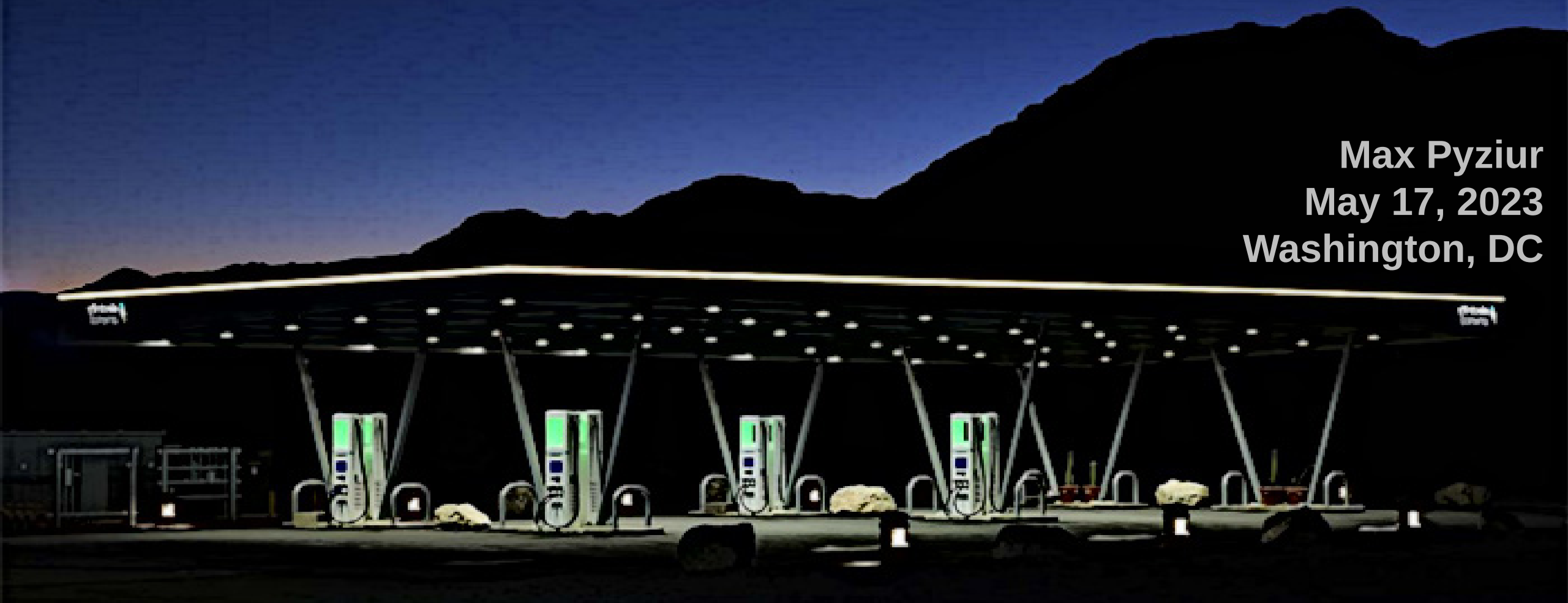


Chart of the Week #2023-20

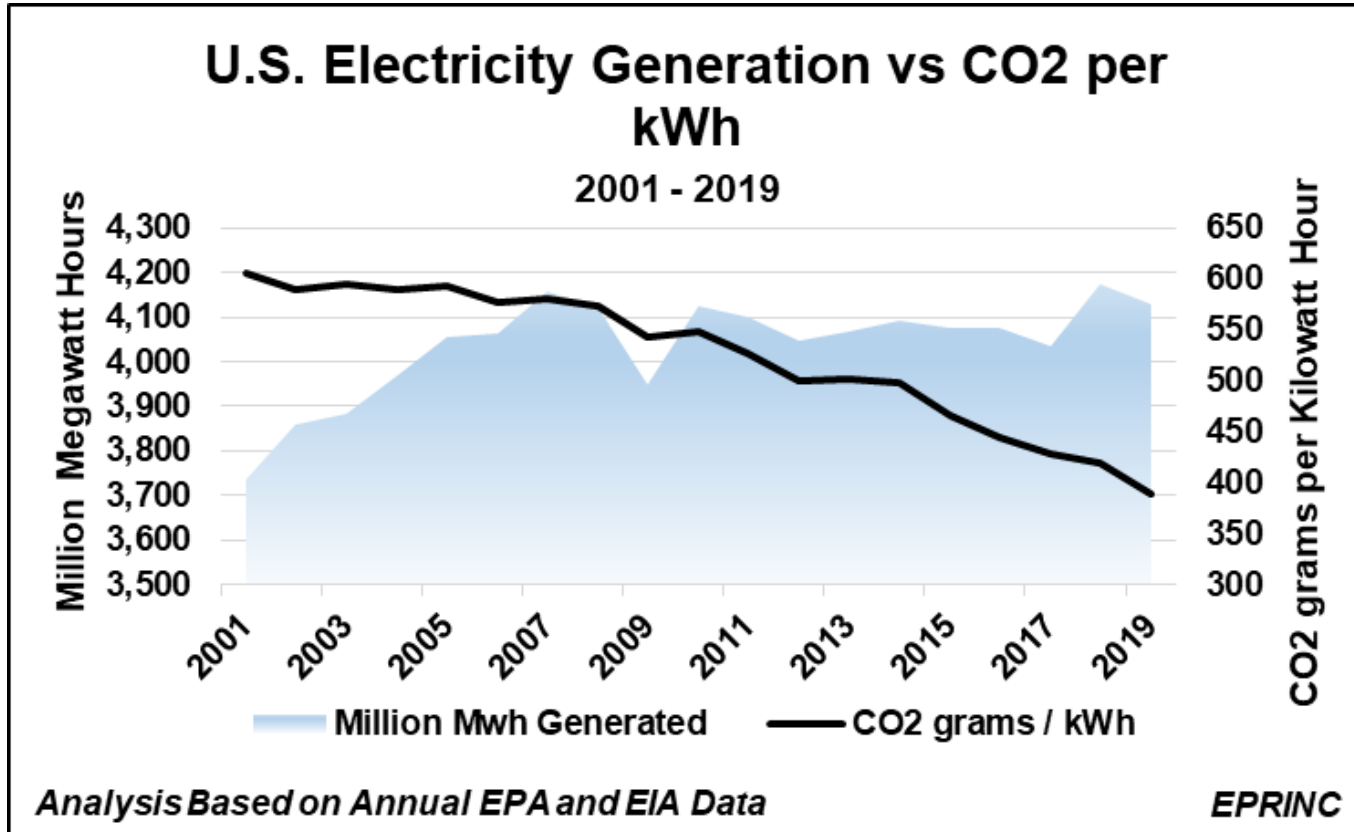
Comparing CO2 Emissions per 100 Miles Based on Energy Mix: Gasoline-Powered vs Battery Electric Vehicles



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May 17, 2023
Washington, DC



Comparing CO2 Emissions per 100 Miles Based on Energy Mix: Gasoline-Powered vs Battery Electric Vehicles



Using the latest data available from 2019, the U.S. generated a total of 4,128 million megawatt hours of electricity. This generation accounted for 1.6 billion metric tons of CO2 emissions, or 389 grams per kilowatt hour (kWh).

It is important to note, with the continuing retirement of coal-fired generation and the increasing use of natural gas generation, U.S. CO2 emissions from electricity generation has declined from 600 grams per kWh in 2001.

Comparing CO2 Emissions per 100 Miles Based on Energy Mix: Gasoline-Powered (ICE) vs Battery Electric (BEV) Vehicles

		Energy per	Grams of
Class	Brand/Model	100 miles	CO2 per 100 miles
Battery Electric Vehicles			
		kWhs per	
		100 miles	
Sedan	Tesla Model 3	19.6	7,633
Pickup / SUV	Rivian	46.9	18,264
Semi	Tesla Semi	170.0	66,204
Gasoline-Powered Motor Vehicles			
		Gallons per	
		100 miles	
Sedan	Honda Accord 2.0T	28.3	3.5
Pickup / SUV	Typical SUV	20.4	4.9
Semi	Typical Tractor	6.0	16.7
Hybrid Gasoline-Electric Motor Vehicles			
Hybrid	Toyota Prius	55	1.8
Analysis based on EPA & Company Data			EPRINC

