



An Electrifying Transition: Inside the Insurance Implications of Electric Vehicles

An Emerging Issues Webinar

November 4, 2024

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Today's Agenda and Speakers

- ❖ Market Snapshot: Charting the Growth of EVs and EV Infrastructure
- ❖ The Emerging Risks of EVs
- ❖ The EV of the (Not Too Distant) Future
- ❖ The View from Verisk: ISO Personal Auto Experience Data
- ❖ Personal Auto Considerations
- ❖ Commercial Auto Considerations



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Market Snapshot: Charting the Growth



Greg Scoblete, CPCU
Emerging Issues Analyst



Start Your (Electric) Engines: EV Growth



8.9% of all vehicles
sold in U.S. were EVs in Q3, 2024



By 2027, may grow to...
29%



EPA Emission Regs:
Phase in: MY2027



Start Your (Electric) Engines: Heavy-Duty EV Growth



0.3% of all heavy-duty vehicles
registered in U.S. in are EVs



By 2030...
could grow to 18% (globally)



Alternative fuels:
Hydrogen on the horizon



Start Your (Electric) Engines: EV Infrastructure Growth

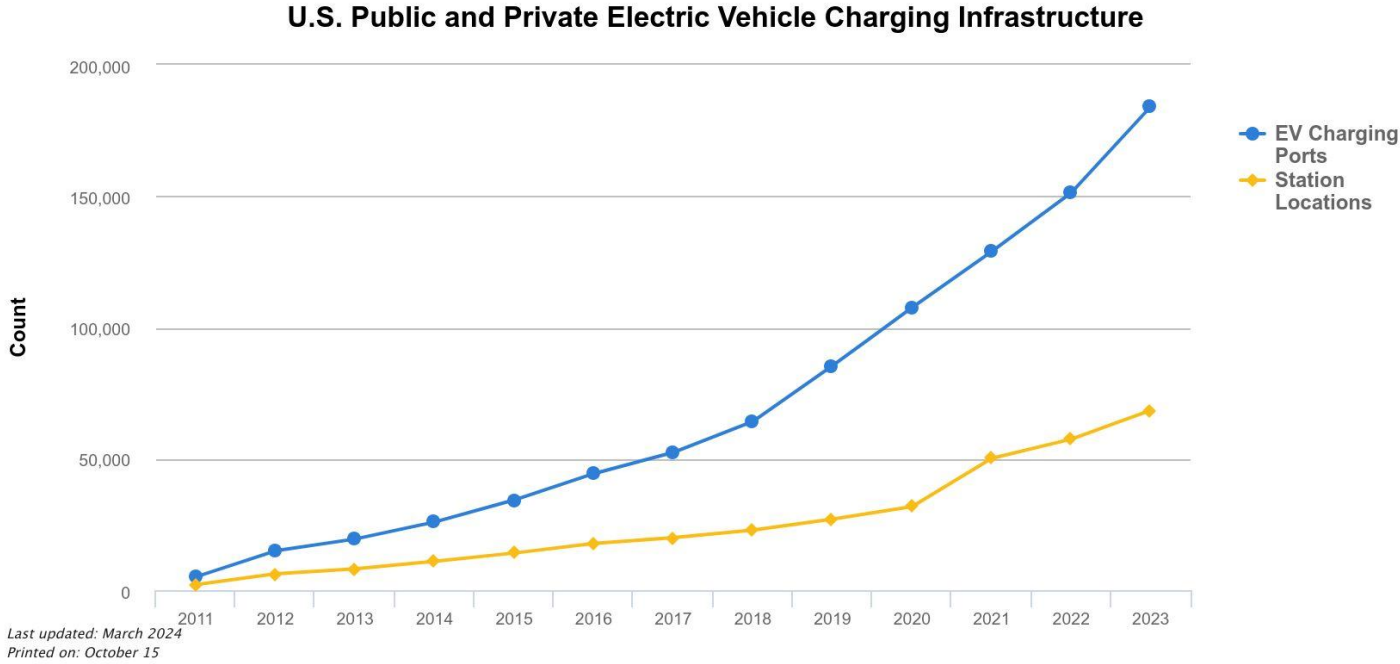
184,000+
 Public/private charging ports
 (+80% since 2020)

↓

U.S. Goal:
500,000 or more
 by 2030

↓

Will this be enough?
 Maybe not...



Source: U.S. Department of Energy

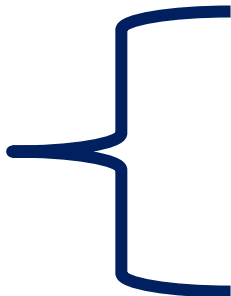
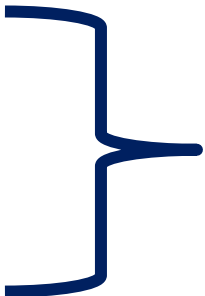
EV Transition: Industry Impact (+)

	Occupation	Projected employment growth 2021-31	Industry NAICS (2022)
Charging network development and maintenance	Urban and regional planners	3.8%	925120
	Electricians	7.1%	238210
	Electrical power-line installers and repairers	3.2%	237130
	Construction laborers	5.3%	
Battery manufacturing	Other electrical equipment and component manufacturing	17%	3359
Design/development of electric vehicles	Software development	26%	541511
	Electrical engineers	1.6%	
	Electronic engineers	6%	
	Chemical engineers	13.9%	541330

EV Transition: Industry Impact (-)

Occupation	Projected employment growth 2021-31	NAICS (2022)
Gasoline Stations	-10%	925120
Motor vehicle parts manufacturing	-21.5%	
Gas Plant Operators	-10%	
Petroleum Pump System Operators	-2%	

Data: Bureau of Labor Statistics


 “Of the nearly 590,000 U.S. employees engaged in motor vehicle parts manufacturing, about one-quarter—nearly 150,000—make components for internal combustion powertrains.” – U.S. Congressional Research Service
 

The Emerging Risks of EVs



EV Fires: Myths and Realities

25.1 fires

for every 100K EVs sold

vs.

1,529 fires

for every 100K ICE vehicles



How can they start?

- Accidents
- During charging
- After flooding
- Faulty battery from manufacturer

Burn hotter

- 1,000+ degrees higher than ICE fire
- Greater possible risk to surrounding people/property

Reignition

- Days to weeks after extinguished
- May increase fire hazard for tow trucks, garages, service stations

Toxins

- Batteries can leak chemicals and fumes
- May pose risk to passengers, first responders, environment

South Korea: 1.3 EV fires per 10K vehicles sold vs. 1.9 for ICE vehicles
Sweden: 0.004% of EVs caught fire vs. 0.08% for ICE vehicles



EV Risk: Charging Station Focus

**Roughly
20%**

of EV fires may be
tied to charging



Property concerns

Directional flames & explosions

Chargers following code?

Peer-to-peer charging
networks, spreading risk?

