

electroindustry

www.nema.org | May/June 2020 | Vol. 25 No. 3

INSIDE:

NEMA Members Address Critical Infrastructure Needs to Combat COVID-19

ON THE ROAD TO ELECTRIFIED TRANSPORTATION





CHAMPION FIBERGLASS CONDUIT.

TOUGH. STRONG. PROTECTIVE.

SECURING DATA CENTERS
FROM THE GROUND UP.



Champion Fiberglass elbows:

- Eliminate burn-through which prevents costly repairs
- Offer a low coefficient of friction for fast, smooth pulls
- Resist faults for easy pull-through

Now in Product MasterSpec

Learn more at www.championfiberglass.com



MADE IN THE
★ USA ★

CONTENTS



3

Dr. W.H. "Bill" Sowell reports on NEMA 3TS updates



10

Applied Information's Sarah Mulligan writes about new traffic tech



18

NEMA Field Rep Mike Stone talks EV infrastructure

electroindustry

Publisher | Tracy Cullen
Managing Editor | Jena Passut
Contributing Editors | Ann Brandstadter, Mariela Echeverria, Andrea Goodwin, William E. Green III
Art Director | Jennifer Tillmann
Advertising Executive | Travis Yaga
The YGS Group
717.430.2021
Travis.Yaga@TheYGSgroup.com

electroindustry (ei) magazine (ISSN 1066-2464) is published bimonthly by the National Electrical Manufacturers Association (NEMA), 1300 N. 17th Street, Suite 900, Rosslyn, VA 22209; 703.841.3200. Periodicals postage paid at Rosslyn, Virginia, and additional mailing offices. POSTMASTER: Send address changes to NEMA, 1300 N. 17th Street, Suite 900, Rosslyn, VA 22209. The opinions or views expressed in *ei* do not necessarily reflect the positions of NEMA or any of its subdivisions. The editorial staff reserves the right to edit all submissions but will not alter the author's viewpoint. Every attempt is made to ensure that information is current and accurate.

Subscribe to *ei* at www.nema.org/subscribe2ei.
Contact us at ei@nema.org.

Follow NEMA:     

We thank our advertisers:



championfiberglass.com



distributordatasolutions.com



idea4industry.com

6

COVID NEMA Member Spotlight

NEMA Staff

8

Challenges and Opportunities in Electrified Transportation

John DeBoer, Head of Siemens eMobility and Future Grid Business Unit

10

Living Lab Tests and Deploys New Traffic Technology

Sarah Mulligan, Product Manager, Applied Information, Inc.

12

Charging Infrastructure for Battery-Electric Buses

David Warren, Director of Sustainable Transportation, New Flyer of America Inc.

2

Comments from the Chair

3

View

4

Electric News

15

Spotlight

16

Advocacy

18

Codes & Standards

20

Business Analytics

21

Endnotes from the President



officers

Chair

Raj Batra

President, Digital Industries,
Siemens USA

Vice Chair

Annette Kay Clayton

Chief Executive Officer &
President, North America
Operations, and Chief Supply
Chain Officer, Schneider Electric

Treasurer

Jack Nehlig

President
Phoenix Contact

Immediate Past Chair

David G. Nord

Chairman & CEO
Hubbell Incorporated

President & CEO

Kevin J. Cosgriff

Secretary

Clark R. Silcox

As the world faces the COVID-19 pandemic, innovative minds are being harnessed around the globe to find the best mitigation strategies, the most effective therapies, and the earliest possible vaccine. Tell Google to search for the term “COVID-19,” and you will immediately find nearly three billion results. By contrast, “autonomous vehicle,” a perennial hot topic for nearly a decade and the focus of this magazine issue, delivers a mere 120 million hits.

While the situation is dynamic and rapidly changing, the experiences of early-wave countries suggest that life can return to normal when accompanied by a rigorous testing and containment regime. At the same time, it seems safe to predict that the knock-on effects of COVID-19 will be felt in unexpected ways for decades to come.

It is too early to assess the specific impacts of COVID-19 on our transportation infrastructure and the advanced transportation systems that travelers crave. But, already mid-crisis, a few things stand out.

First, mobility means community spread. No matter where disease originates, it thrives best when carried by a human—on a bike, a train, a cruise ship, or a plane. As we make our infrastructure smarter, a vital data point will be the health of the passenger.

Second, micromobility is not just about convenience. The humble bicycle was declared “essential infrastructure” in major cities around the world so that riders could avoid the cramped spaces of subways and buses. Delivery drivers bringing groceries and carryout items helped many more people obey stay-at-home orders.

Third, and most optimistically, building consensus around a shared purpose and the need for universal solutions can dramatically speed up results. Private individuals and pop-up advocacy organizations have worked alongside governments around the world to deliver reliable apps and real-time data resources to help societies make smarter decisions.

The tragic losses and severe lessons of the pandemic have made our hearts heavy. But as we mend, let’s hope that these experiences force us to look beyond medicine and public health preparedness to reflect on how quickly change can happen when there is a collective will to move forward. It will be interesting, and hopefully inspiring, to see how the transportation sector responds. 🌐

Raj Batra
Chair, NEMA Board of Governors

On the Road to Connected Vehicles

According to the National Highway Traffic Safety Administration, more than 35,000 people die from traffic-related collisions each year in the U.S. Globally, that number is more than 1.35 million. If these traffic-related deaths received the daily attention of the public and the media, it would be equivalent to hearing on the news about a large airliner crashing each day.

Enter the prospect of connected and autonomous vehicles (CAV). By taking the human element out of driving and ground transportation, would it be possible to end up with zero traffic-related fatalities?

CAV is not a new concept. It was pictured in a 1957 *Life Magazine* advertisement by Central Power and Light Company. The concept of an electrically powered and self-driven auto was a dream of the future then, and such technology was elusive. However, CAV is here today, and it is immediately deployable in terms of technology. Sadly, widespread CAV deployment lacks funding.

What new business models can be developed that will pay for surface transportation infrastructure like upgrading traffic signal cabinets and CAV radio transceivers?

With the increasing use of electrically powered vehicles, federal and state gasoline tax revenue is declining. There are not enough charging stations for the coming demand for electrically powered vehicles. How can we fund CAV and electric vehicle deployment quickly and efficiently?

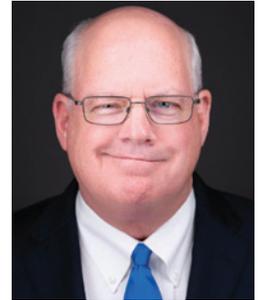
Presently, there are approximately 400,000 signalized intersections in the U.S. Fewer than 250 of the initial test deployments of those signalized intersections are equipped to receive the signals generated by CAVs with either connected vehicle to infrastructure (C-V2I) or dedicated short-range communications (DSRC). Recently, U.S. Federal Communications Chairman Ajit Pai mandated that 5G/C-V2I communications would be used in the U.S. for CAV communications.

How do we pay to upgrade every signalized U.S. intersection to receive CAVs that generate a basic safety message (BSM) and vulnerable road user (VRU) message set? While public/private partnerships (3P) have proven to be successful outside of the U.S., using a concessionaire design-build-finance-operate model, the U.S. has yet to develop an acceptable business model for signalized intersections using a 3P.

The issue of long-term roadway infrastructure development continues to be bogged down in the traditional political and lobby-rich conference rooms of Capitol Hill. Our elected and appointed officials lack a sense of urgency when it comes to the rapid deployment of proven CAV technologies and the allocation of several billion dollars to upgrade new intersections to be CAV-ready.

Want to save lives? Contact your elected officials and ask them to support the rapid deployment of CAV technology. The life saved may be your own.

The NEMA 3TS Section has been hard at work generating a NEMA TS 10 connected vehicle Standard, which facilitates the requirements for vehicles and signalized intersections to optimally communicate, enhancing motorist and pedestrian safety. We will continue to see CAV testbeds; however, at the present rate of deployment, it will be 2035 to 2040 until we see widespread CAV deployments in the largest U.S. cities. The entry of mobility as a service and signals as a service could lead to promising new business models that we may soon see as more CAV-ready intersections are deployed. 📍



Dr. W.H. "Bill" Sowell, MBA, PhD, President, Eberle Design, Inc.

