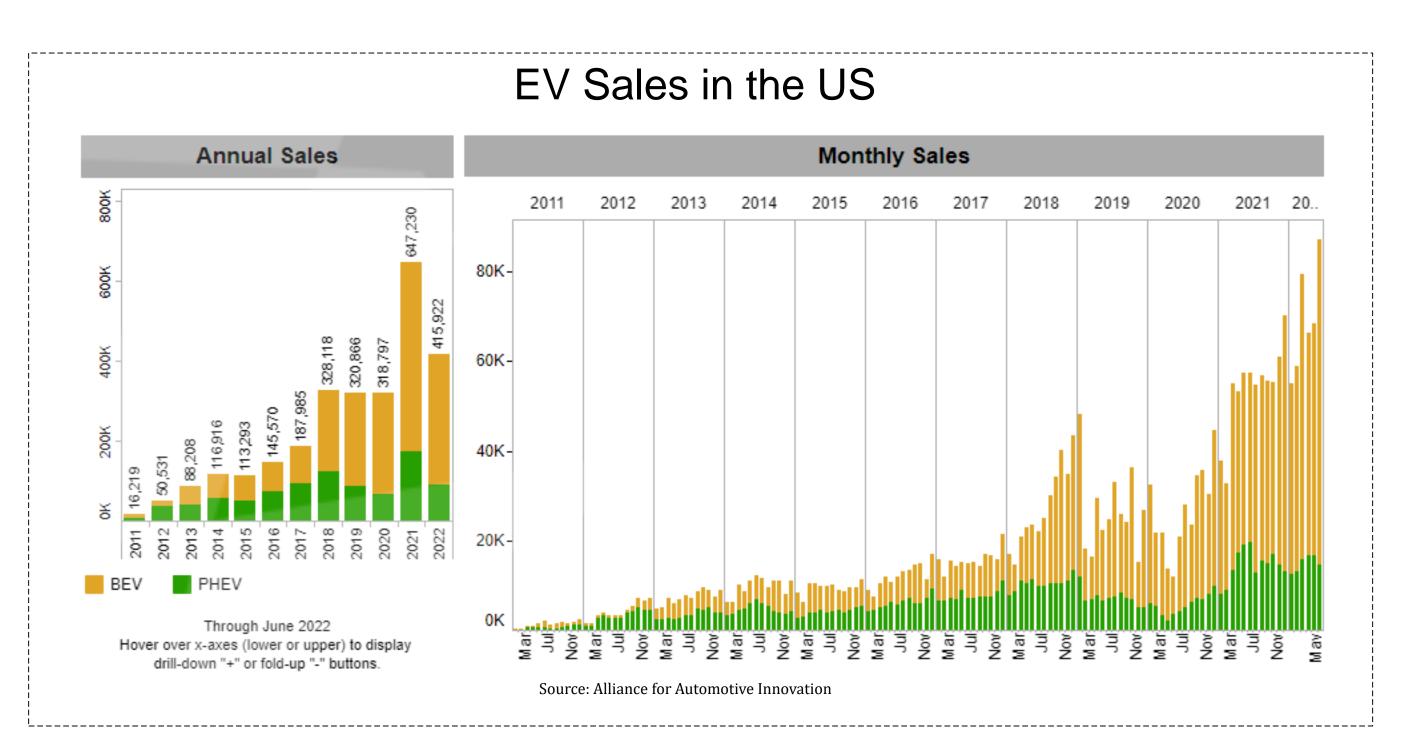


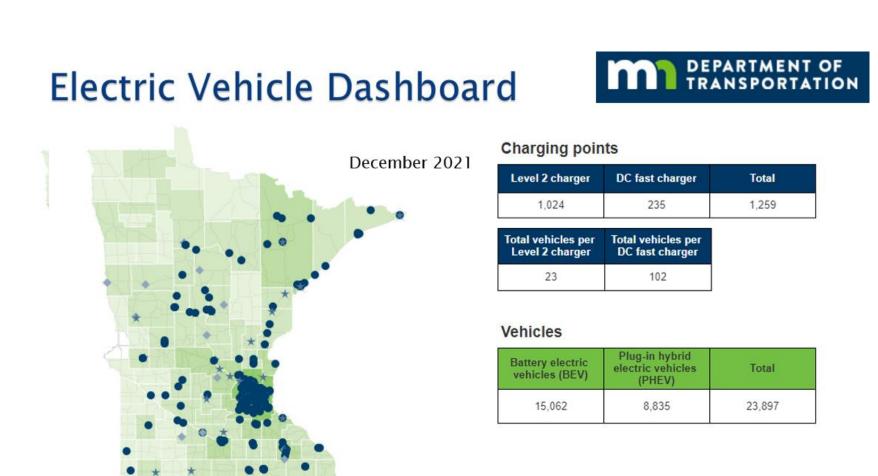
# Crisis in Power Engineering Education: A National Security Concern Minneapolis, MN October 21-22, 2022



