



# Service Bulletin

File in Section: -

Bulletin No.: PIC5414C

Date: September, 2013

## PRELIMINARY INFORMATION

**Subject:** (EREV) Explanation Electric Range Variation and Driving Tips For Maximum Range

**Models:** 2011-2014 Chevrolet Volt  
2012-2014 Opel Ampera

**This PI was superseded to update the model list. Please discard PIC5414B.**

The following diagnosis might be helpful if the vehicle exhibits the symptom(s) described in this PI.

### Condition/Concern

Some customers may state that the vehicles electric range is less than customer expectations or what is being displayed on the in-vehicle display for EV range. The electric range of the Volt may be higher or lower than expected due the driver's technique, the terrain, and/or the outdoor temperature. In other words, driving and braking aggressively, driving in areas with large elevation changes, or driving in extreme outdoor temperatures will impact the electric range capability. While electric-only range may vary based on these factors, the range extender feature is always available for hundreds of miles of additional driving.

The EV Range displayed in the vehicle is a prediction based on the recent driving conditions. It is normal for the displayed value to adjust while the vehicle is driven as this estimate is constantly being re-calculated. Adjustments are based on recent driving history for the vehicle. The displayed EV Range can vary from season to season, week to week, day to day and even drive to drive.

The following items listed below explains what affects EV Range and driving tips for better energy efficiency.

### Recommendation/Instructions

The range can vary on any given day depending on temperature, terrain, driving conditions and so forth — especially temperature. The distance you can go in an electric vehicle varies hugely with the outside temperature.

The following Affects Electric Vehicle Range:

#### A) Temperature

1. All electric vehicles are less efficient in hot or cold conditions. This is function of battery storage capability and greater use of air conditioning and/or heat in these conditions.
2. During periods of low temperature the electric cabin heater, electric air conditioning, and battery heater may be running to defrost the windows and heat the cabin. These can have a substantial affect on range.
3. During high ambient temperatures the use of A/C will also affect range. Example: setting in eco mode will use up to 2.1 kWh and in comfort 2.4 kWh.
4. High ambient temperatures may also cause an increase in battery temperatures. When battery temperatures increase this will force the A/C compressor and battery chiller to run and maintain a battery temperature of 81 degrees F (27.2 C). If operating the HVAC system in Fan Only Mode cold air may be felt through the HVAC vents during chiller operation, this is normal operation. When the chiller is operating EV range will be affected.
5. Even in Eco setting, the actual range during periods of cold temperatures will be at the low side of range estimates. This may become more evident when a customer is driving for maximum fuel efficiency or on the same route and the only thing that changed was outside temperature. This is no different than a gas engine fuel mileage decreases; due to cold temperatures, efficiency losses, cold starts, cabin heat, and the use of defrosters.
6. The average cost to fully charge the HV battery is \$1.50 and a customer who is driving in cold temperatures may experience approximately 40-60 cents of electrical energy used to climate control the cabin and heat the battery.

**Note:** ENGINE RUNNING DUE TO TEMPERATURE: In cold conditions, below 25F (-3C) the customer may experience the engine running due to low ambient temperatures even when the battery is charged. "Engine Running Due To Temperature" message will be displayed in the DIC. This provides supplemental cabin heat as well as heating the high voltage battery. The engine may run periodically during these conditions. Also, in high ambient temperatures the electrically driven air conditioning compressor will work harder using more energy.

## **B) Drivers Technique**

1. Jack-rabbit starts and driving aggressively can drain battery faster.
2. High speed driving (over 75mph / 120kph) will deplete battery capacity and range quickly.
3. Increased weight from additional cargo or passengers can also decrease the range.

## **C) Tire Pressure**

1) Tire pressure can have an impact on your battery range. Additionally tire pressures can change with temperature changes. In order to maximize your range, insure that your tires are properly inflated. Tire pressure values can be viewed through the driver information center. For proper tire pressure, consult the owner's handbook and the vehicle Tire and Loading Information Label.

## **D) Terrain**

1. Living in hilly terrain, can definitely impact your range
2. Driving uphill requires more energy and can reduce range

The following information below provides tips for driving the vehicle for Better Energy Efficiency

**Note:** Use the following tips to help maximize energy efficiency and range.

## **A) Driving Style**

1. Efficiency Gauge (Instrument Cluster)
2. The ball indicator gauge in the Instrument Panel Cluster should be kept green and in the center of the gauge.
3. Inefficient acceleration is indicated when the ball turns yellow and travels above the center of the gauge.
4. Aggressive braking is indicated when the ball turns yellow and travels below the center of the gauge.

## **B) Acceleration/Braking/Coasting**

1. Avoid unnecessary rapid accelerations and decelerations.
2. Electric range is maximized at 80 km/h (50 mph) and below. Higher speeds use more energy and can significantly reduce electric range.
3. Use cruise control when appropriate.
4. Plan ahead for decelerations and coast whenever possible. For example, do not rush to traffic signals.
5. Do not shift to N (Neutral) to coast. The vehicle recovers energy while coasting and braking in D (Drive) or L (Low).

**Note:** A significantly different driving style (higher speed and acceleration rate, harder braking, etc.) compared to the previous drive event (the last X miles of history recorded in the vehicle's computer) will cause the actual driving range to be significantly less than the initially predicted electric range.

## **C) Drive Mode and PRNDL Selection**

1. Use Normal Mode when possible.
2. Sport Mode provides more responsive acceleration than Normal Mode but can reduce efficiency.
3. Use Mountain Mode prior to climbing long, steep grades in mountainous areas. Be sure to engage Mountain Mode before starting to climb. Mountain Mode reduces electric range and power but may be needed to maintain speeds above 96 km/h (60 mph) when climbing grades of 5% or greater.
4. Use L (Low) in heavy stop-and-go traffic or when traveling downhill. L (Low) requires less brake pedal application and provides a controlled, efficient way to slow the vehicle down.
5. In Model Year 13 and beyond, try using Hold Mode in cold weather at the beginning of a drives longer than 25 miles. This will heat up the cabin much more rapidly early on, and can save HV Battery energy for motion rather than heat.

## **D) Climate Settings**

1. Using the heat and air conditioning systems decreases the energy available for electric driving.
2. Optimal energy efficiency is achieved with the heat, air conditioning, and fan turned off.
3. Less energy is used at low fan speeds. When using the fan, Fan Only is the most energy efficient climate setting. ECO is for moderate air conditioning and heater operation and is the next most energy efficient setting. Comfort provides the most comfort but is the least energy efficient.

4. Use the auto heated seat feature instead of climate settings. Heating the seat uses less energy than heating the vehicle interior.
5. Use remote start to heat or cool the interior when the vehicle is plugged in to maximize the electric range by utilizing electricity from the electrical outlet.
6. In hot weather, avoid parking in direct sunlight or use sunshades inside the vehicle.
7. Turn off the front and rear window defog/defrost when they are no longer needed.
8. Avoid driving with the windows open at highway speeds.

Please follow this diagnostic or repair process thoroughly and complete each step. If the condition exhibited is resolved without completing every step, the remaining steps do not need to be performed.