Dr. Sowell is a Member of the NEMA Board of Governors, Vice Chair of the NEMA 3TS Transportation Management Systems and Associated Control Devices Section, and Chair of the NEMA Performance Measures Technical Committee.

NEMA Establishes Automotive Component Council

Steve Griffith, Industry Director, NEMA

In December, a NEMA Automotive Component Workshop convened Member companies that provide products and systems that make up the internal components of passenger vehicles, vans, commercial and industrial trucks, and buses. It covered internal combustion engines (ICEs), hybrids, and electric vehicles (EVs). The purpose of the workshop was to assess the opportunity landscape for this section of the transportation market by utilizing Member company expertise and collaborating across the product supply chain.

The automotive industry's transformation to a future that is increasingly connected, electrified, and ultimately autonomous is already having a profound effect on the automotive component industry. Here are some notable trends:

- **Technological advances in sensor technology and electronic systems** such as advanced driver assistance systems used in a wide range of vehicle safety and control applications, including anti-lock braking systems, airbags, and engine emissions control.
- **Steadily declining battery prices** serving to boost the sale of EVs. If battery prices continue to fall, they will reach a point that makes EV prices comparable to traditional ICEs in the absence of incentives when you consider a vehicle's total cost of ownership.
- **Tax incentives and regulatory activities.** Governments around the world, such as China, the U.K., India, and France, have put forth initiatives to phase out ICEs. In the U.S., tax rebates and incentives were launched to promote the adoption of EVs.
- **Intense competition in the automotive component industry.** More established high-tech companies, including semiconductor makers, are actively pursuing opportunities in automotive components. Automotive original equipment manufacturers are also more willing to collaborate and work with these types of companies to facilitate the development of automotive components.

Historically, automotive manufacturers have been reluctant to set broad industry Standards on components and instead set internal procurement policies and evaluation protocols. However, with the increasing adoption of EVs, that dynamic could be changing.

A McKinsey report from October 2017 suggests that because of the lower complexity of powertrains in EVs, the path to commodity will happen quickly. Said another way, if Standards can be set, these automotive manufacturers would quickly move to outsource building these subassemblies to reduce costs. This would result in opening the market for manufacturers that specialize in making similar products (i.e., NEMA Member companies).

During the workshop, Members brainstormed policy, technical, and other issues related to the automotive component market. Some of the key findings from that discussion were:

- The component qualification process is lengthy, taking an average 1½+ years. With technology changing so rapidly once a component is qualified and its design locked in place, it could become obsolete. Also, even minor changes to it could require a requalification. For components not dedicated to life safety, a standardization process could reduce qualification time.
- There are several Standards gaps in areas such as on-board components (power electronics, inverters, and inductors), EV drive, and advanced driver-assistance systems.
- Product regulations (conflict minerals, the Restriction of Hazardous Substances Directive, and Prop 65) are amplified due to the small enclosed environment within the automobile.
- There is a need for policies to promote EVs, and connected and autonomous vehicles, perhaps more at the state and/or regional level.
- A broader dialogue needs to occur with automotive manufacturers, either directly or through their associations.

The NEMA Automotive Component Council is being established to increase manufacturer collaboration in the expanding automotive component market. For more information on the Council and to find out how to participate, contact Steve Griffith, NEMA Transportation Systems Division Industry Director, at Steve.Griffith@nema.org. 

NEMA-DOD Cooperate on Critical Materials

NEMA is exploring cooperation with the Department of Defense (DOD) as agency procurement officials face mandates for supply chains of products containing critical materials.

As rare earth minerals have become increasingly important for advanced manufacturing and other high-performance and strategic applications, manufacturers and the federal government have concerns about the reliability of supply into the future. DOD is facing a prohibition on procurement of certain alloys and magnets containing rare earth elements as well as some forms of tungsten from specific countries. DOD has also found overreliance on sole foreign sources for unique and proprietary advanced materials and overreliance on China for strategic and critical materials.

NEMA staff and DOD procurement officials are discussing how NEMA and its Member companies could achieve compliance and help mitigate supply chain risk. NEMA is exploring ways to help the electroindustry understand the government requirements, help provide a path to identify products meeting the requirements, and encourage development of alternative sources for these critical and strategic materials.

If your company uses rare earth or other critical minerals or you are interested in learning more about this initiative, please contact Kirk Anderson, Director, NEMA Industrial Systems Division, at Kirk.Anderson@nema.org. 

Kirk Anderson, Industry Director, NEMA

RE-
INTRODUCING



SYNDICATION.io

PRODUCT CONTENT SYNDICATION FOR MANUFACTURERS



FULL-CHANNEL SYNDICATION

An intelligent, technology-driven solution for syndicating product content across your entire channel, including wholesale + retail distributors



CUSTOM EXPORTS

Automated, scheduled product content updates to each partner with custom formatting for their unique e-commerce system + needs



CUSTOM IMPORTS

Custom imports for each manufacturer/line ensures your data is treated uniquely + delivered in full



WE MAKE IT SIMPLE

SYNDICATION.io simplifies the delivery and management of product content so you can focus on your business

Learn more at www.distdatasolutions.com/syndication-io/ | 888.350.DATA



NEMA MEMBER SPOTLIGHT

Several NEMA Members are on the front lines addressing critical infrastructure needs to combat the global COVID-19 pandemic.

ABB ELECTRIFICATION OFFERS FREE DIGITAL SOLUTIONS THROUGHOUT 2020

From remote monitoring and diagnostics for uninterruptible power supplies for critical healthcare applications to energy and building management solutions for utilities and commercial and industrial facilities, ABB Electrification is providing the tools that address critical infrastructure needs.

Through December 31, 2020, ABB Electrification will waive its fee for 12 months for all new subscriptions for its iUPSGuard software for hospitals as well as for all new or renewed subscriptions for its ABB Ability™ software-as-a-service (SaaS) capabilities.

At the current time, reliable power distribution is especially critical for hospitals and healthcare applications. Read how hospitals can benefit from these cost-free solutions at new.abb.com.

A number of cost-free solutions from the ABB Ability Marketplace™ (superscript) are designed to enhance operational efficiencies and security for businesses remotely. These solutions support facilities in their current efforts to maintain critical operations while minimizing on-site workforces.

Any customers who wish to take advantage of the free-of-charge software solutions should contact their local ABB Electrification sales representative.

HOLOGIC'S MOLECULAR TEST FOR THE NOVEL CORONAVIRUS, SARS-COV-2, RECEIVES FDA EMERGENCY USE AUTHORIZATION

Hologic has created a highly accurate, fully automated test that detects genetic material from SARS-CoV-2, the new coronavirus strain, in under three hours.

The U.S. Food and Drug Administration granted Emergency Use Authorization for Hologic's Panther Fusion® SARS-CoV-2 test, which identifies the virus causing COVID-19.

Hologic began research for a new coronavirus test shortly after the COVID-19 outbreak emerged in China. The company's development and manufacturing teams have worked around the clock to create the test and prepare for its market rollout.

The test was the first COVID-19 diagnostic product to receive development support from the U.S. government's Biomedical Advanced Research and Development Authority. The agency's partnership includes nearly \$700,000 in funding.

HONEYWELL RAMPS UP PRODUCTION OF N95 MASKS

To address the growing demand for masks during the outbreak of the coronavirus disease, COVID-19, Honeywell is quickly ramping up production and making millions of N95 masks in the United States.

The MITA Member company is expanding manufacturing operations in Phoenix and a factory in Smithfield, Rhode Island, which also produces Uvex safety glasses.

The expansion will allow Honeywell to produce more than 20 million N95 disposable masks monthly, and they will be delivered to the U.S. Department of Health and Human Services to support health, safety, and emergency response workers.

N95 masks provide respiratory protection and "reduce the wearer's exposure to airborne particles, from small particle aerosols to large droplets," according to the Centers for Disease Control and Prevention. "N95 respirators are tight-fitting respirators that filter out at least 95 percent of particles in the air, including large and small particles," Honeywell says.