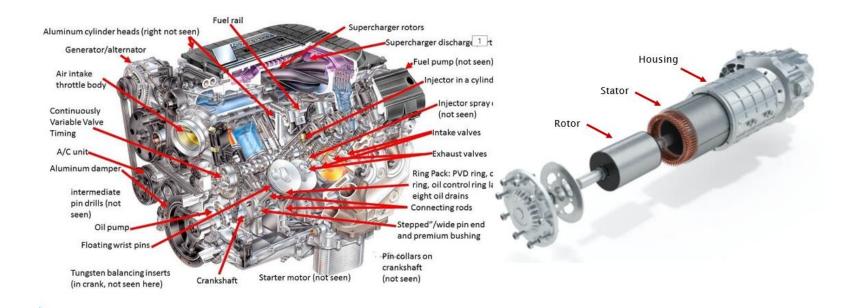
# **Electric Vehicle Market and Resources**

### Brought to you by Shift2Electric.com



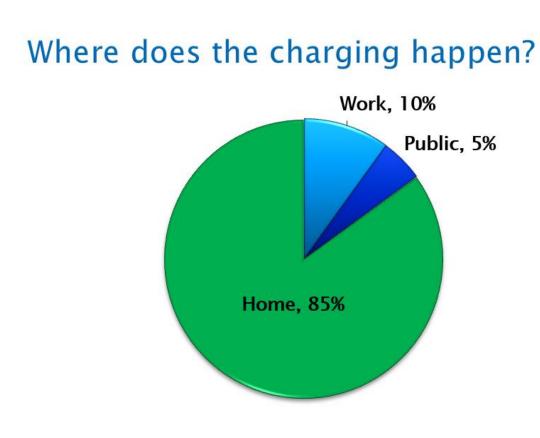


#### Internal Combustion Engine vs. Electric Motor



	_			Page 1	013									MidwestEVOLVE						
							Rango			Charging speed (miles/hr)				,	Performance		-			
Make	Model	Photo	Seating	EV Type	RWD/ AWD	Base MSRP	federal tax credit	Price after federal tax credit	Size (kWh)	Range (miles)	Total Range (miles)	Charging rates (kW) L2/DCFC	Level 1 120V	Level 2 240V	DCFC 400+V	MPGe/	Top Spd (mph)	mph (sec)	Towing capacity (lbs)	Crash Ratings: IIHS/NHTS
Audi	a-tron		8	REV	AWD	\$74,800	\$7,500	\$67,300	95	204	204	11/130	1	24	228	74	155	5.5	4000	Top Safet Pick +/ No rated
Audi	Q5 e		5	PHEV	AWD	\$52,900	\$6,712	\$46,188	14.1	20	390	7.4	2	14	N/A	65/27	130	5	4400	Good/ Not rated
Audi	ASL PHEV	1-0-2	5	PHEV	AWD	\$94,000	\$6,795	\$87,205	14.1	17	420	7.4	2	12	N/A	54/23	130	4.9	0	Not Rate
8MW	13		4	nev	RWD	\$44,450	\$7,500	\$36,950	42	153	153 (200)	7.4/5:0	4	27	147	124 (39)	93	6.9-7,2	0	Good- Acceptable Not rated
BMW	iŝ		4	PHEV	AWD	\$147,500	\$3,793	\$148,707	7.2	15	330	3.3	3	7	N/A	76/28	155	4.2	0	Not rated Not rated
BMW	X8 xDri	W	τ,	71	(A)	L	75	71	n	f,	\I	•	cł	F.	c	<b>.</b> .	n		)	Top Safet Pick + / Not rated
BMW	531	VV	V	V	VV	.L	١ ز	<b>/ I</b> .	11	1(	J	<b>.</b> 1.	<b>3</b> (	L	L	JI	11		,	Top Safet Pick + / Not rate
BMW	745e		5	PHEV	AWD	\$95,550	\$5,836	\$89,714	12	16	290	3.7	2	6	N/A	56/22	155	4.9	0	Not rated Not rates
Chevrolet	Bolt EV		5	BEV	FWD	\$36,620	\$1,875	\$84,745	66	259	259	7.2/50	4	25	140	118	98	6.5	0	Top Safet Pick / 5 star
Chrysler	Pacifica Hybrid (PHEV)		7	PHLV	FWD	\$39,995	\$7,500	\$32,495	16	33	570	8.6	ı	16	N/A	84/12	107	7.8	0	Top Salet Pick / 5 ctar
Ford	Fusion Energi	0 0 5	5	PHEV	FWD	\$35,000	\$4,609	\$30,891	9	26	610	3.3	3	9	N/A	97/42	85	8.5	0	Good/ 5 star
Honda	Clarity PHEV		5	PHEV	FWD	\$33,400	\$7,500	\$25,900	17	48	340	6.6	4	22	N/A	110/42	110	8.8	0	Not rated Not rated
Jaguar	I-PACE		S	BLV	AWD	\$69,850	\$7,500	\$62,350	90	246	246	7.0/85	1	16	153	76	124	4.5	0	Not rate
											_							_	_	