“Fire is getting faster”

“Right to charge”

Legislation enacted or considered in
at least **7 states** in 2023

May accelerate charging buildout for
apartments/condos

Emerging charging station risks

- ❖ Thefts: Copper wire targeted
- ❖ Reliability and interoperability: Some states taking action



EV Cybersecurity Risk: Multiple Vectors

A growing threat to the electric vehicle infrastructure

- Charging station hacks can display inappropriate content, access personal data, distribute malware, and disrupt critical functions (DoS attacks)
- Charging station hacks could serve as a springboard for penetrating and disrupting electrical grids
- Recent research indicates attackers could interfere with EV operability and access personal data via charging ports
- Attackers could decrease battery capacity up to 50%, according to one report



EV Cybersecurity Risk: Multiple Vectors

Understanding the EV ecosystem

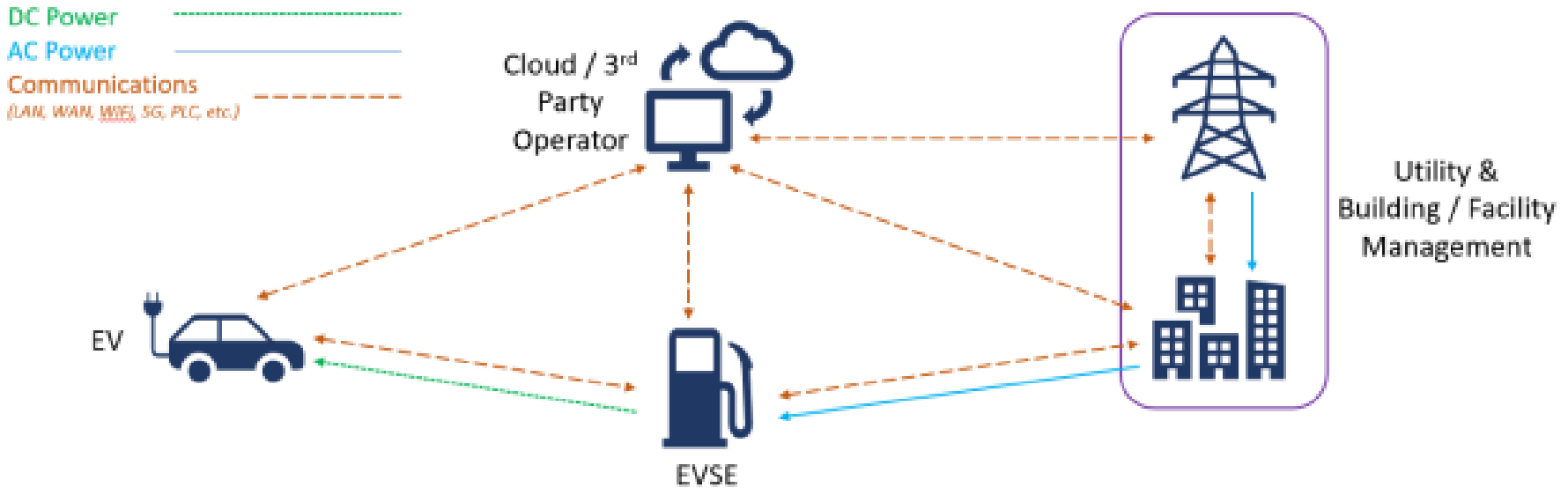


Fig. 2. EV/XFC Ecosystem Domains and Profile Scope

Source: [National Institute of Standards and Technology](#)

Electric Vehicles: The Weight Is the Hardest Part

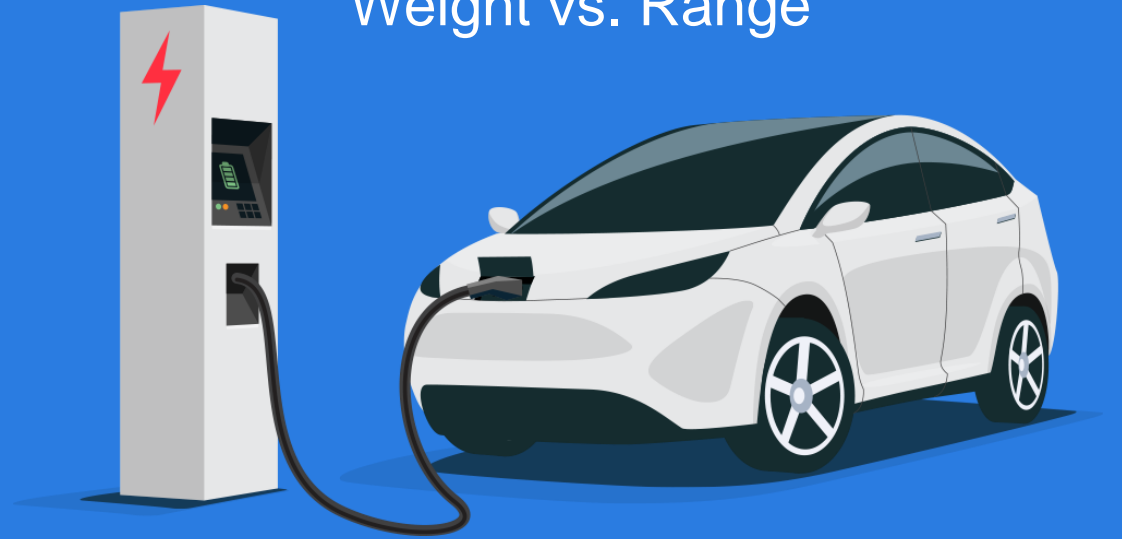
Tale of the Tape

Electric vehicles may be **20% to 50%** heavier than gas-powered vehicles

Some existing roadway guardrails cannot withstand impacts from EVs

U.S. infrastructure: Heavy-duty vehicles—**not private passenger types**—may be biggest concern

Emerging risk:
Weight vs. Range



Can infrastructure support the weight?

EV Supply Chains: Stretched Thin



Demand for EV minerals remains steady



Currently heavily concentrated, prone to possible disruptions and ESG concerns



A robust battery supply chain is developing in the U.S.

Emerging risk:
U.S. mining and the
“battery belt”



