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| Working Group: **Electric Vehicle Charging Infrastructure**  |
| Challenges and barriers (15 minutes):* Dale, Fleets: Will not take order until met with utility and completed a route analysis for buses. ID period of time to charge, develop system for opportunity charging; avoiding peak charges
* Don: lack of power at the site. Behind the meter upgrades.
* Michael: resale electricity w/o kwh regulation
* Jim: Dealer education on charging. Availability of models/ZEV
* John: maintenance and support for infrastructure
* Ben J: lack of understanding on revenue model for property owner/ROI
* Jiangfeng: Power implications for demand/load of DC Fast Chargers
* John: utilization rate on DCFC vs L2 and peak demand charging
* David: Fear of IOU can enter refueling market in a guaranteed ROI vs mom-n-pop gas station deploying a charger
* Steven: supply chain constraints?. Commercial fleets don’t know where to start on chargers
* Josh: cost of chargers. DCFC – high entry barrier. Might not even be the most expensive portion. Understanding ROI for private infrastructure
	+ Lack of utility involvement and investment at scale
* Camille: Demand charges/time-of use rates. Plan for statewide infrastructure deployment. Overlay with transportation needs, use needs, and behind-the-meter grid availability – GIS
* Bryan: “public angst” – education about charging standards, companies, manufacturers, business models.
* Eddie: Utility – high density subdivision – codes/ordinances for sizing chargers
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| Potential benefits and opportunities (15 minutes):* Ben K: Completing readiness of Alternative Fuels Corridors for EV Infrastructure
* Ben J: Business and Corporations engaging with ZEV fleets
* Dale: Understanding the total cost of ownership and savings for fleets
* Brad: public/private ownership models for infrastructure deployments due to high entry costs – possibly incentives/expanding use of charging assets over lifetime/upgrading
* Ben K: ID’ing who would regulate weights and measures for EV infrastructure, similar to SCDA and gas stations.
* Vincent: Building code requirements – EV ready coding for single/MUD ownership
* Josh: 1. Air Quality – EV ecosystem use. Med-Heavy/Port electrification/multimodal freight; quantifying benefits? 2. Downward pressure on utility ratepayers; benefits for utilities and ratepayers, quantify? – lack of incentives to manage charging, apply behaviors to not charge during peak. – seconded by Jim R.
* Jim P: EV L2 rebates and DCFC Park and Plug program. Expanding by 30 sites/ 60 outlets.
* Don: expanded and robust network = more sales/adoption = economic development. MUD very difficult to electrify, will need building codes. Georgia has MUD codes for new/re-modeling MUDs. Market pressure is making developers go back and install chargers.
* Eddie: ROI for private deployments
* Dale: Large fleets, ability to use MW chargers for multiple vehicles
* Jianfeng: Vehicle to grid potential, bi-directional energy, solar canopy/RE chargers
* Ben: Evacuation Routes/Emergency Response to facilitate EV owners to move safely out of the area in time.
* Kevin: model availability will drive discussions on chargers, especially for heavy duty and even first-mile last mile.
* Ben J: Scope 3 emissions, Corporate goals to reduce emissions within supply chain
	+ Automobile suppliers/manufacturers: how to pivot to new economies and promote attracting business. Economies of scale
* Kevin: prep for workforce, installation, O&M, k-12 curriculum, technical schools.
* Camille: Interoperability standards.
* Opportunity to work with developers for EV ready commercial and home locations
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| **Rapid Fire Discussion (30 minutes)** |
| Education and outreach opportunities* Revenue model for chargers on demand-side
* Education about batteries ranges vs infrastructure – dispelling myths
* Make sure information is spread to all communities, not just wealthy communities – bilingual education flyers?
* Columbia area Tesla Owners Club – PCF/Tesla promoting these events; get butts in seats!
* Fee structure for EVSE – different charges at different locations
* Education customer base about using EVs for evacuation efforts
* Education of dealer networks and personnel – PCF has been engaged with efforts – has developed fact sheets – check in with other states, NC is engaging GM.
* Promotion of branding, marking, locating stations for motorists
* Information about standards and charging – might be not as big an issue moving forward but education important.