A BEV sedan such as a Tesla Model 3 requires an average of 19.6 kWhs of electricity to travel 100 miles. Based on aggregate 2019 U.S. electricity data, this would generate 7,600 grams of CO2.

A typical ICE sedan such as a Honda Accord generates 34,500 grams of CO2 in order to travel the same distance (based on an MPG of 28.3 and the combustion of a gallon of gasoline generating 8,900 grams of CO2).

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- Motor-vehicle CO2 emissions categories range from being narrow to expansive. At their most encompassing, they are termed "cradle-to-grave," where operating emissions along with other vehicle-cycle emissions (material, production, and end-of-life vehicle disposal emissions) are factored. These expansive costs require making different assumptions, and the estimates can vary.
- Operating emissions require fewer assumptions and can be more easily derived.
- While battery-electric vehicles produce no tailpipe emissions, the energy mix of the electricity used for a BEV's charging impacts its operating CO2 footprint.
- A BEV sedan such as a Tesla Model 3 requires an average of 19.6 kWhs of electricity to travel 100 miles. Based on aggregate 2019 U.S. electricity data, this would generate 7,600 grams of CO2. A typical ICE sedan such as a Honda Accord generates 34,500 grams of CO2 in order to travel the same distance (based on an MPG of 28.3 and the combustion of a gallon of gasoline generating 8,900 grams of CO2).
- The expanded version of this slide deck is available at: <https://eprinc.org/chart-of-the-week/>
- For more information on this chart, please contact Max Pyziur (maxp@eprinc.org).