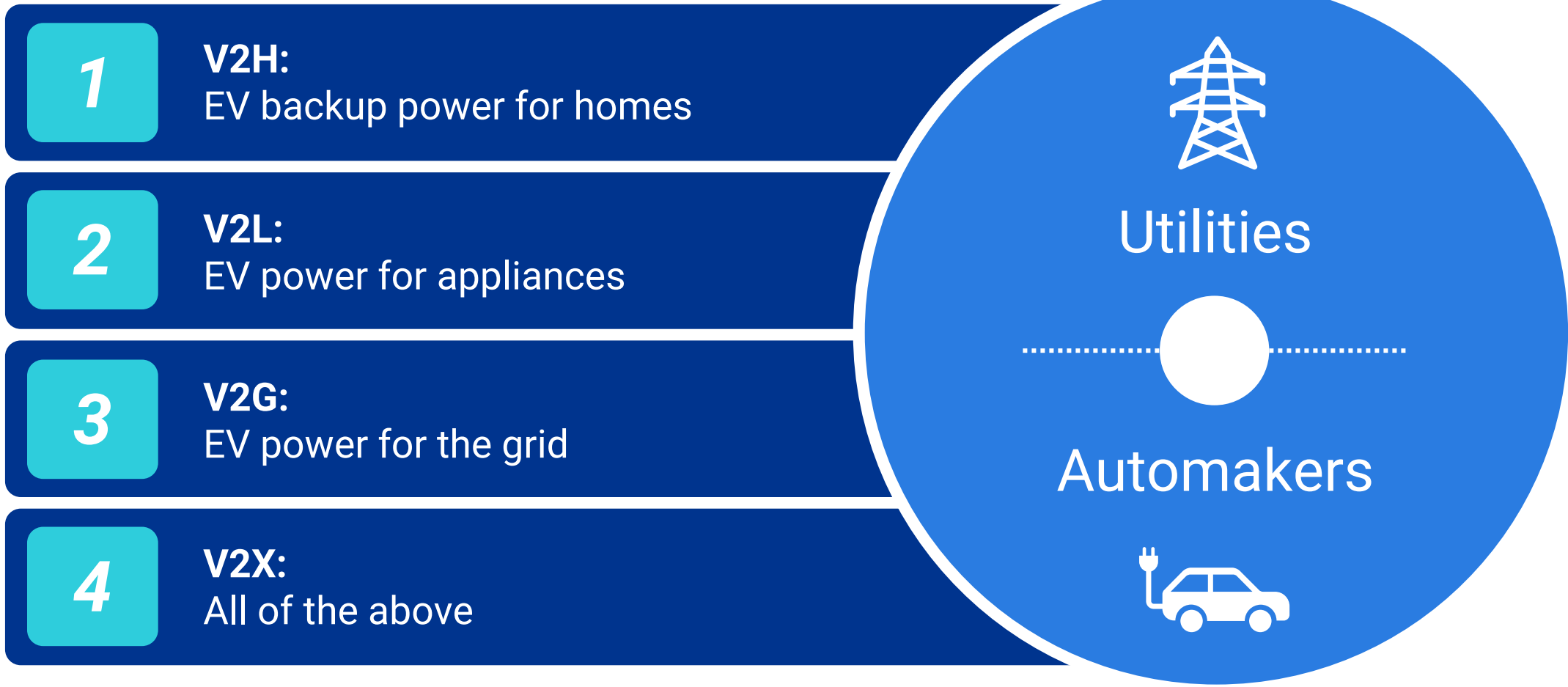
EV Supply Chains: Battery Recycling Developments

Challenges and opportunities facing the downstream supply chain

- Battery lifespans range from 10-20 years
- EV battery recycling process remains in its infancy
- Private sector investment and federal support is currently outpacing demand
- 1.2 million EV and hybrid batteries projected to reach end of life by 2030—14 million by 2040, and 50 million by 2050
- Reusing 50% of end-of-life batteries could reduce new demand on critical minerals



Emerging Use Cases: Bidirectional Charging



Bidirectional Charging: Considerations



Vehicle cost

May add \$3.7K to cost of vehicle



Fire

An open question



Cyber

A possible vector to the vehicle, home, business, & grid



Resilience

Safer backup power & more stable grids



U.S. Congress: HB 6178 “Bidirectional Electric Vehicle Charging Act of 2023” – Introduced

California: SB59 – Signed by Governor

The EV of the (Not Too Distant) Future



Better batteries:
Solid state, swapping, self-extinguishing



Charging:
Rapid, wireless, universal



Materials: Bring down
EV weight



The future of the **gas station?**



Personal Auto: Loss Experience



Raul Retian, FCAS, MAAA, CPCU
Senior Director
Personal Lines Actuarial Products

Electric/Hybrid Vehicles VSR Personal Auto Experience



Electric Vehicles are **3.4%** of the ISO Personal Auto database (5 years).

Hybrid Vehicles are **9.1%**.

Electric/Hybrid Vehicles VSR Personal Auto Experience

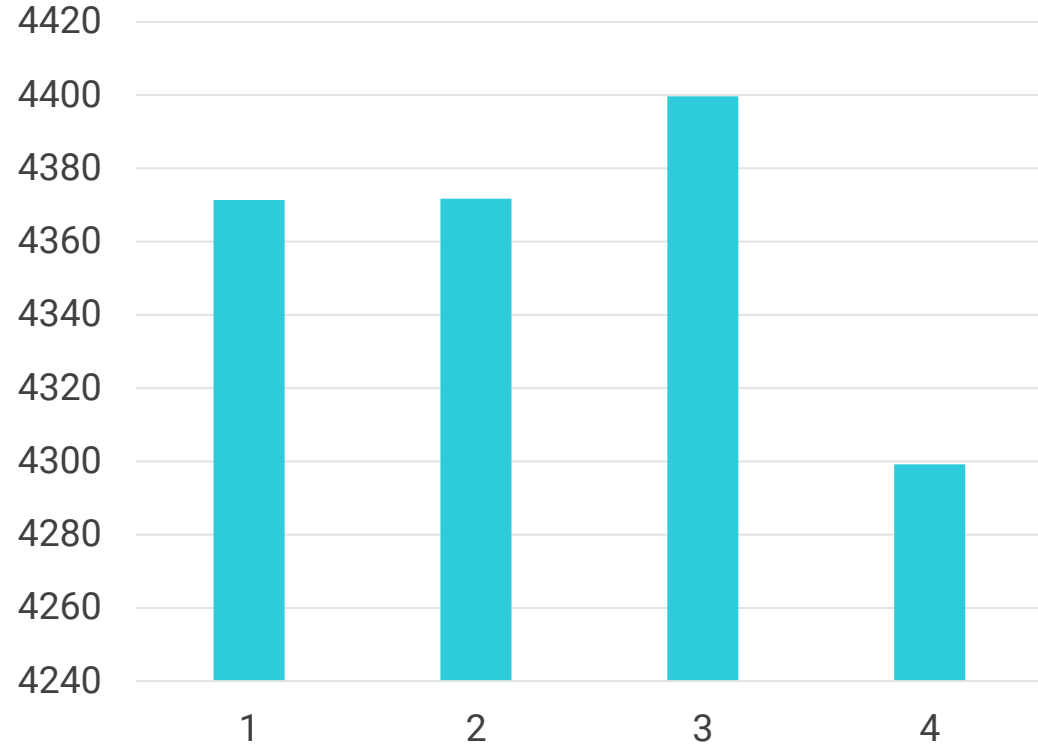
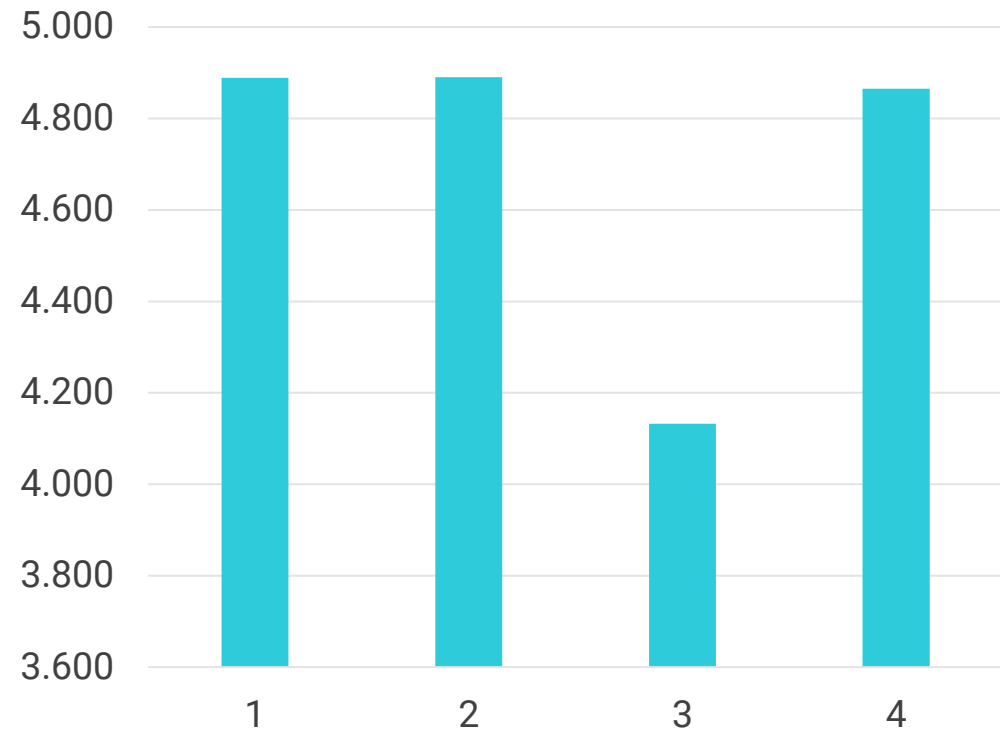