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| Equity and environmental justice considerations* Making sure disadvantaged communities reap benefits of electrification; have access to charging at MUD; air quality benefits – medium heavy duty electrification in frontline communities
* School bus electrification – helping public fleets understand infrastructure and benefits to children and AQ
* Rural electrification – urban vs rural gap
	+ GA – Oglethrop Power – Alan Shed – rural electrification power – possibly use as guide
	+ Statewide electrification plan – vision to include equitable and distributive access to EVSE – Camille
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| Financing challenges and opportunities* Incentives that decrease financial barriers for disadvantaged communities
* Leasing program for batteries/chargers – 12 year lease remaining balance
* Have not seen a ROI that is not utility-based that works – guaranteed ROI – possibly only if you are using ROI exclusively for the sale of electricity – rather than attracting people to come into your stores.
* Keep an eye on federal legislation/executive orders/congressional and cabinet actions
* Opportunities for state and local governments to pay for EVs/EVSE and incremental costs
* Range of incentives from utilities to customers to make ready costs.
* utility ownership disincentives EV infrastructure
	+ truck stop electrification has been limited to markets with high EV market penetration – such as California.
	+ Investment by others may be lower than truck stop owners
* Incentives for med-heavy duty ZEV deployment; could possibly sell energy credits to subsidize – kinda like HVIP
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| Implications to the electric grid* Making sure charging infrastructure is not overbuilt for demand
* Vehicle to grid – peak demand modulation, grid response, resiliency – bi-directionally
* IRPs- including load growth/demand for EVs – integrating RE into generation
* Tariff charges/on-bill finances/rate designs.
* Rate designs – specific rates for fleets/chargers
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| Infrastructure considerations* Legacy chargers from 2009 – case study
	+ Making sure EV chargers are supported by manufacturers over the lifetime. O&M is important for future-proofing.
* Permitting/standardization/stream lining
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| Regulatory and legislative considerations* Charging fees – “gas” tax fee – equity issues
* Does registration fee equate to mileage/tax driven by ICE drivers?
* EVSE – not a utility function kwh vs. minute
* Participation by site hosts/multiple available networks – 98% of charging infrastructure is tied together by roaming agreements. “Can I plug in?”
* Interoperability between hardware and software – avoid stranded assets.
* Statewide electrification plan – vision to include equitable and distributive access to EVSE – Camille – state agencies/utility/stakeholder groups
* Sale of EVs – legislative constraints on manufacturers for selling and servicing – franchise model
* Renewable energy being prohibited from generating electricity for EVSE if not IOU
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| Other:* Making sure we don’t restrict conversations to just vehicles; first-to-last mile, car sharing, non-public infrastructure, public transit.
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| **Stakeholders and Subject Matter Experts** |
| * Parking lot operators
* Commercial developers
* HOAs/Condo Associations/MUDs
* Invite associations for amenity charging locations, grocery stores, etc
* USDOT/FHWA
* SCDOT
* SC Department of Agriculture
* SC Department of Revenue
* SC Department of Motor Vehicles
* Municipal Association of SC
* SC Association of Counties
* SC Department of Insurance/Department of Labor – VW Mitigation
* SC Department of Employment and Workforce
* Advocacy groups for low income/underserved: AARP/Climate/Children’s health
* Elected officials – state & local
* Airports
* Port Authorities
* Building Codes

**Subject matter experts:*** Alliance for Transportation Electrification
* Regulatory Assistance Project
* American Lung Association
* Plug in America
* EV Noire
* Fleet operator – who is embracing EVs, Ikea?
* SC Logistics – transportation/freight movers
* Rocky Mountain Institute
* Center for Transportation and Environment
* ICCT – International Coalition for Clean Transportation.
* Southeast Alliance for Clean Energy
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| **Final Report Out Question** |
| What is the greatest challenge or opportunity to transportation electrification identified in your working group?Cars sit idle for 96% of the time, find opportunities at places where people park; avoiding costs like permitting along the way**With a collaborative statewide plan; South Carolina can deploy an equitable infrastructure network that is future proofed and grows with EV adoption.**Greatest challenge: Understanding the return on investment for different deployers and the cost/benefits of electrification  |