



**CIVIL ENGINEERING DEPARTMENT  
BRUCE PODWAL SEMINAR SERIES  
September 24, 2024**

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**Zero Emission Fleet Transformation**

**Abstract:** Zero Emissions technologies (vehicles, chargers, SW) have not yet reached design or operational stability. Challenges continue to hamper the transition, typical of new technologies which do not easily nor fully displace older technologies. The typical fleet operator will experience a period of mixed-fleet operations during the transition phase which will introduce burdens in terms of availability, reliability, and the requirement of additional resources. Considering the CAPEX increase (25-300%) and OPEX unknowns, one can understand that adoption rates will vary and even with governmental subsidies, the transition timelines keep slipping. Analogies can be drawn from transitioning ships from sail to steam, or telephones to pocket computers/smart phones. The adopter understands the impacts of software, data, requirements, fleet operations, machine learning, artificial intelligence, cybersecurity to bring the key parameters from the vehicles and chargers and multiple other sources like weather, traffic, battery behavior to support operations. In the United States the federal government expects 97% reliability from chargers a number too low to gain trust in this new technology and as evidenced by most OEMs shifting to the Tesla model as defined in the new North American Charging Standard – NACS/SAE J3400. ZM Quality Requirements focus the software development to support >99% uptime while improving the charger/vehicle session completion rate above the 97% bar.

**Biographical Notes:** Danny Ilioiu, has held numerous leadership roles managing the implementation of new infrastructure and vehicle technologies including diesel-electric hybrid, battery electric, fuel cell vehicles and renewable fuels. At STV, he has been supporting various client agencies such as New Jersey Transit, LA Metro, Washington Area MTA and others to develop transition plans for zero-emissions fleets of bus and paratransit operations. As King County Metro's Zero-Emissions Program Manager, Danny advanced Metro's fleet transition to zero-emissions, coordinating with local universities, national laboratories, and local utilities. Metro operates buses, water ferry, streetcar and light rail in 39 municipalities of King County, Washington including in the city of Seattle. At MTA-NYCT he has led a team of seasoned professionals in the Research & Development group to explore, test and commercialize technologies that reduce or eliminate tailpipe emissions from a 5,700-bus fleet plus the support vehicles. Prior to the 22 years spent in the transit agency Danny has worked for 8 years in various engineering roles at two airlines, one passenger and one cargo, and for 3 years in the Packaging Machinery industry. He is a certified Project Management Professional with a graduate study from Rice University, an MS in Engineering Management from NJIT's college of Engineering, and a Bachelor of Manufacturing Engineering Technology from the College of Aeronautics with a minor in Aeronautical Engineering Design. In addition, he has instructed in various driving clubs including BMW, SCCA and Tire Rack's Street Survival Teen Driving School. Danny Ilioiu has presented topics related to zero-emissions to International, National and Academic audiences to inform on challenges and tools to successfully develop transition plans, and tools to measure success.