Electric Vehicles are **8.4%** of the ISO Personal Auto database in latest model year.

Hybrid Vehicles are **15.9%**.

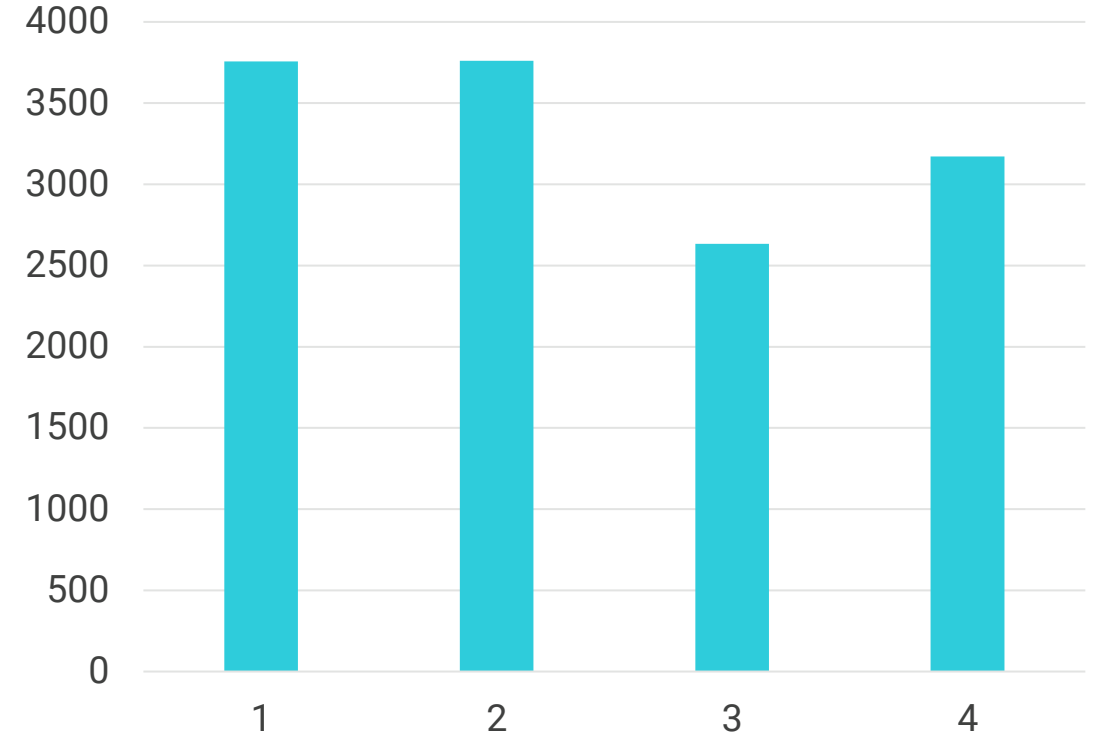
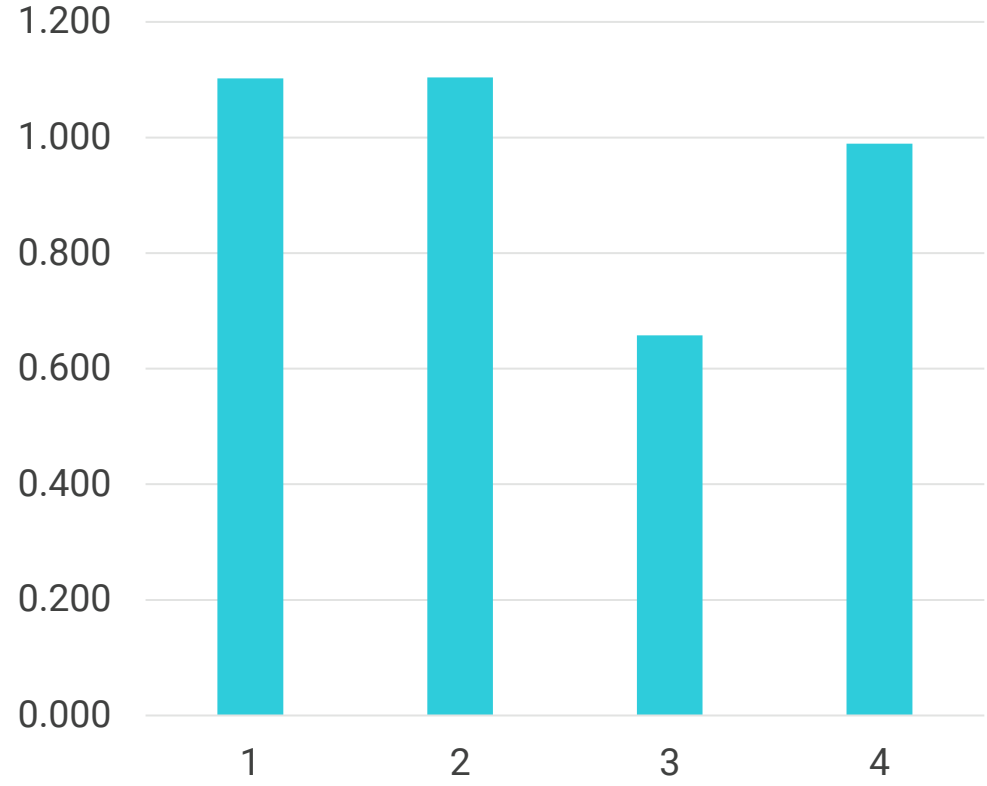
Electric/Hybrid Vehicles Personal Auto Experience