MEDTRONIC SHARES VENTILATION DESIGN SPECIFICATIONS TO HELP INCREASE GLOBAL VENTILATOR PRODUCTION

Medtronic announced it is publicly sharing the design specifications for the Puritan Bennett™ 560 (PB 560) to enable participants across industries to evaluate options for rapid ventilator manufacturing to help doctors and patients dealing with COVID-19. This decision is consistent with the recent Food and Drug Administration guidance and in accordance with the public health and medical response of governmental agencies globally.

This ventilator's ability to be used in a range of care settings, as well as its technology and design, make it a solid ventilation solution for manufacturers, inventors, start-ups, and academic institutions seeking to quickly ramp up ventilator design and production. PB 560 product and service manuals, design requirement documents, manufacturing documents, and schematics are now available at [Medtronic.com/openventilator](https://www.medtronic.com/openventilator). The PB 560 design specifications are available today; software code and other information will follow shortly.

SIEMENS CONNECTS HEALTHCARE PROVIDERS AND MEDICAL DESIGNERS TO PRODUCE COMPONENTS THROUGH ADDITIVE MANUFACTURING

Siemens is making its Additive Manufacturing (AM) Network, along with its 3D printers, available to the global medical community to speed design and production of medical components. The AM Network connects users, designers, and 3D-print service providers to enable faster and less complicated production of spare parts for machines like ventilators. The Siemens AM network is available globally and covers the entire value chain—from upload and simulation to checking the design up to the printing process and associated services.

Starting immediately, doctors, hospitals, and organizations in need of medical devices, as well as designers and service providers with medically certified printing capacities, can register for free access to the Siemens AM Network.

Siemens' designers and engineers are a part of the AM Network, so they can answer design requests and help convert designs into printable files. Afterward, these components can be printed via medically certified 3D printers of partner companies that are also part of the AM Network. In addition to numerous 3D printers from partner companies, Siemens' 3D printing machines are also connected to the network and, if suitable, will also be used to locally print components and spare parts for medical devices.

SIEMENS DIGITAL INDUSTRIES RESPONDED TO THE WHITE HOUSE'S CALL TO MAKE ONLINE LEARNING RESOURCES MORE ACCESSIBLE

Siemens Digital Industries Software is providing complimentary access to two sets of educational offerings on [TechforLearners.org](https://www.techforlearners.org)—a searchable online database of education technology tools. The site now features Siemens K-12 and Siemens Higher Ed and Workforce Development software. These professional software and learning offerings address all aspects of the product development process, including CAD/CAM simulation. Manufacturing, design, and engineering jobs worldwide are currently unfilled because of the growing skills gap. With these tools, students at all educational and experience levels can develop the technical skills needed to prepare for Industry 4.0 through a comprehensive solution of tools, technical expertise, and strong industry collaboration. ^{ei}



Electric vehicle charging infrastructure is needed to meet growing demand.

Challenges and Opportunities in Electrified Transportation

John DeBoer, Head of Siemens eMobility and Future Grid Business Unit

Mr. DeBoer leads the North American eMobility and Future Grid business for Siemens and is a member of the global eMobility management team.

The energy landscape is shifting with the rise of renewables and decentralized energy, shaping a new energy era that is changing the way we think about electrification. The overall trend is toward decarbonization—driven by regulation as well as by public opinion and action.

In order to meet ambitious emission reduction goals, solutions will need to be pursued beyond changes in the power generation mix and at the utility level. For example, electrifying the transportation sector can significantly impact greenhouse gas emissions. The transportation sector makes up 35 percent of total U.S. energy-related emissions.

Fortunately, many of the technologies that will help reduce CO₂ already exist and are deployed across the country. The difficulty lies in how, when, and where these technologies are put into use and what infrastructure will be needed to support them.

Electric Mobility Momentum

Electric vehicle (EV) growth continues at a rapid pace and is now joined by the electrification of almost every mode of transportation—cars and buses, truck fleets, and even bicycles. In fact, according to the International Energy Agency, “In 2018, the global electric car fleet exceeded 5.1 million, up 2 million from the previous year and almost doubling the

number of new electric car sales.” Looking ahead, McKinsey estimates that EVs, which currently make up less than 1 percent of the global fleet, could reach 20 percent by 2030 for cars and 12 percent for commercial vehicles. In addition, there are now more than 200 cities in the United States that are implementing the electrification of buses and transport.

While it’s certainly an exciting time for the EV market, the simple fact is that the U.S. charging infrastructure is falling behind in terms of supporting such growth. The increasing number of EVs poses new challenges for distribution grid operators, fleets, gas stations, and other charging infrastructure operators.

The International Council on Clean Transportation recently reported that the expected EV growth will require an investment of more than \$2.2 billion in charging infrastructure across the United States’ 100 most populous metropolitan areas by 2025. The report notes that “Charging infrastructure deployment will have to grow at about 20 percent per year to meet the 2025 targets.”

Which came first—the vehicles or the charging stations? This was once a popular industry version of the chicken or the egg argument, but it’s now an obsolete and futile dispute. For consumers, the lack of charging infrastructure and the associated concern of running out of charge on the road are some of the main reasons for not purchasing EVs. Others include the lack of availability of the chargers.

The demand for electric transportation can grow only as fast as the charging infrastructure enables it to. To address the charging challenge, and create an EV-ready environment, public and private sectors must collaborate at the local level and tear down barriers so that utilities can work directly with cities and extend some of the grid value back to the transit authority. Where there’s local investment, there’s local reward.

Electrified Transportation Ecosystem

According to Deloitte, “Cities may not be able to achieve their [smart city] goals without collaborating with their utilities”—and that goes for deploying electrified transportation initiatives as well. It’s important to build the right partnerships to collaborate on the successful deployment and expansion of EV infrastructure.

Cities, transit authorities, automakers, facility managers, property developers, corporate fleet operators, and regulators all want to enable

the electrical infrastructure to support greener transportation, and utilities need to provide a modern grid that can support it. This is creating a new electrified transportation ecosystem, one where once disparate entities now have to work together to provide a single solution.

One leader in driving EV adoption and infrastructure deployment is California. Most recently, the Public Utilities Commission chose to further its EV infrastructure programs by approving \$54 million for local utilities like PG&E, SCE, SDG&E, and Liberty Utilities to invest in EV chargers at schools, parks, and beaches. The state is also developing a Transportation Electrification Framework to guide utilities in future programs and accelerate transport electrification.

Corporations and campuses that are deploying smart technology in their buildings to reduce energy costs and meet sustainability goals are now incorporating EVs and chargers into their plans. In fact, charging infrastructure is becoming one of the key assets in integrating a building to make it more effective, as their resources can be tapped for enhanced energy efficiency. EV chargers were once independent islands in the middle of a parking lot, but property developers and facility managers are now recognizing the benefits of incorporating them within their smart building deployments.

While a big undertaking, these examples prove that it’s possible—and that it needs to start now. We need to provide cities with the tools to create infrastructure plans that can realistically support their electric transportation goals. We need to continue active deployment of charging infrastructure to lay the groundwork for continued growth. We need to support public and private fleet managers to build charging depots holistically. We need to increase the role of electric utilities to bolster the power grid and help advance common sense Standards. And we need to engage building operators and facility managers as they deploy smart technologies in their buildings.

Though the past decade has been one of significant growth for the EV market, expect 2020 to be the year the industry comes together and focuses on building those private-public partnerships to support and execute the deployment of electrified transportation infrastructure in cities across the country. The time is now, and we’re in full acceleration mode in the EV market. 🚗

Living Lab

Tests and Deploys New Traffic Technology

Sarah Mulligan,
Product Manager,
Applied
Information, Inc.

Ms. Mulligan
devises and
delivers marketing
messaging
for Applied
Information.

A new connected vehicle facility opened north of Atlanta, Georgia, this year, providing a platform for diverse industries to assess and implement new traffic technology. This hub, dubbed the iATL (Infrastructure-Automotive Technology Laboratory), is both an office space and a living lab connected to a growing number of connected vehicle infrastructure devices in a wide-scale early deployment expected to grow to more than 1,000 intersections by the end of 2020.

