

Chart of the Week #2023-26

EV Electricity Requirements and EPA's Challenging Rules



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Danielle Amy / WSJ

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Can the U.S. Power Grid Manage An Immediate Switch to Electric Vehicles?				
			Factor	Formula
A	U.S. Total Miles On-Highway Driven (VMT)	3.2	Trillion	
B	Number of Light Duty Vehicles (LDVs) (90% of VMT)	249.0	Million	
C	Heavy Duty Vehicles (HDVs) (10% of VMT)	13.2	Million	
D	LDVs VMT	2.9	Trillion	90% * A
E	HDVs VMT	0.3	Trillion	10% * A
F	MPG-Equivalent LD Electric Vehicle	100.0	One	
G	MPG-Equivalent HD Electric Vehicle	30.0	One	
H	LDV Fuel – Gasoline KWH/Gallon	35.3		
I	HDV Fuel – Diesel KWH/Gallon	40.3		
J	LDV EV Annual Electricity Requirement	1.015	Trillion KiloWatt Hours	(D ÷ F) * H
K	HDV EV Annual Electricity Requirement	0.4	Trillion KiloWatt Hours	(E ÷ G) * I
L	Total EV Annual Electricity Requirement	1.4	Trillion KiloWatt Hours	J + K
M	U.S. Total Electricity Generation	4.2	Trillion KiloWatt Hours	
N	10 year Annualized Growth Rate	0.4%		
O	Years Required of Growth in Electricity Generation	79.8		(ln(L+ M) ÷ M) ÷ N
Analysis based on EIA & DOE Data			EPRINC	

In order to accommodate a full fleet of electric vehicles, the U.S. Grid would need to generate 33%, or 1.4 Trillion KWHs, more of electricity.

U.S. Electricity Generation grew at an annualized 0.4% growth rate during the last ten years.

At that rate, it would require 79.8 years to accommodate a full EV transition of the U.S. fleet.

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- On April 12, 2023, EPA announced a proposed rule (Docket Number: [EPA-HQ-OAR-2022-0829](#)). If implemented, EPA anticipates that this rule would effectively increase the number of electric vehicles (EVs) in use. Under the proposed rule, 60% of automakers production would need to be EVs by 2030 and 67 percent by 2032 to meet the requirements, compared to just 5.8%, the relative number of sold US vehicles that were EVs in 2022. The comment period closes July 5, 2023.
- On May 8, 2023, EPA announced proposed new GHG standards for coal and gas-fired power plants (Docket number: [EPA-HQ-OAR-2023-0072](#)). The rule mandates that most coal and natural gas fired electricity plants capture 90% of their emissions by 2035 and convert to hydrogen by 2038. Furthermore, EPA estimates that this proposed rule would lead to the retirement of 42 thousand megawatts of coal plants, and use of natural gas for power generation would decline by 37%. The comment period closes August 8, 2023.
- The two rules effectively contradict each other: the motor vehicle rule mandates higher EV production and usage; the power plant rule mandates lower amounts of dispatchable electricity generation.
- 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).