EVs available in the US



#### Quick answer links:

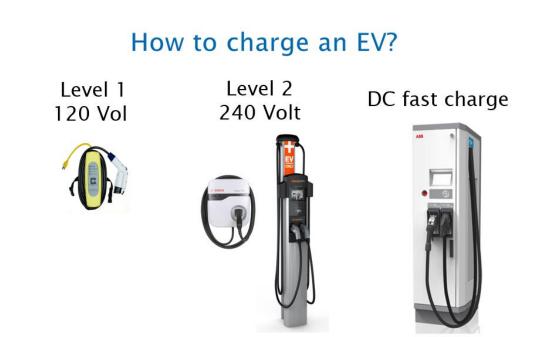
Which EVs are available in MN: <a href="https://www.EVInfoList.com">www.EVInfoList.com</a>
I could consider an EV but I need more information:

I could consider an EV but I need more information: <a href="www.MNEVBuyer.com">www.MNEVBuyer.com</a>
I'm ready to buy an EV, who should I talk to: <a href="www.EVSalesSavvy.com">www.EVSalesSavvy.com</a>
I would like to talk with existing owners: <a href="www.MNEVOwners.org">www.MNEVOwners.org</a>
How can my utility company help: <a href="www.MNCharging.org">www.MNCharging.org</a>
I live in an apartment building or a condominium: <a href="www.MUDCharging.com">www.MUDCharging.com</a>

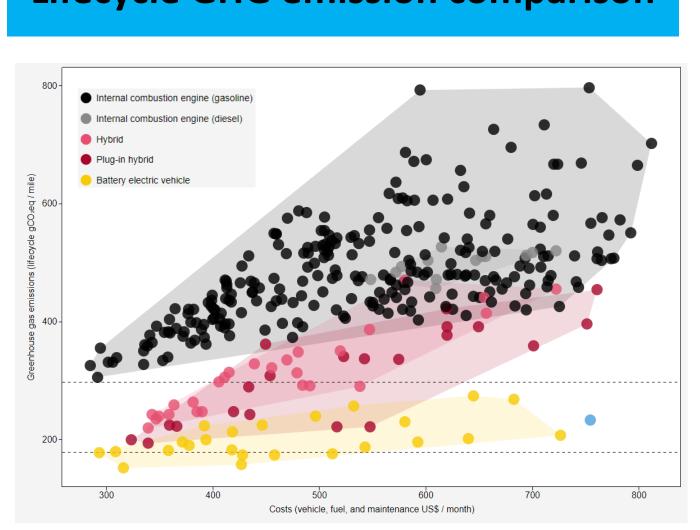
How could I get charging at my workplace: <a href="www.MUDCharging.com">www.MUDCharging.com</a>
How could I get charging at my workplace: <a href="www.WorkplaceCharging.com">www.WorkplaceCharging.com</a>
How can I find public charging: <a href="www.PlugShare.com">www.PlugShare.com</a>

Are EVs really cleaner and affordable: <a href="https://www.CarbonCounter.com">www.CarbonCounter.com</a>



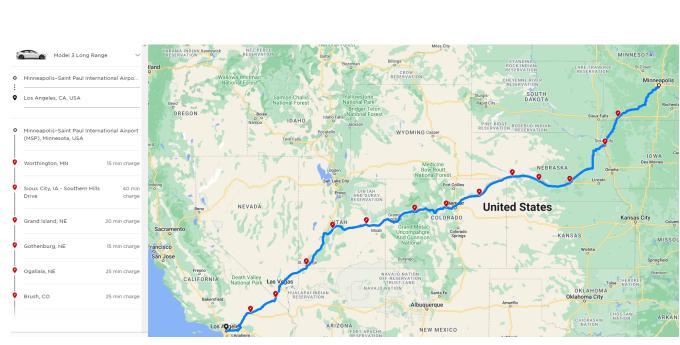


# Lifecycle GHG emission comparison



Source: CarbonCounter.com

# **Road trips enabled**



Source: Tesla trip planner

# How can EVs help to flatten the Duck Curve?

Figure 2: The duck curve shows steep ramping needs and overgeneration risk Net load - March 31 26,000 24,000 22,000 20,000 18,000 ramp need 16,000 ~13,000 MW 14,000 in three hours 12,000 overgeneration 10,000 Graph: CAISO