“The iATL is where automakers, roadway operators, and technology companies can come together and make the vision of connected vehicles a reality now,” said Bryan Mulligan, President of Applied Information and Chair of the NEMA 3TS Transportation Section.

“The iATL is not just a collection of traffic devices in a laboratory, but it is embedded in an early deployment of 1,000 connected intersections to test the Day One application in real-world conditions.”

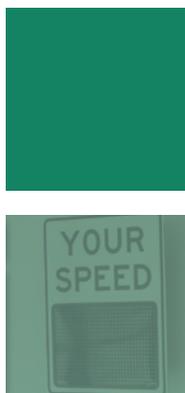
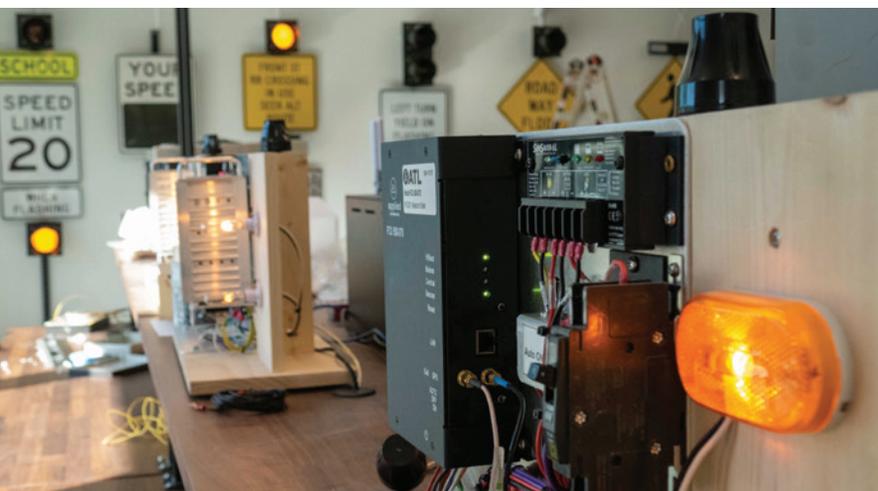
These connected intersections, named the CV-1K+ (connected vehicle 1,000 plus) project, encompass various controller types, protocols, and technologies. In a swath stretching from the Hartsfield-Jackson Airport in the south to the northern suburbs of Atlanta, intersections are communicating via a combination of cellular-vehicle to everything, 4G LTE cellular network, dedicated short-range communication, and unlicensed Wi-Fi. As the iATL is a private sector-funded enterprise, this gives everyone from telecommunications giants to automobile manufacturers to traffic signal controller manufacturers a place to “play in the traffic.”

How Is This Lab Different?

With an endgame in mind that connected vehicles connect to smart city infrastructure, this lab is a stepping stone to connect these devices to cars and emergency vehicles. Car manufacturers can test against not only smart intersections but also school zone safety beacons, electronic crosswalks, rail crossings, weather sensors, and other smart infrastructure that a car may encounter in the wild.

To move forward to this connected vehicle reality, it’s essential to have real-world applications and circumstances. Many labs all over the globe are already in use, from Florida’s SunTrax to Michigan’s American Center for Mobility. These labs, which provide a smart city test center, were a much-needed stepping stone toward autonomous driving. SunTrax, with its unique tolling facilities, is a closed lab, with private drives and roadways.

The difference between those labs and the iATL is the availability of traffic controllers and technologies. Private roads and monoculture traffic controllers will take technologies only so far, which could result in massive gaps in knowledge and applications.



Photos courtesy of Applied Information

Developing a connected, autonomous vehicle is only as good as the number of situations and communication methods it's exposed to, even with AI or machine learning. Imagine a connected vehicle that could speak to the traffic lights in Nevada but was useless anywhere else! Traffic lights can send messages about their signal, phase, and timing, but each controller (Siemens, Econolite, Intelight, TrafficWare, etc.) sends these in a slightly different way and format. Their passthrough communications, likewise, are also encoded and sent differently.

"The iATL is a prime example of Georgia's leadership in developing critical technology that is so important to our state and national economies while at the same time improving the safety of all of us who use our streets and highways today," said Georgia Lt. Gov. Geoff Duncan. "I am particularly pleased that this incredible facility is privately sponsored and enjoys the overwhelming support of the local government and surrounding business community—where the rubber meets the road."

According to the National Highway Traffic Safety Administration, there were 37,133 traffic fatalities in the U.S. in 2017. Autonomous vehicles and connected smart city technology could reduce that number up to 94 percent, but first, cars and trucks must be able to talk to local intersections and school zones. The nature of the traffic industry, because of the sheer number of companies and technologies involved, makes for a very fragmented market. Each traffic cabinet could be owned by a state, city, community improvement district, or county. Cabinet access is limited and difficult to obtain, so providing Day One access to over a thousand intersections makes Georgia an attractive place to test modems, controllers, original equipment manufacturers, car manufacturers, and others involved.

Day One Applications

Several hundred of these connected intersections are already being put to use for emergency vehicles, which can automatically preempt and change traffic lights to green as fire trucks or police approach an intersection. Each smart city intersection saves first responders 11 seconds or more per traffic light. Given the dual-band radios installed in each intersection, the emergency vehicles communicate via both short-range radio and cellular, allowing for fail-safe green lights from an unlimited distance. While at the iATL, you may hear a siren and watch the lights change and lock to let fire trucks through.

Buses, equipped with fleet management devices, are triggering priority calls to the intersections. These priority calls do not immediately change the lights ahead and disrupt traffic, but rather let the smart city infrastructure know the bus is coming and gently ask for a green light when it gets there. This saves time for the buses, making them work better even in clogged Atlanta traffic, reducing their emissions and conserving fuel since they're making fewer needless stops.

Citizens can use a smartphone app, available free from the Google Play or Apple App Store, to watch countdown timers and get notifications when lights are turning green. This allows users to sit and test each intersection, watching the countdown timers from the comfort of a smartphone. Vulnerable road users, such as cyclists and pedestrians, can download the app and test collision warnings. This alerts motorists and others if a crash is detected for either car to car, car to walking folk, or car to cyclists. This technology is already being studied in conjunction with Georgia Tech and the University of Florida with eye-tracking and collision alerts to improve the algorithms.

The office space is also an attractive location for training purposes so local city technicians can get their hands on experimental communications and devices. It's an essential part of a smart city for the city's technicians to be able to see, test, and understand these devices. This completes the loop between the private sector, academics, and local governments, and it provides a centralized location to distribute information.

Having a place to bring together a diverse group of traffic control product manufacturers, automakers, roadway operators, and technology developers is an important evolutionary step in deploying connected vehicle technology at scale. It will be interesting to see what the next steps will bring for all. 📍



Charging Infrastructure for Battery-Electric Buses

Transitioning to the Zero-Emissions Future of Transit



Figure 1: Charging begins when the pantograph makes conductive contact with a cross-rail system on the bus.

David Warren,
Director of
Sustainable
Transportation,
New Flyer of
America Inc.

Mr. Warren is a preeminent industry leader in the battery-electric and clean propulsion space. He leads New Flyer's sustainable technology strategy, with a specific focus on zero emission technologies.

Buses and motor coaches currently incorporate a wide range of propulsion systems: clean diesel, natural gas, diesel-electric hybrid, and zero-emission electric (trolley, battery, and fuel cell). With the advancement of lithium-ion battery technology, major cities and states are implementing policies or regulations to transition transit from low emissions to zero emissions.

In the United States alone, the transportation sector represents 27 percent of total greenhouse gas (GHG) emissions nationally.¹ Every zero-emission bus (ZEB) can eliminate 1,690 tons of CO₂ over its 12-year lifespan. ZEBs may also eliminate 10 tons of nitrogen oxides and 350 pounds of diesel particulate matter, improving air quality in the communities they serve.

In California, the Innovative Clean Transit regulation was established to transition all transit buses to zero emissions by 2040. Major cities throughout North America have also put in place policies to transition to zero emissions.

To accomplish these objectives, charging infrastructure is a crucial part of the zero-emission system that must be factored into the transition of transit fleets to ZEB propulsion.

