

# Roper Chevy Bolt EV

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**[tinyurl.com/RoperChevyBoltEv](https://tinyurl.com/RoperChevyBoltEv)**



**Lifelong Learning Institute Fall Semester 2017 Course:  
Hybrid 23 Oct, Plug-In Hybrid 30 Oct and Battery Electric Cars 6 Nov**

# Chevrolet Bolt EV (a BEV)

[tinyurl.com/BoltEVManual](http://tinyurl.com/BoltEVManual)

**(EPA range: 238-miles)(\$37,500 - \$7,500 Tax Credit)**



**60-kWh battery**

**110/128/119 MPGe  
EPA**

**75-mph = 190 miles**

**93-mph = 160 miles**

**Fast charging  
capability: \$750**

**1-pedal driving**

**Don't confuse the Chevy Bolt EV, a BEV,  
with the Chevy Volt, a PHEV.**

**[Tinyurl.com/TRTCBEV](http://Tinyurl.com/TRTCBEV)**

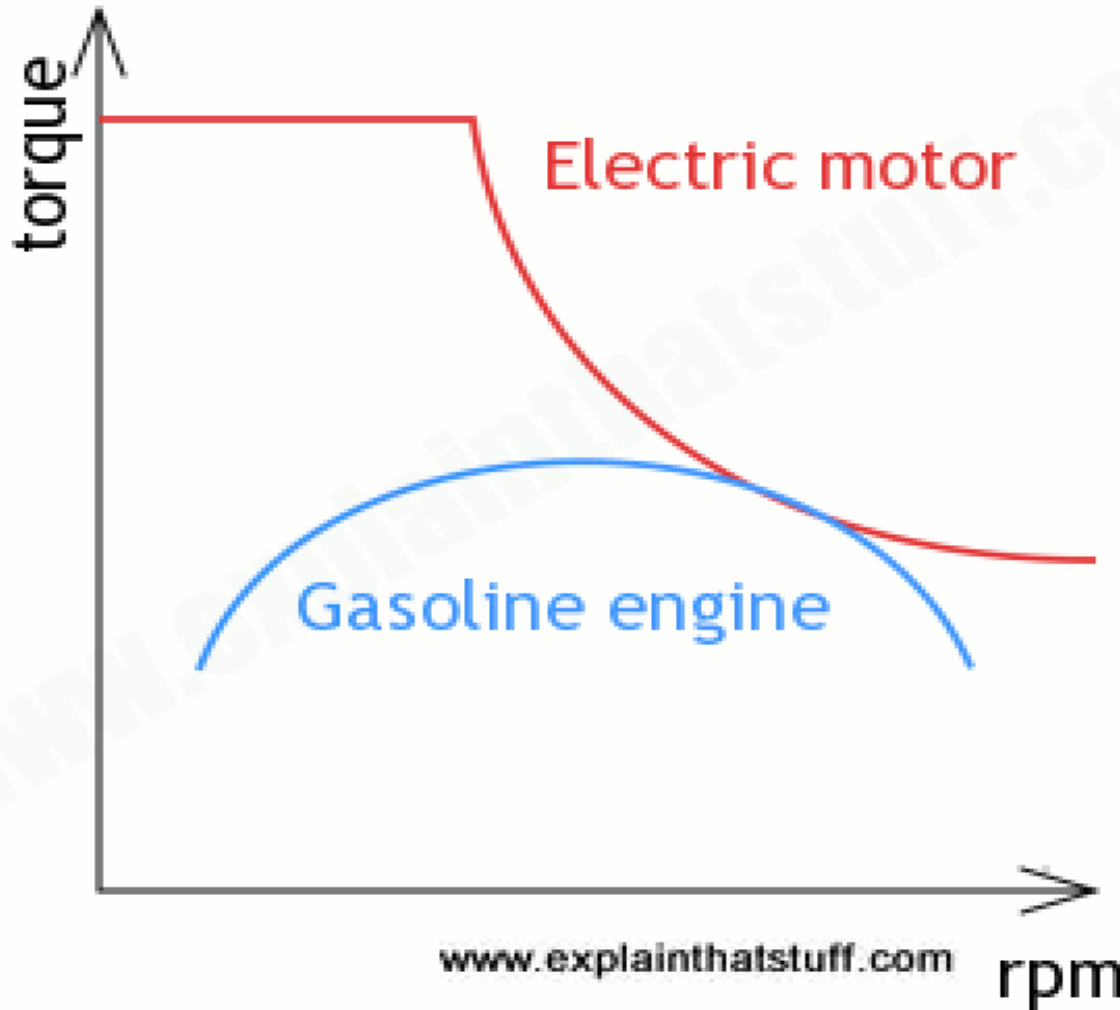
**Electric car =  
Battery Electric  
Vehicle (BEV) +  
Plug-in Hybrid  
gasoline-Electric  
Vehicle (PHEV)**

# Why Drive an Electric Car?

- Zero vehicle emissions to reduce pollution and global warming
- Greatly reduced noise & heat (Low noise added at low speeds.)
- High energy efficiency: ~90% (electric **motor**) vs ~30% (gasoline **engine**) and ~40% (diesel **engine**) (**Note terminology.**)
- Less total emissions than ICE car, even for 100% coal electricity. US average = 36% coal electricity.
  - [>68-mpg ICE for same total emissions as a BEV in U.S.](#)
- Most emissions are eliminated with solar and wind electricity. So, ultimate fuel source is solar, wind or other renewable electricity source.)
- Low “fuel” cost (~33% of equivalent gasoline car) (0% for solar PV.)
- Low maintenance cost (~25% of equivalent gasoline car)
- High performance: **high torque at low speed!**
- \$7,500 federal tax credit (Some states have additional benefits.)

# 0-30 mph Acceleration is a BIG DEAL!

- **High torque at low speed! Triple acceleration same efficiency as for ICE.**
- Can get to the next traffic light far ahead of ICE cars with no roar.
- Can maneuver much better in tight traffic.



Battery: 60-kWh

Motor: 150-kW = 200-hp

0-30 mph in 2.9-sec

0-60 mph in 6.5-sec

# Electric-Car Components

- **Large DC battery** (LEAF: 30 kWh; Chevy Bolt EV: 60 kWh)
- **Powerful AC electric motor** (LEAF: 80 kW = 107 hp; Chevy Bolt EV: 150 kW = 200 hp)
- **Regeneration** of gravitational and kinetic energy (Motor is a generator, also. Same for hybrids, e.g., Prius.)
- **Chargers** (120V-AC, 240V-AC, **480V-DC**) (CBEV: 7.2-kW AC)
- **DC to/from AC inverter** (battery to/from motor)
- **Auxiliary 12V battery** & DC to DC converter
- **Cooling systems** for motor, inverter and battery
- **Heating/cooling system for battery (liquid for Bolt EV)**
- Electric steering, brakes and climate control
- In-cab driver information about battery level, energy used and location of charging stations