Bodily Injury and Property Damage Liability



Electric/Hybrid Vehicles Personal Auto Experience

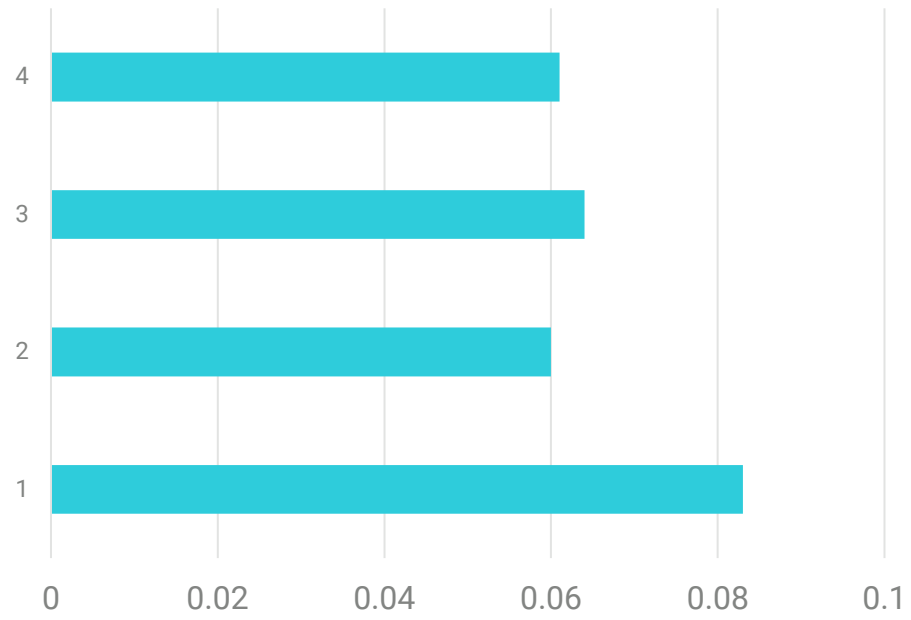
Medical Payments and No-Fault



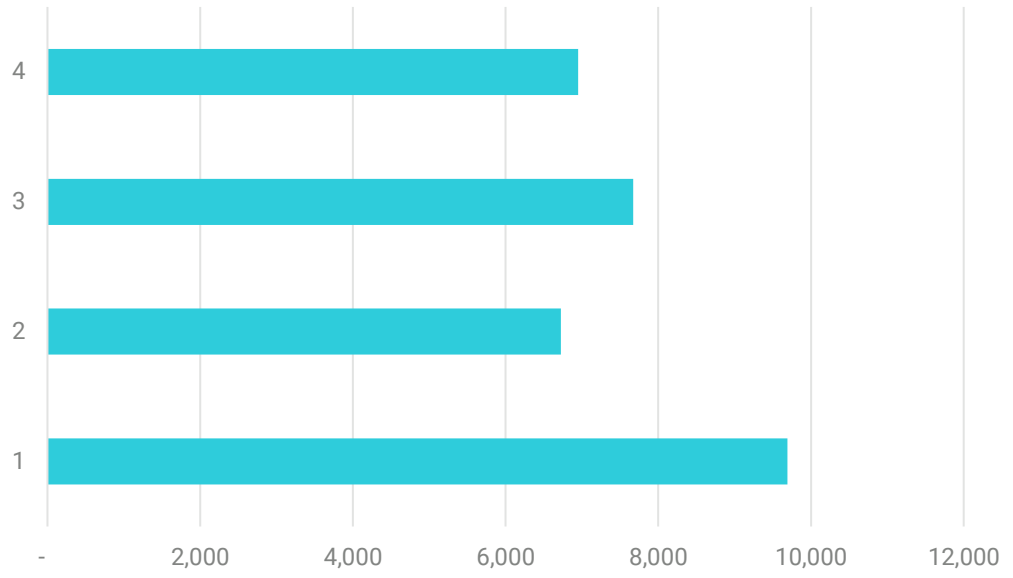
Electric/Hybrid Vehicles Personal Auto Experience

Collision

Frequency



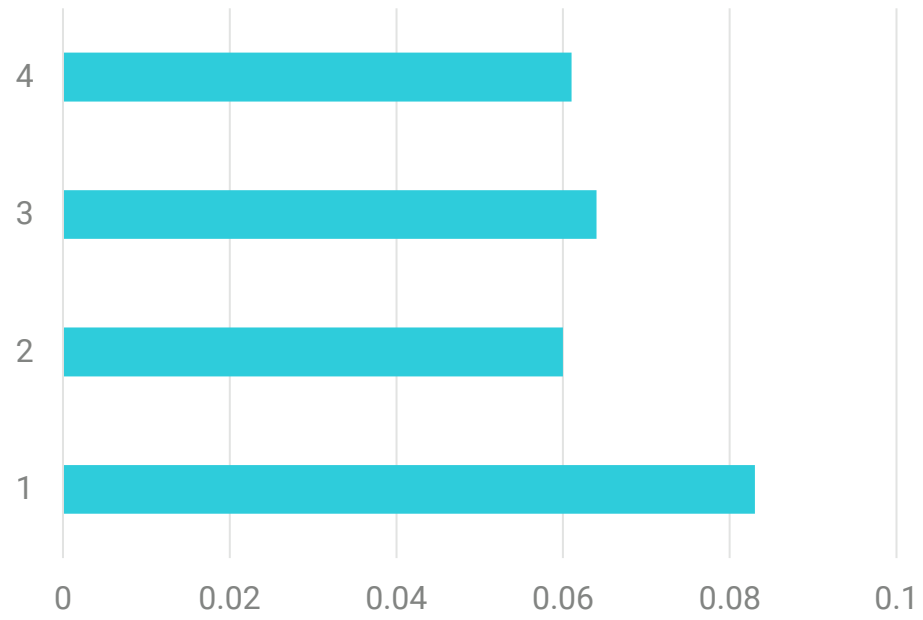
Severity



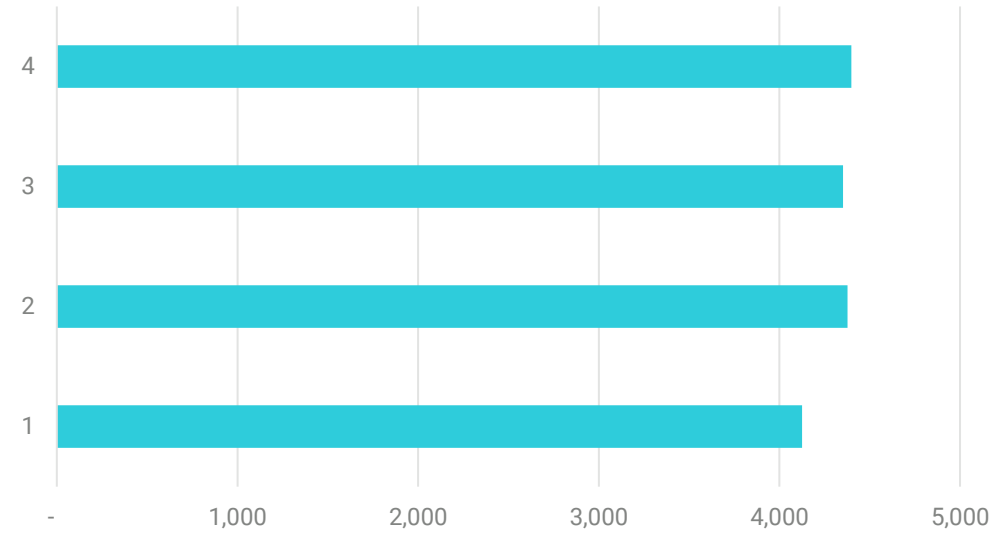
Electric/Hybrid Vehicles Personal Auto Experience