Charger Standards for Transit— The Foundation for Interoperability

There are currently two Standards from SAE International, previously known as the Society of Automotive Engineers, that define the general physical, electrical, functional, and performance requirements

for direct current (dc) conductive charging of electric buses:

- Plug-In Charging (SAE J1772)
- On-Route Charging (SAE J3105)

Plug-in charging transit buses typically utilize SAE recommended practice J1772 with a Combined Charging System Type 1 connector. This permits a transit bus to charge using the same electric vehicle supply equipment (EVSE) as electric vehicles such as a Chevy Bolt. Typical EVSE power for overnight charging ranges from 50 to 175 kW.

On-route charging utilizes SAE J3105 with a power transfer system based on Conductive Automated Connection Devices. This system typically involves an overhead pantograph system mounted on an overhead gantry that automatically lowers onto the roof of the bus when initiated by the driver. Charging begins when the pantograph makes conductive contact with a cross-rail system on the bus as shown in Figure 1. This charging method allows for high-power ratings of up to 600 kW.

Inductive charging for transit (also known as wireless or cordless charging) is being deployed in limited transit applications. SAE J2954/2 is currently under development to define criteria for interoperability and electromagnetic compatibility.

Working closely with leading electric vehicle supply equipment (EVSE) firms such as Siemens, ABB, ChargePoint, Heliox, and others, transit bus original equipment manufacturers collaborated closely with the Federal Transit Administration, the American Public Transportation Association, the Canadian Urban Transit Research & Innovation Consortium, and the Electric Power Research Institute to ensure complete interoperability between vehicles and EVSE.

SCALABILITY CHALLENGES OF FLEET CONVERSION TO ELECTRIC

Transit buses in major cities are utilized up to 16 hours per day, with ranges exceeding 200 miles and consuming up to 500 kWh of energy stored in the lithium-ion batteries. For reference, a Nissan Leaf Plus car is equipped with a 62 kWh battery and may operate two to three hours on a charge.

Large metropolitan transit agencies have fleet sizes that can amass 300 buses at a single site. Over an eight-hour nighttime period, 150 MWh of energy is needed to recharge the buses for next-day operations. Constant power of 20 MW over an eight-hour duration is needed

to support daily operations—the equivalent power output of a small hydroelectric dam.

Power requirements for transitioning transit to fully electric requires critical planning with utility and power providers to ensure the entire infrastructure system can provide power to a single site in an economical and practical manner.

ON-ROUTE CHARGING

Cities currently utilizing or deploying on-route opportunity charging of transit buses include New York, Portland, Salt Lake City, Vancouver, Minneapolis, and Los Angeles.

On-route charging (utilizing SAE J3105) is an approach that allows a transit bus to be charged throughout the entire day in-service and away from the bus depot. This charging method negates the need for overnight charging and requires that the bus remain on a designated route with chargers typically at one or more turnaround endpoints.

The typical process for on-route charging is shown in Figure 2. A bus configured with on-route charging often requires 6-8 minutes of charging at 450 kW for every hour of operation. Continuous operation requires that charging happen periodically throughout the day. Buses that utilize on-route charging can be equipped with only 150-200 kWh of batteries compared to the long-range and depot-charged bus (500 kWh typical); this results in a lower vehicle cost that is offset by higher EVSE costs, the complexity of off-site construction, and real estate costs.

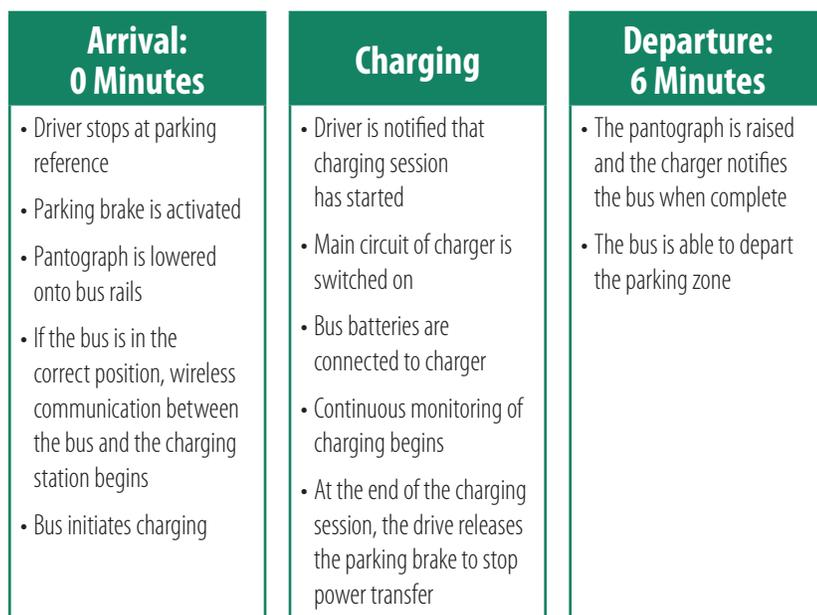


Figure 2: Typical process for on-route charging

Energy and Power—Using Analytics to Optimize Performance

Energy and power analytics are an opportunity to enhance efficiency, reduce energy consumption, and optimize performance of the EVSE and buses using the Internet of Things and GPS technology.

ANALYTICS FOR ASSESSING BUS PERFORMANCE

Figure 3 represents an array of analytics used for assessing the transit bus performance on each day and any given route.

The “Energy Wheel” (top left portion) provides the ability to assess the energy consumption in kWh by major subsystem—the motor, electric heating, and low-voltage and high-voltage accessories. Based on the total energy consumption of these systems, the range of the bus in terms of mileage and duration can be determined for actual and full-charge capability.

The state-of-charge (SOC) percentage (top right portion) provides a graph of the SOC by time of day and mileage accumulation to assess whether the bus is operating as designed with EVSE.

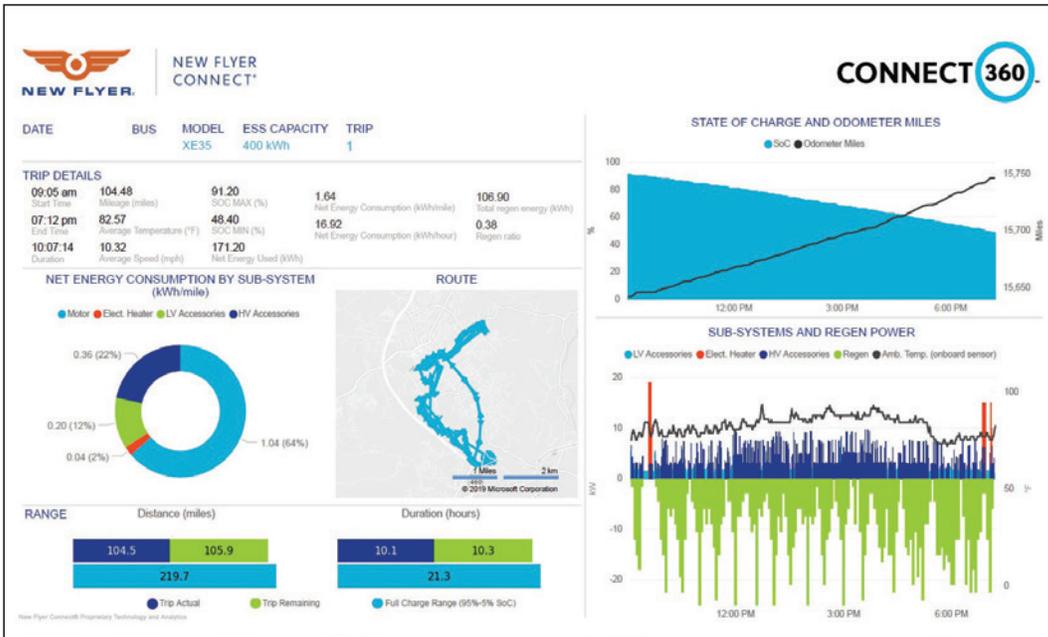


Figure 3

The power consumption graph (lower right) shows the amount of power consumed during any given time throughout the day, as well as documenting the regenerative power that is created during deceleration to recharge the batteries and extend the range capability of the bus.

