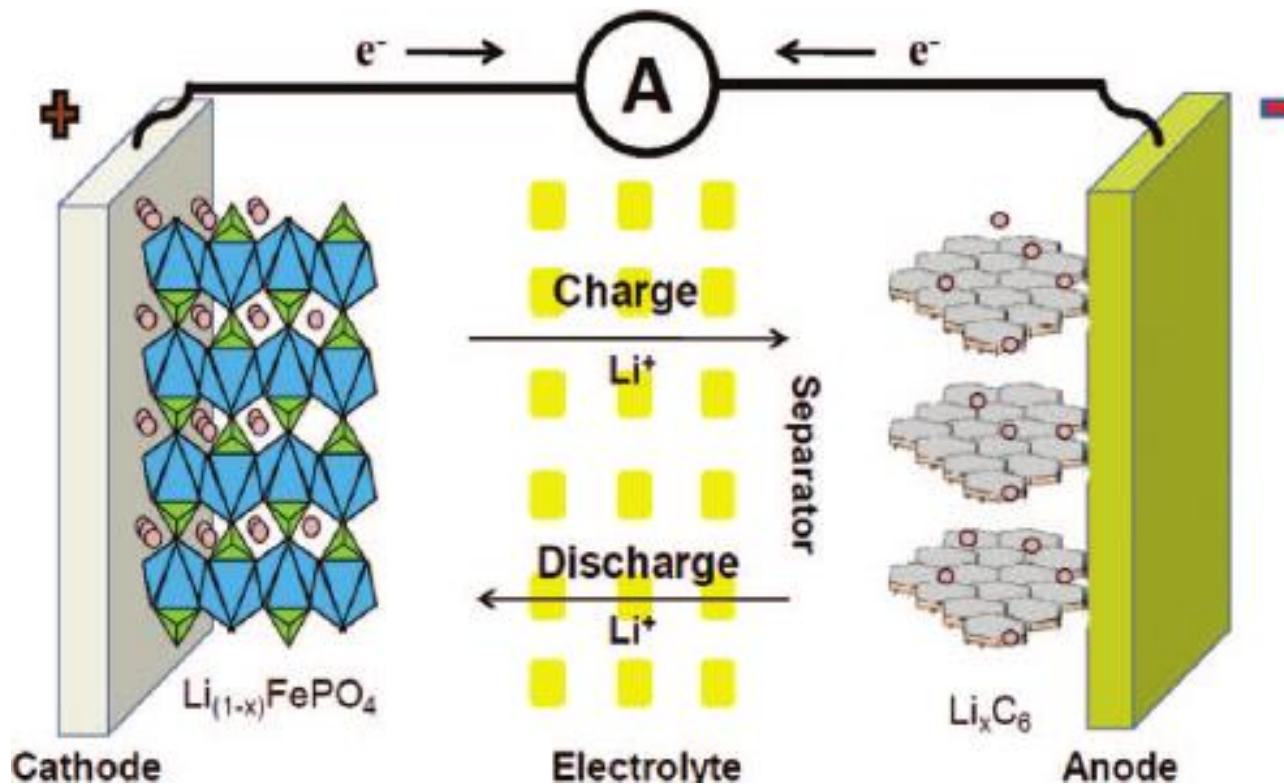
- **Renewable energy sources coming from wind, solar or hydropower, and according that charging systems for EVs were developed.**
- **Generating the electricity for EVs does not presents a serious problem, at the contemporary level of technology.**
- **There are some estimations that wind energy alone could power all the cars in the world, if they were all fuelled by electricity.**
- **Much better situation is with solar energy.**