Collision

Frequency



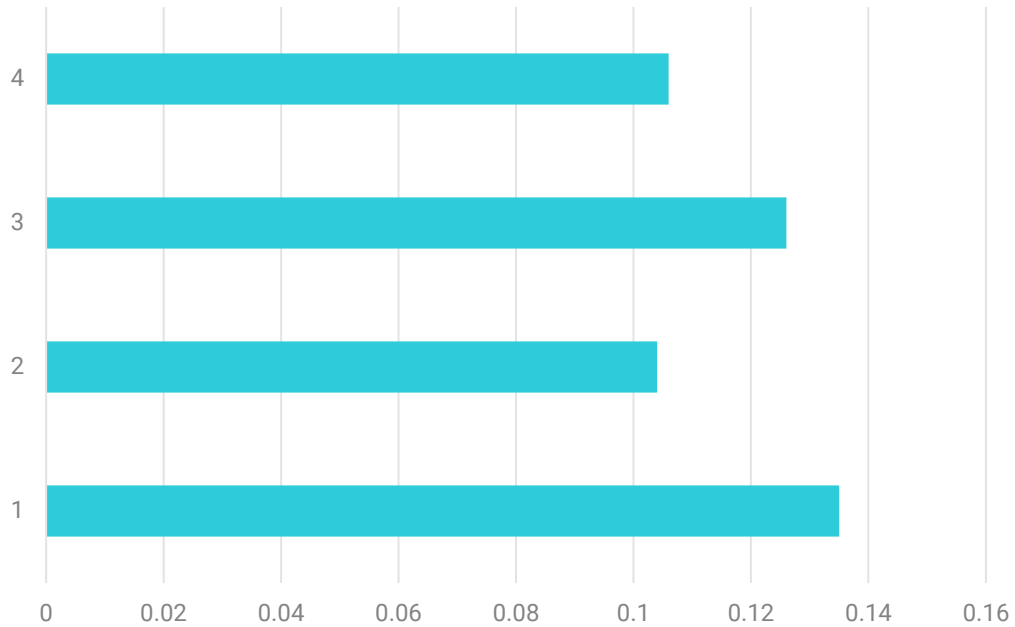
Adjusted Severity



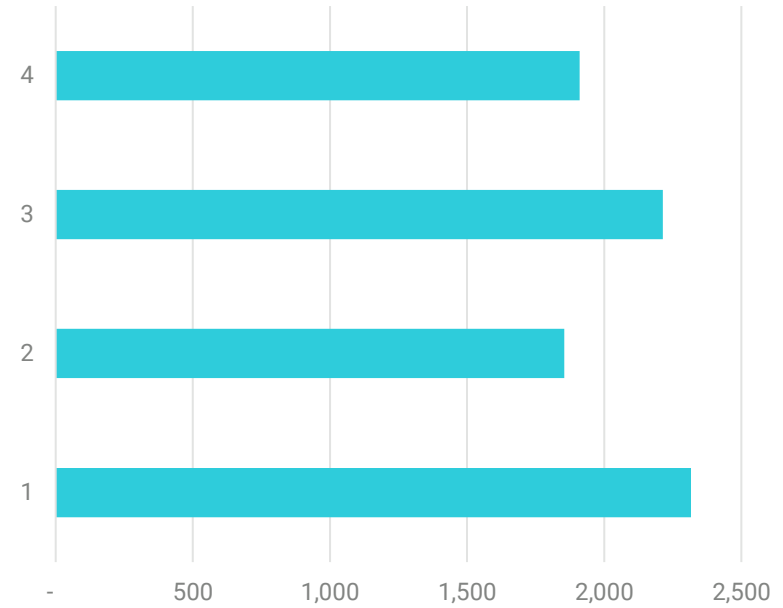
Electric/Hybrid Vehicles Personal Auto Experience