ANALYTICS FOR ASSESSING CHARGING PERFORMANCE

Figure 4 represents an example of on-route charging throughout the day for a bus using SAE J3105 rapid charging. The graph displays the SOC percentage of the bus while in motion, idle, and charging on-route. In this example, the bus starts the day with one short-duration depot charge (noted in green), followed by eight on-route charging sessions (noted in dark blue) over a nearly 16-hour period while in operational service. In this example, the SOC of the batteries operates between 60 and 90 percent SOC. This type of information is useful for battery engineers and researchers to optimize the charging patterns and enhance the duty cycle for extended battery life.



Figure 4

Key Takeaways

- The electrification of transit buses is progressing rapidly as lithium-ion battery mass production costs decrease through the automotive consumer market. As this technology becomes more affordable, government agencies and policy makers are mandating zero-emission technology for clean air opportunities for pollutant and GHG emissions reduction.
- SAE charging Standards are encouraging wide deployment of interoperable EVSE charging equipment to ensure infrastructure services all brands and types of vehicles.

- Scalability of battery-electric transit fleets, from pilot projects to full fleet conversion, is complex and will require significant public and private investment.
- On-route charging of electric buses provides an option for distributing power throughout the city and recharging within normal transit operations.
- Performance analytics of the bus and EVSE are key to optimizing power and energy efficiency to reduce costs and optimize asset utilization. ☺

1 CALSTART, Race to Zero Emissions (R2ZE)

I am NEMA

I first joined NEMA as a Member about 30 years ago. I was working for a NEMA Member company and was responsible for a line of products that needed a boost. My boss recommended getting it covered by a relevant code or Standard, so joining NEMA was the natural next step.

As a Member, I learned the true meaning of consensus, due process, alliances, patience, and fairness. That helped me a great deal when, years later, I joined NEMA as a technical Program Manager (PM). It turns out, I had more to learn, however. Just a couple of weeks into my new job, I realized what I didn't notice from "the other side." To really help Members, a PM needs to have true expertise in processes: codes, Standards, regulations, legislations, ordinances, to name a few. Members bring to NEMA their business needs. We try guiding them toward efficient ways to satisfy those important needs.

My greatest satisfaction in this job was to find some of those hidden needs, articulate them, bring Members and non-Members together, and convince manufacturers we are the organization that can help. As a result, they decided to join NEMA as new product groups.

The first was the electric vehicle supply equipment manufacturers. The EV industry needed a charging infrastructure. The association's strength was historically in building and supporting infrastructure. The match was made. A new Section was formed.

The second was the electrical submeter group. Electrical energy conservation needed to be managed, and submeters were the answer. The



Andrei Moldoveanu

only problem was that the new industry needed a voice. NEMA offered it. The group is now involved in all the processes!

And what about my original goal in joining NEMA, you ask? I got my product in a Standard. But I had to write it myself, sell it to competitors, get elected chairman of that group. It lasted about five years, and that's how I learned what I needed to learn. I've been learning ever since! ☺

Andrei Moldoveanu

STOCKART

cover: ©istockphoto.com/the-lightwriter
6-7: ©istockphoto.com/RomoloTavani
6-7: ©istockphoto.com/Goja1

8: Scharfsinn©shutterstock.com
12: ©istockphoto.com/zssp

SPOTLIGHT

Advocacy Briefs

Mexico Builds a New Standardization Law

In March 2020, the Mexican Senate received a proposal from the government of President Andrés Manuel López Obrador for a new law on standardization and metrology. On its face, the proposal for a Quality Infrastructure Law aims at modernizing, broadening, and accelerating development of mandatory and voluntary Standards in Mexico. The proposal is also intended to come into compliance with commitments made in the U.S.–Mexico–Canada (USMCA) trade agreement, including on use of North American and other international Standards.

Although many details remain to be determined through the legislative process and subsequent development of implementing regulations, the Economy Secretariat intends to increase accessibility and transparency via a new online integrated technology platform for publication of Standards and conformity assessment information. 📧

Craig Updyke, Director, Trade and Commercial Affairs, NEMA

Connected Vehicle Spectrum at Issue in Rulemaking

The NEMA Transportation Management Section recommends that the Federal Communications Commission (FCC) preserve the entire 5.9 GHz band of the radiocommunications spectrum for roadway safety applications. Arguing that progress has been too slow in deploying intelligent transportation systems that use the spectrum, the commission approved a proposal in December 2019 to reallocate portions of the band to unlicensed use and reduce the amount of spectrum available for vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications.

In March 2020 comments responding to the proposal, NEMA welcomed the Commission's proposal to open use of the spectrum to competing V2V/V2I technologies but opposed reallocation of 45 MHz away from applications that hold the promise of improving roadway safety and reducing vehicle incidents that result in tens of thousands of deaths and injuries each year.

"NEMA Members are already developing roadway safety applications for advanced use of the 45 MHz," wrote Phil Squair, Vice President, NEMA Government Relations.

Recognizing that multiple communication technologies coexist in the marketplace and Section Members are involved in deployments thereof, the Section updated the FCC on an upcoming NEMA Standard, NEMA TS 10, to enable transportation infrastructure owners and operators to have confidence in specifying and procuring roadside infrastructure equipment as technology evolves and advances. The Section also recommended that the FCC revisit the allocation of the 5.9 GHz band in seven years if the transportation industry has not taken full advantage of it to deploy connected vehicle (CV) technologies and improve roadway safety.

The Section intends to submit supplementary comments to the Commission by the end of April on standardization of cellular vehicle to everything technology, deployment of roadside units for V2I capabilities, and testing interference between Wi-Fi and CV signals. 📧

Craig Updyke, Director, Trade and Commercial Affairs, NEMA

Squair Serves on DOT Lithium Battery Advisory Committee



Phil Squair, NEMA Vice President, Government Relations, is a member of the federal Lithium Battery Air Safety Advisory Committee. Launched in January 2020, the committee promotes communication among manufacturers of lithium batteries and products containing lithium batteries, air carriers, and the federal government. The committee also advises the Department of Transportation (DOT) on new battery technologies and transportation safety practices, provides a forum to discuss DOT regulatory activities related to lithium

battery transportation safety, and will ultimately report to the DOT Secretary and Congress on the results of private sector and international regulatory efforts to enforce safe lithium battery air transport practices. 📍

Craig Updyke, Director, Trade and Commercial Affairs, NEMA

Council Seeks Input from NEMA/MITA Members

The NEMA Additive Manufacturing Council (AMC) continues to welcome additions. The NEMA AMC was formed to continue the work of a 2019 Strategic Initiative. The mission of the AMC is to 1) gather and develop useful information for NEMA Members to benefit business planning, 2) facilitate partnerships between NEMA Members and manufacturers of AM equipment, 3) establish synergy between these groups to enable the development of appropriate Standards and best practices for NEMA/MITA industries, and in so doing 4) assist in the successful and beneficial expansion of AM technology into the electrical sector. Participation is granted on a fee basis and is open to all comers, non-Members included. For questions or to join, please contact Alex Boesenberg. 📍

Alex Boesenberg, Senior Manager of Regulatory Affairs, NEMA

Codes Address EV Infrastructure Needs



Electric vehicles (EVs) are becoming increasingly prevalent on America's roads. Industry expert projections regarding how many EVs will be on America's roads by 2030 vary widely, but all agree that the number will increase exponentially. One estimate from the Edison Electric Institute, the investor-owned U.S. utility association, predicts an increase from 1 million EVs in 2018 to 18.7 million by 2030. In order to accommodate this dramatic increase in EVs, a considerable amount of vehicle charging infrastructure needs to be installed.

There are many different grant programs, incentives, and utility initiatives that aim to provide this infrastructure, but one of the key pieces to address this infrastructure need is through green building and energy codes. Some of these codes are voluntary, or "reach" codes, but increasingly they are becoming mandatory. They generally apply to new construction or major improvements. They all contain provisions for EV-ready installations, where future conduits and wiring are installed near parking spaces. Some of the codes have requirements for the actual installation of electric vehicle supply equipment (EVSE).