KIND OF BATTERY

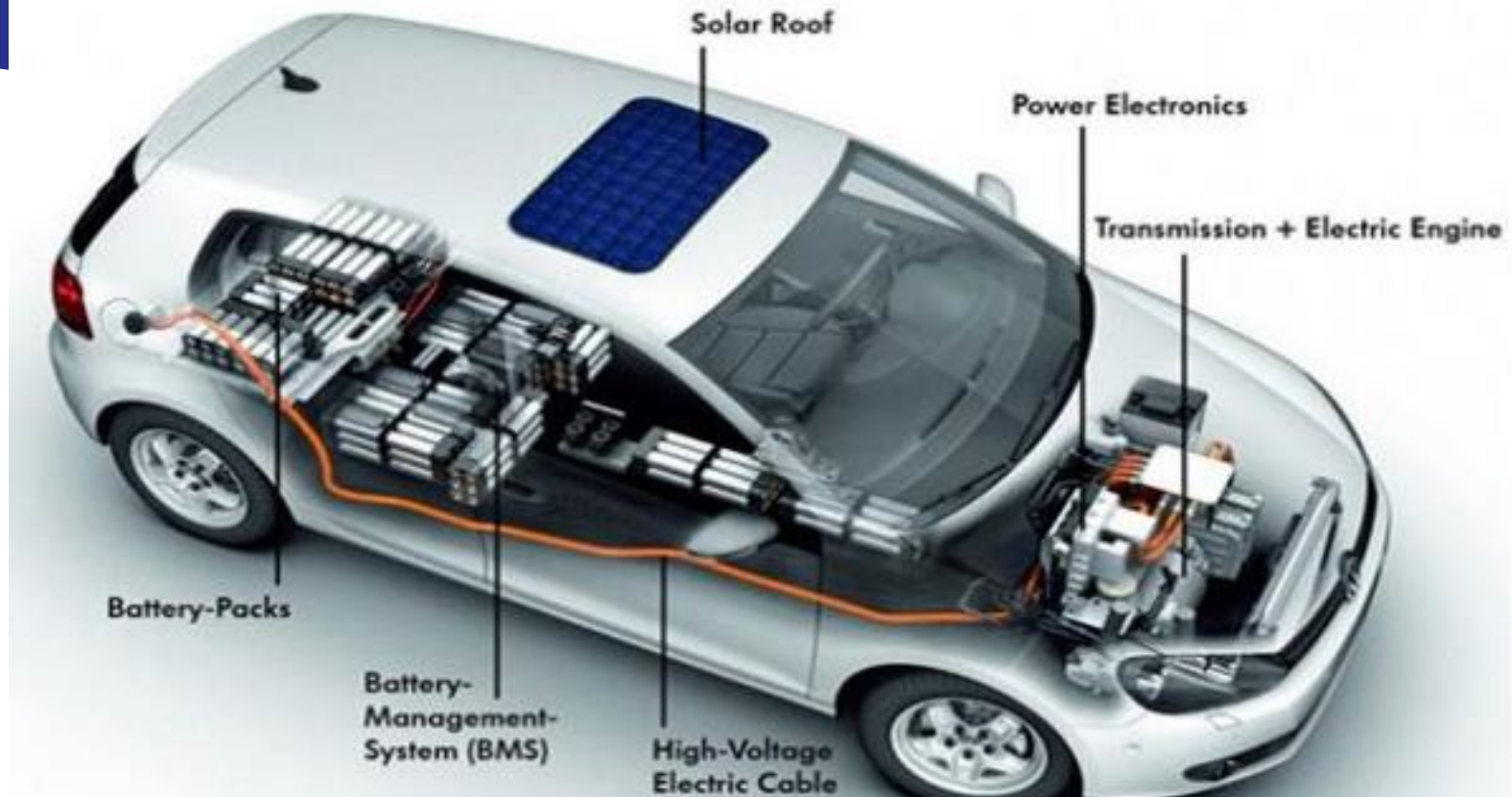
today are from nickel hydroxide or Li ion
two examples are shown here



Each battery consists of an anode and a cathode into an electrolyte containing dissociated lithium salts



ONCE AGAIN



Weight of batteries (over 400kg) is a serious problem

CONCLUSION

The main question about (dis)advantage about using of fossil fuel and green energies for battery electric cars is:

are the exhaust gases from combustion engines (CO, CO₂, nitrogen, moisture and various hydrocarbons) represent more danger to the environment than electrolytes from waste batteries on basis of lead, nickel, lithium, etc, and their hydroxides, acids or salts ?