Comprehensive

Frequency



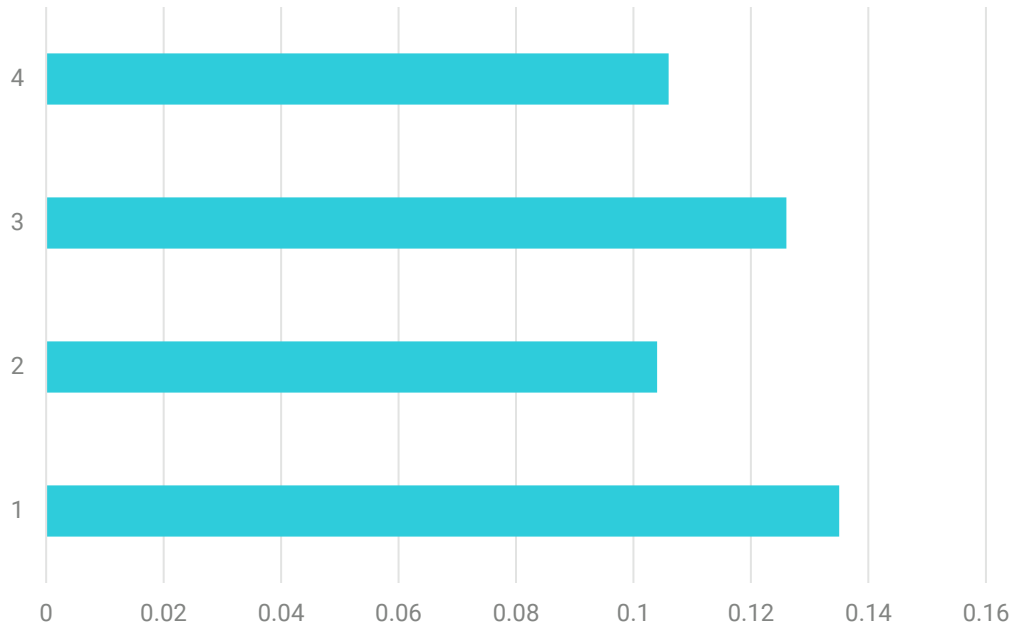
Severity



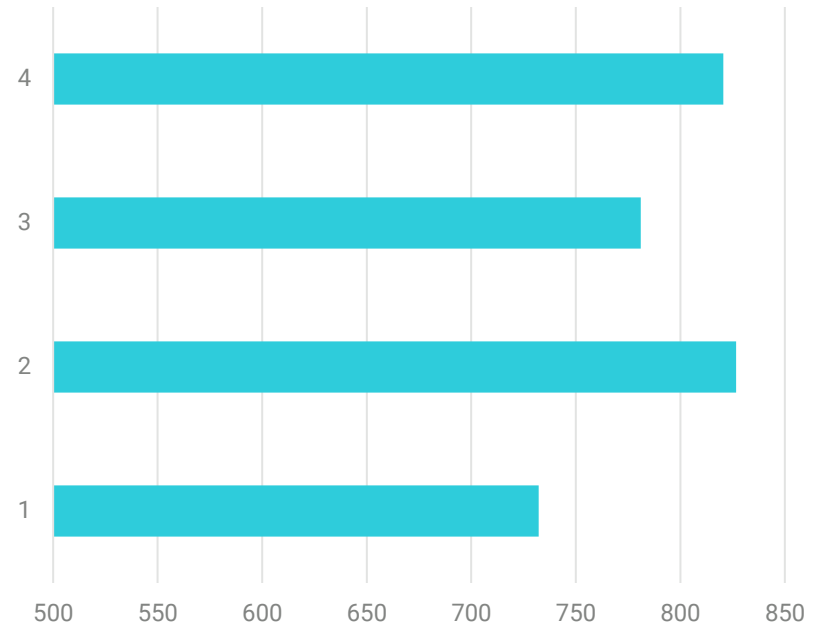
Electric/Hybrid Vehicles Personal Auto Experience

Comprehensive

Frequency

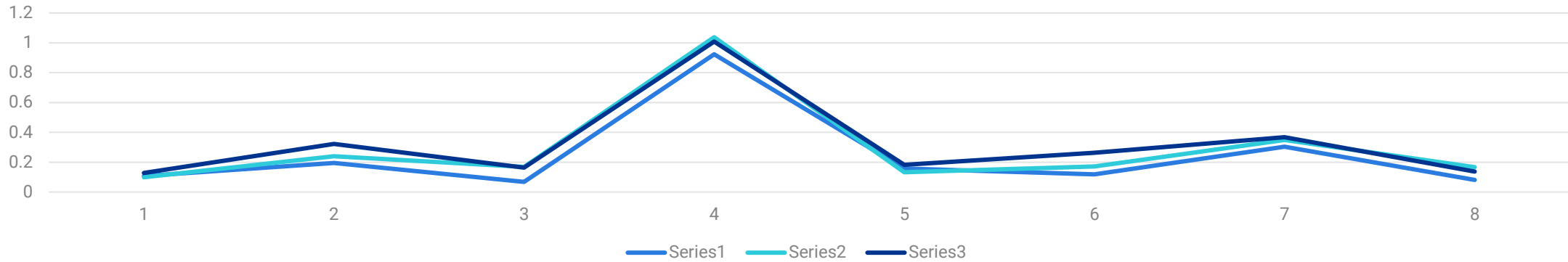


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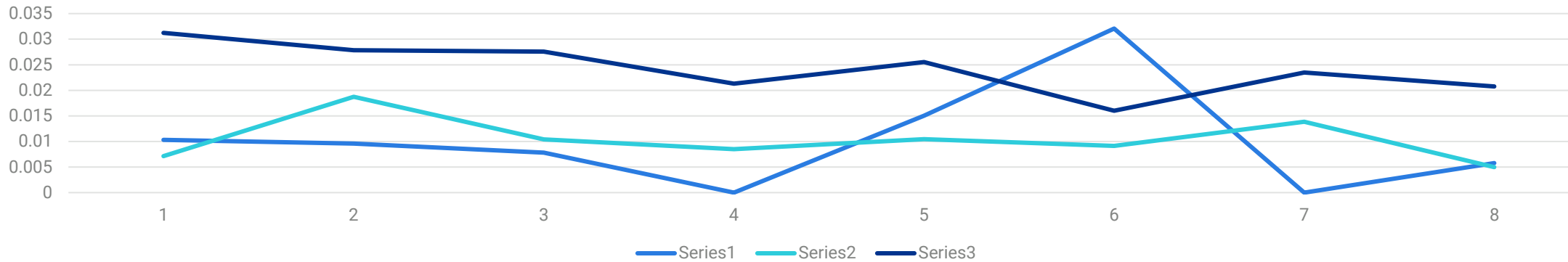


Multistate Electric/Hybrid Vehicles Personal Auto Fire Loss Experience - Frequency (FL, GA, NC, SC, VA)

Multistate Wind and Water Freq



Multistate Fire Frequency



Personal Auto Insurance Considerations



Sandee Perfetto, CPCU
Senior Director
Personal Lines Coverage Products



Electric (and Automated) Vehicle Considerations



Fire Considerations



Cyber Considerations



Liability Considerations



Miscellaneous Considerations

Vehicle Technology Considerations

- **Post Build Upgrades: Physical and Software-related**
- **Hacking and other Cyber-related exposures**
- **EV Charging**
- **Longer repair times**

Personal Auto Program

Updates under consideration



Post Build Upgrades:

Physical -> Software -> Custom
Equipment considerations



Charging:

Potential impacts on auto vs.
home insurance



Hacking & Cyber: Newly defined
terms, exclusion updates, optional
endorsements



Transportation Expenses:

Changes in length of rental and
cost



Commercial Auto Considerations



Andréa Klanderman
Product Development Analyst
Commercial Auto

Electric Vehicle Adoption in Commercial Auto

- ❖ Federal and State Initiatives on Commercial Transportation
- ❖ Infrastructure Bill and Inflation Reduction Act
- ❖ California - Advanced Clean Fleets Regulation for commercial trucking
- ❖ Clean School Bus Program
- ❖ Charging network and range challenges for commercial vehicles
- ❖ Transportation industry investment and transition to electric vehicles



Sources: See Appendix

Battery Weight Considerations

- ❖ Larger commercial vehicles with extended ranges require larger batteries
- ❖ Increased weight and safety concerns
- ❖ Business impacts by reduced loads and additional trips to account for additional battery weight
- ❖ GVWR Size Class and Rule 223