Major examples of these codes are:

- The 2021 International Energy Conservation Code (IECC), published by the International Code Council (ICC), contains requirements for up to 20 percent of EV-ready and EVSE parking spaces in new multi-family and non-residential construction. NEMA participated in the code hearings in 2019 where these rules were accepted. We successfully supported our energy industry partners who were the proponents of the EV proposals. The 2021 IECC will be published later this year or early next (after

confirmation by the ICC Board) and will be available for state and local adoption in 2021.

- The 2019 California Title 24, Part 11 Green Building Code (a.k.a. CALGreen) went into effect on January 1, 2020. It contains new construction requirements for EV-ready installations in all single-family dwellings, multi-family dwellings (10 percent of spaces), and non-residential parking facilities (6 percent of spaces).

Another way the EVSE infrastructure need is addressed by code requirements is through local ordinance by individual cities and counties. For example, the County of Los Angeles and the Cities of Los Angeles, Seattle, and New York have all passed ordinances requiring from 10 to 30 percent of parking spaces in newly constructed multi-family dwelling complexes and non-residential parking areas to be either EV-ready or fully functional with EVSE installed. Many smaller cities are enacting similar rules. In California, the City of San Jose has adopted rules for newly constructed single-family homes and townhouses to be EV-ready, and up to 70 percent of parking spaces in multi-family complexes to be either EV-ready or have EVSE installed. Many other cities in the San Francisco Bay Area and throughout the country have enacted similar ordinances requiring varying degrees of EV-ready/EVSE installations for new construction.

NEMA continues to monitor the expansion of EV charging requirements in the codes. We work with our industry partners to help facilitate the passage of these codes that help to meet the charging needs of the ever-expanding fleet of EVs on our roads. 🌱

Public Chargers Will Alleviate EV Driver Anxieties

One of the most significant efforts to boost the electric vehicle (EV) industry is to overcome the natural anxiety EV drivers experience when they travel farther than their regular commute. The answer is to create public charging stations similar to ones we see at gas stations everywhere. For several reasons, mostly financial and regulatory, one way to provide the most access to EV supply equipment (EVSE) is to link stations together and offer access via some form of club membership. Several companies followed this model. The result is that many distinct EV charging networks exist, each offering different complementary services.

Every network needs to make sure the EV driver is the authorized party incurring a financial or other obligation for the service. Conversely, the EV driver should have confidence that fraudulent transactions have not occurred.

NEMA EVSE 1 *EV Charging Network Interoperability Standard—A Contactless RFID Credential for Authentication (U_R Interface)* describes a manner for authenticating EV charging service requests using contactless credentials such as wallet-sized cards (RFID), mobile phones, key-fob tokens, etc. It is a prerequisite for a more general standardization effort permitting the EV drivers to charge their vehicles at EVSEs belonging to networks other than theirs.

NEMA is currently opening the Standard review process to interested stakeholders other than its manufacturer Members in an ANSI group so that the final document reflects the needs of an expanding market. ☺

Ann Brandstadter

Manager, Standards Publications and Marketing, NEMA

NEMA Revises Standard for Roadway Luminaire Labeling

ANSI C136.22-2019 *American National Standard for Roadway and Area Lighting Equipment—Internal Labeling of Luminaires* covers internal luminaire identification labels for all styles of luminaires used for roadway lighting.

The ANSI C136 committee, Roadway and Area Lighting Equipment, is actively seeking additional membership for the “user” and “general interest” membership categories. For information, contact lighting@nema.org.

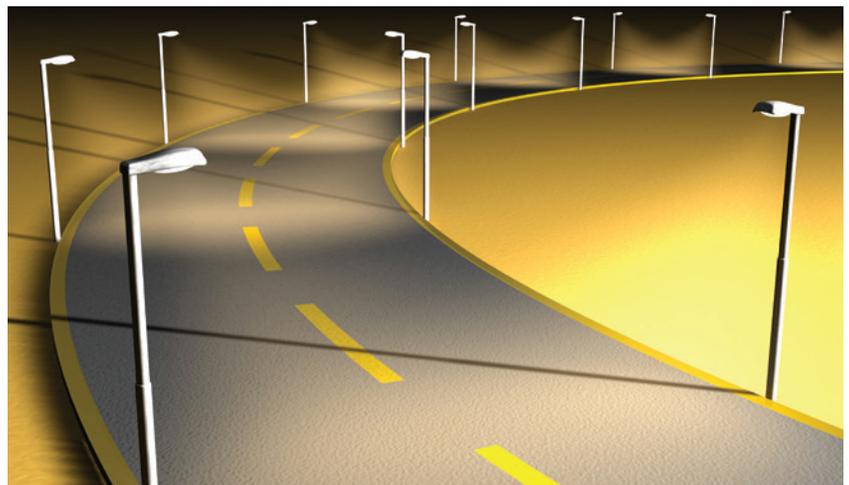
ANSI C136.22-2019 is available for \$48.

ANSI C136.25-2019 *American National Standard for Roadway and Area Lighting Equipment—Ingress Protection (Resistance to Dust, Solid Objects, and Moisture) for Luminaire Enclosures* is available for \$76.

ANSI C136.32-2020 *American National Standard for Roadway and Area Lighting Equipment—Enclosed Setback Luminaires and Directional Floodlights for High-Intensity Discharge (HID) Lamps* is available for \$62.

ANSI C82.77-10-2020 *American National Standard for Lighting Equipment—Harmonic Emission Limits—Related Power Quality Requirements* is available for \$100.

NEMA LSD 65-2019 *NEMA Guide to Emergency Lighting* is available in electronic download at no cost. ☺



Ownership Cost Parity Between EVs and Gas-Powered Cars Possible by 2025

Over the past decade, electric vehicles (EVs) have made substantial progress toward mass adoption. Charging stations have become faster and more readily available, and range-anxiety has slowly dissipated, with some EVs being able to travel nearly 400 miles on a single charge. One obstacle, however, remains at the forefront: cost.

The ownership cost of a vehicle goes well beyond the sticker price in a showroom. Fuel, maintenance costs, and depreciation are key determinants of the total cost of ownership. So how do electric vehicles stack up against gas-powered vehicles? And when will price parity occur?

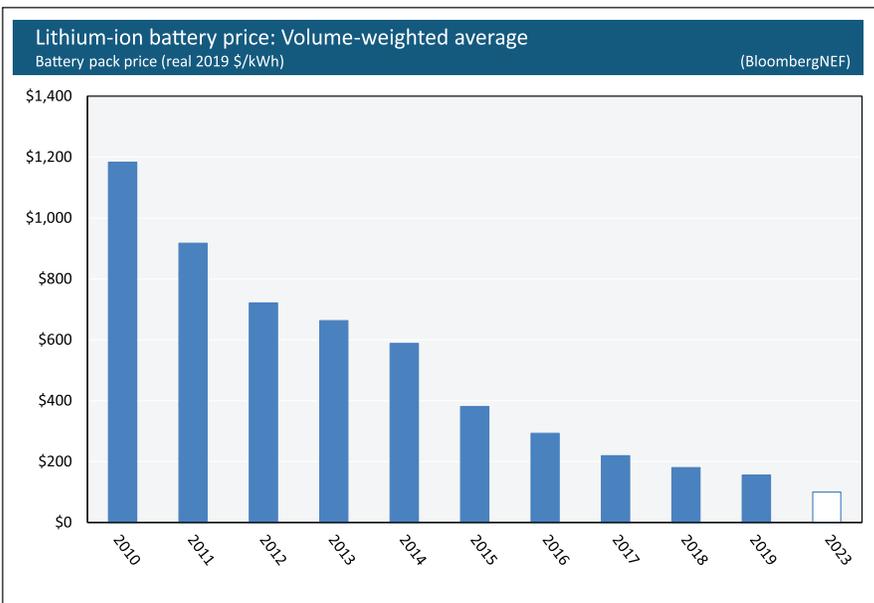
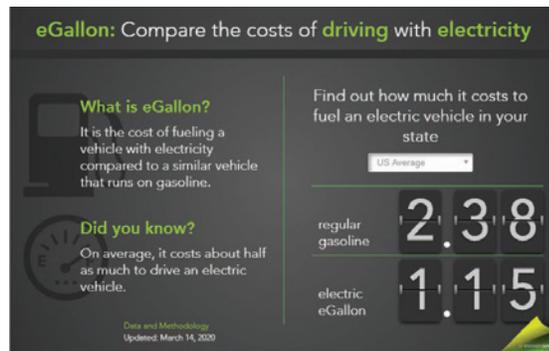
A study conducted by the University of Michigan found that the average annual cost to “fuel” an electric vehicle in the United States is \$485, compared to \$1,117 for a gas-powered vehicle.¹ However, the costs for electricity and gas vary dramatically from state to state. To help consumers

gauge fuel costs in their state, the Department of Energy has put together an eGallon calculator. eGallon “calculates how much electricity the most popular electric vehicles would require to travel the same distance as similar models of gasoline-fueled vehicles would travel on a gallon of gasoline. That amount of electricity is then multiplied by the average cost of electricity for the state.”² According to the eGallon calculator, in no state is it cheaper to fuel up on gasoline.

