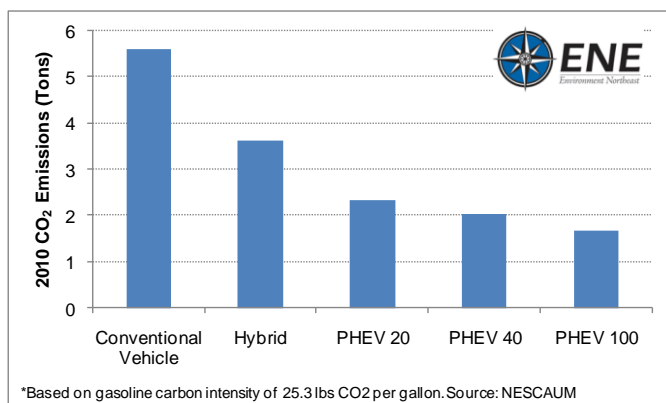


Emissions Benefits of Plug-in Hybrid Electric Vehicles

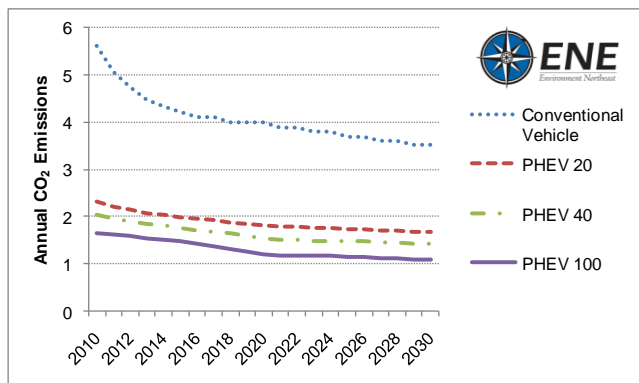
January, 2009



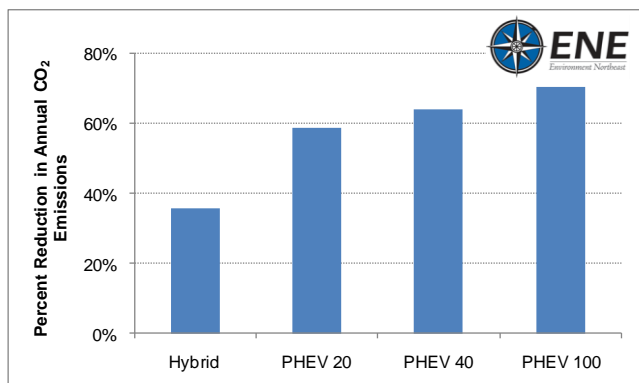
2010 CO₂ Emissions for Different Vehicles (per vehicle)



Annual CO₂ Emissions including RI RES



Percent Reduction in Annual CO₂ Emissions Compared to a Conventional Vehicle



Vehicle energy consumption in 2010

Vehicle Characteristics 2010	Conventional Vehicle	Hybrid Vehicle	PHEV 20	PHEV 40	PHEV 100
Annual Mileage (miles)	12,000	12,000	12,000	12,000	12,000
Utility Factor (percent)	n/a	n/a	0.49	0.66	0.88
Electric (kWh/mile)	n/a	n/a	0.25	0.25	0.25
Efficiency					
Fuel Efficiency (mpg)	27	48	48	48	42
Electric (kWh)	0	0	1470	1980	2640
Consumption					
Gas (gallons)	444	255.7	127.5	85	30

Sources:
 Electrification Roadmap: Revolutionizing Transportation and Achieving Energy Security. Electrification Coalition, Washington, D.C.: November 2009.
 Environmental Assessment of Plug-In Hybrid Electric Vehicles. Volume I: Nationwide Greenhouse Gas Emissions. EPRI, Palo Alto, CA: 2007. 1015325.

Conventional and electric engine efficiency

	Average Internal Combustion Engine Fuel Efficiency (MPG)	Average Electric Motor Efficiency (mi/kWh)
2010	27	4.0
2011	30	4.0
2012	32	4.0
2013	34	4.1
2014	35	4.1
2015	36	4.2
2016	37	4.3
2017	37	4.4
2018	38	4.5
2019	38	4.7
2020	38	5.0
2021	39	5.1
2022	39	5.1
2023	40	5.2
2024	40	5.2
2025	41	5.3
2026	41	5.3
2027	42	5.4
2028	42	5.4
2029	43	5.5
2030	43	5.5

Source: Electrification Roadmap: Revolutionizing Transportation and Achieving Energy Security. Electrification Coalition, Washington, D.C.: November 2009.

CO₂ emissions from electricity generation including Rhode Island Renewable Energy Standard targets

Year	RI RES*	Off-Peak CO ₂ (Lbs. per MWh)	Peak CO ₂ (Lbs. per MWh)
2010	5%	968.4	950.2
2011	6%	958.2	940.3
2012	7%	948.1	930.3
2013	8%	938.0	920.4
2014	9%	927.8	910.4
2015	10%	912.6	895.5
2016	12%	897.4	880.6
2017	13%	882.2	865.7
2018	15%	867.0	850.7
2019	16%	851.8	835.8
2020	16%	851.8	835.8
2021	16%	851.8	835.8
2022	16%	851.8	835.8
2023	16%	851.8	835.8
2024	16%	851.8	835.8
2025	16%	851.8	835.8
2026	16%	851.8	835.8
2027	16%	851.8	835.8
2028	16%	851.8	835.8
2029	16%	851.8	835.8
2030	16%	851.8	835.8

Sources:
 Marginal Emissions Analysis. Independent System Operator-New England: 2007.
 Rhode Island Renewable Energy Standard. Database of State Incentives for Renewables and Efficiency: 2009.



8 Summer Street, PO Box 583 Rockport, ME 04856 (207) 236-6470 admin@env-ne.org
 Rockport, ME / Boston, MA / Providence, RI / Hartford, CT / Portland, ME
 Charlottetown, PEI, Canada / www.env-ne.org / Daniel L. Sosland, Executive Director

Environment Northeast is a nonprofit organization that researches and advocates innovative policies that tackle our environmental challenges while promoting sustainable economic development. ENE is at the forefront of state and regional efforts to combat global warming with solutions that promote clean energy, clean air and healthy forests.