Sources: See Appendix

Battery Fire Concerns

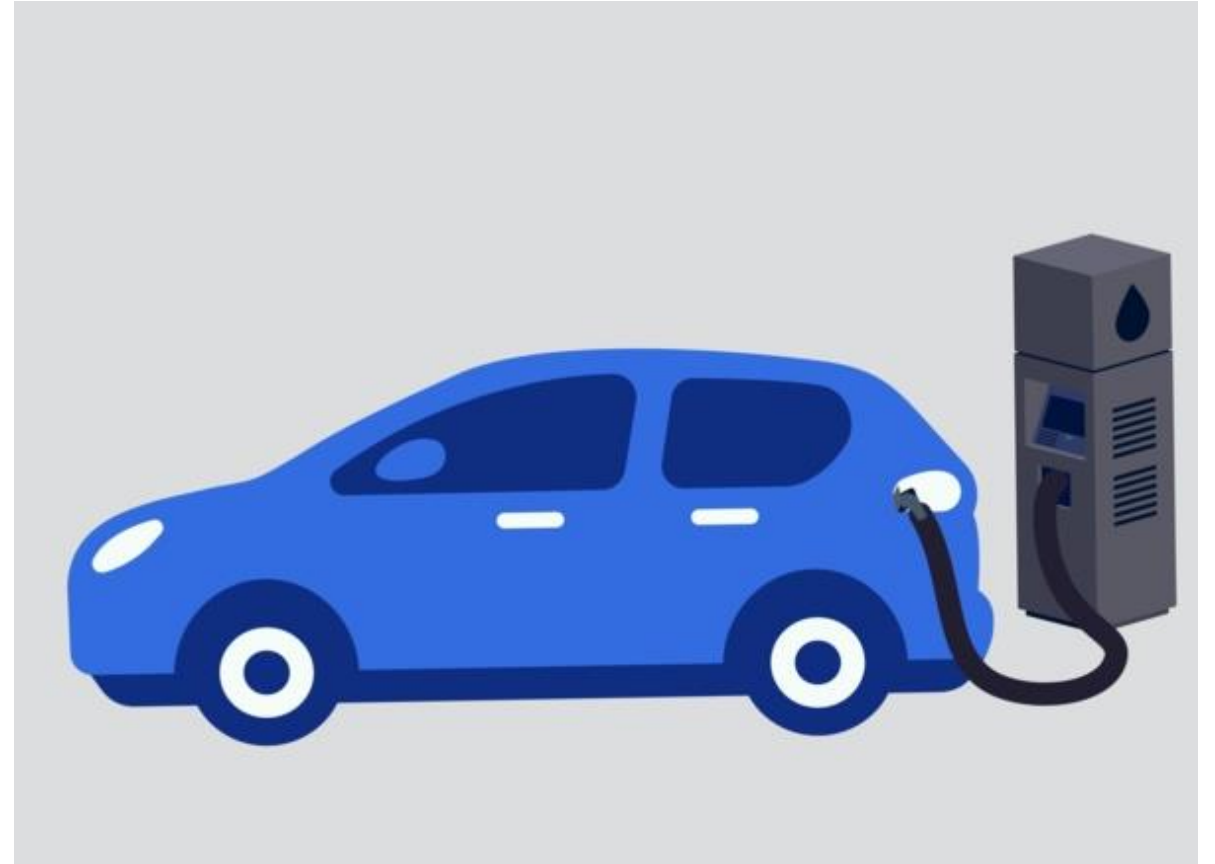
- ❖ Potential increased hazards of larger commercial vehicle fires
- ❖ Commercial fleets parked in proximity to each other—parking lots and garages
- ❖ Potential physical damage loss to dealer vehicles from electric vehicle fires at dealerships and repair bays
- ❖ Risk mitigation considerations



Sources: See Appendix

Other Considerations

- ❖ Bidirectional charging and potential hazards including fire or cyber attacks
- ❖ Cyber risks—reliance on software increases risk of hacking, data breaches and malware attacks
- ❖ Limited repair facilities and trained mechanics—increased loss of use and business interruption



Poll

Of the emerging EV risks you heard about today, which would you like to learn more about?
Choose one.

1. The cyber vulnerabilities of EVs and EV infrastructure
2. The supply chain concerns surrounding the EV transition
3. How EV weight may impact U.S. infrastructure
4. How future EV technologies may influence automotive risks

Poll Results

QUICKPOLL

Of the emerging EV risks you heard about today, which would you like to learn more about?

Poll Results (single answer required):

The cyber vulnerabilities of EVs and EV infrastructure	28%
The supply chain concerns surrounding the EV transition	9%
How EV weight may impact U.S. infrastructure	16%
How future EV technologies may influence automotive risks	47%

Emerging Issues Resources

[Electric Vehicles Topic Page](#)

- Primer pieces on electric vehicle risks
- Regularly updated newsfeed curated by Emerging Issues staff
- Research articles in reverse-chronological order

[Recent Research:](#)

- [How do Electric Vehicle Losses Compare to Gas Vehicles?](#)
- [Understanding EV Weight and Infrastructure Concerns](#)
- [How Green Are EVs, Really?](#)
- [A Primer on Bidirectional Charging](#)
- [How Bidirectional Charging Might Influence Homeowners Insurance](#)


Electric Vehicles

Electric vehicles (EVs) are projected to grow to 30 percent of the light-duty vehicle fleet by 2050, according to the U.S. Energy Information Administration. How might this major change transform the risk environment? Verisk's Emerging Issues team delivers critical market intelligence, empowering property/casualty insurers and risk managers to better navigate these new and emerging risk exposures.


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EVs in Focus




Part I: Charting the Growth




Part II: How Safe Are EVs?




Part III: EV Fire Risk




Part IV: EV Weight & Infrastructure



Part V: Cyber Risks



Part VI: EVs and ESG Considerations



VII: The Future of the Electric Vehicle

Recent Insights

- Experience the Possible: Key Insights from Verisk's 2024 Core Lines User Conference**
October 2, 2024 - The conference featured 14+ sessions from 20+ Verisk experts. In one packed day, here are some of the key insights shared.
- Connected Chaos: Cyber Incidents and Their Collateral Damage [Webinar]**
October 1, 2024 - Learn how cyberattacks and incidents can spread chaos far and wide.
- Emerging Risk Number of the Week**
October 1, 2024 - Catch up on key figures and data points in the world of emerging risks.
- Understanding the Climate Crisis in an Era of Polycrisis**
September 5, 2024 - A term first coined by experts in the 1990s may help p/c insurers better understand the intersecting threats posed by the climate crisis.
- How Do Electric and Hybrid Losses Compare to Gas? Recent Auto Experience Data Provides Insights**
July 19, 2024 - New personal auto research compares loss experience by vehicle type as regulation continues to spur electric and hybrid vehicle sales.

Newsfeed

- 10/13/2024
 Electric Vehicles: California Mulls Bidirectional Charging Mandate (Gleasel) [View](#)
- 10/11/2024
 Electric Vehicles: Countries Ending Electric Vehicle Subsidies Causing Drop in EV Sales (NHT Technology Review) [View](#)
- 9/20/2024
 Electric Vehicles: California's electric grid building backlog is stalling climate progress (Cenex Media) [View](#)

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Verisk's ISO Activity

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On the Horizon

What's new or coming soon to Core.Verisk.com/EI



[Cyber Webinar Replay + Slides](#)



[Social Inflation Update](#)

20+ Years of Tracking Emerging Risks

The transformative power of tracking emerging risks



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[Personal Auto Hub](#)



[Commercial Auto Hub](#)



[New: Cyber Hub](#)

Don't Miss: [Executive Insights: Personal Auto \(Q2 2019 - Q1 2024\)](#)
Key trends in personal auto from ISO data



Appendix: Sources

Sources

Start Your (Electric) Engines: EV Growth

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