Additionally, the prices of lithium-ion batteries have fallen dramatically since 2010 from \$1,183/kWh to \$156/kWh in 2019, according to Bloomberg.³ They also expect the average price will be close to \$100/kWh by 2023.

Maintenance also contributes to the lifetime cost to operate a vehicle. An article written in *Forbes* notes that maintenance for EVs is likely lower because they have “fewer moving parts, no exhaust system, less need for cooling ... and no need to change oil, fan belts, air filters ... and spark plugs.”⁴

Forbes notes that when fuel savings are accounted for, EVs are already at cost parity in some markets. An executive at Volkswagen predicts electric vehicles will cost less in three to five years.⁵ Although calculators are helpful, none of them incorporates the effect of depreciation. EVs depreciate significantly faster in value than gasoline-powered vehicles. In some cases, EV tax incentives may offset the depreciation handicap. While the lack of EV infrastructure is likely to remain a headwind to the mass adoption of EVs, ownership costs are heading toward parity by mid-decade. ☺



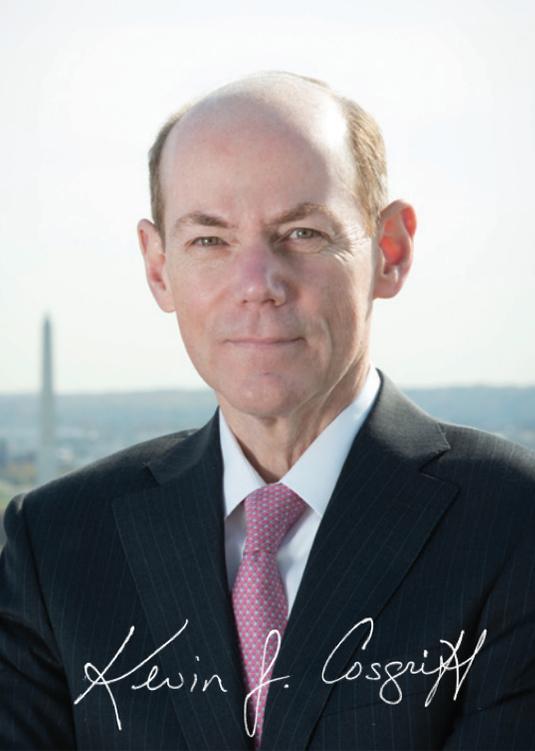
1 “Costs and benefits of electric cars vs. conventional vehicles,” EnergySage, <https://www.energysage.com/electric-vehicles/costs-and-benefits-evs/evs-vs-fossil-fuel-vehicles>

2 “eGallon: What It Is and Why It’s Important,” Department of Energy, June 10, 2013, <https://www.energy.gov/articles/egallon-what-it-and-why-it-s-important>

3 “Powering The EV Revolution — Battery Packs Now At \$156/kWh, 13% Lower Than 2018, Finds BNEF,” CleanTechnica, December 4, 2019, <https://cleantechnica.com/2019/12/04/powering-the-ev-revolution-battery-packs-now-at-156-kwh-13-lower-than-2018-finds-bnef/>

4 Jeff McMahon, “Electric Vehicles Cost Less Than Half As Much To Drive,” *Forbes*, January 14, 2018, <https://bit.ly/2WBcW2L>

5 Steve Hanley, “EV Price Parity Coming Soon, Claims VW Executive,” CleanTechnica, August 9, 2019, <https://cleantechnica.com/2019/08/09/ev-price-parity-coming-soon-claims-vw-executive/>



The first means of human transport involved walking and running. Basically, survival depended upon some elemental level of mobility. But as social groups became larger and interactions among them increased, an impetus for traveling faster than on foot emerged. From single-axle carts in previous millennia to globe-spanning passenger aircraft today, we humans remain keen to shrink time and distance. Ideas that seemed to belong only to the realm of science fiction—*Jetsons*, anyone?—are becoming a reality. But we still have considerable work to accomplish as we continue this trend, and NEMA companies are an integral part of the physical and technological infrastructure needed to support transportation innovations.

It may seem odd to discuss transportation while most of us are under orders to minimize moving about too much. But NEMA remains active in electric, autonomous, and connected transportation; government advocacy; and Standards development. For instance, NEMA is involved in rulemakings with both the National Highway Safety Administration (NHTSA) and the Federal Communications Commission (FCC) to pave the way for the adoption of connected and autonomous vehicles.

NHTSA seeks to modernize the definition of “driver” to include both humans and advanced driver systems capable of different levels of vehicle operational autonomy. This change should accord autonomous vehicle (AV) developers the needed flexibility to advance toward fully autonomous vehicles in the United States. Acceleration of related technologies and the needed “tweaks” to our infrastructure can help us “bend the curve” of motor vehicle accidents and injuries by creating a much safer driving environment ... one based on vehicles, roadways, and traffic control systems being connected and all playing a role.

There remain challenges. For example, the FCC is analyzing a proposed rule to open 75 MHz of spectrum (in the 5.9 GHz band) previously set aside exclusively for transportation safety applications. Connected vehicles and transportation infrastructure increasingly rely on wireless communication to operate effectively. NEMA is arguing against the rule and is stressing that the FCC should retain exclusive use of this bandwidth for transportation safety. Without this guarantee, exciting transportation-relevant adaptations of innovations such as 5G will be placed in jeopardy.

At the same time, NEMA is developing industry Standards for transportation infrastructure. The latest Standard, NEMA TS 10 *Connected Vehicle Infrastructure—Roadside Equipment*, will enable vehicles and infrastructure to communicate with each other regardless of the type of device or underlying communication technology (e.g., cellular vehicle to everything or dedicated short-range communications). It addresses practical user needs in equipment such as emergency signal preemption, school zone and wrong way alerts, and pedestrian crosswalk warnings. The NEMA TS 10 Standard also includes information on maintainability, connectivity, communications interoperability, and the ability to address future advances in communications. All of this will give infrastructure owners (e.g., departments of transportation and their partners) confidence to deploy these important technologies today and future-proof their new, safer transportation infrastructure for tomorrow.

As the transportation ecosystem evolves to become more connected, electrified, and increasingly autonomous, NEMA and its Member companies—whether through the development of Standards or government advocacy—will be part of a safer and smarter future for surface transportation. ☺

Kevin J. Cosgriff
NEMA President and CEO

2020 Editorial Calendar

| |
|---|
| July/August |
| Building Systems Energy management |
| September/October |
| Industrial Products & Systems Improving the manufacturing process |
| November/December |
| Building Infrastructure Increasing productivity in manufacturing |



BUILD UPON YOUR IDEA

MASTER DATA MANAGEMENT UPGRADED

The more robust product detail you supply, the better you communicate with potential buyers, and ultimately sell. Start expanding your product attribution now and reap the benefits. Include your:

- **ETIM attributes**
- **360 images**
- **Extended product descriptions**
- **Installation videos**
- **Material Safety Data Sheets (MSDS)**
- **And much more**

IDEA Connector has unlimited attribute and category expansion capability available today to populate all of your product information. By expanding your eCommerce attribute portfolio, you'll expand your company's brand and grow your business.

idea 
CONNECTORSM

→ Start now!
Log in to **IDEA Connector**