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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 |
| 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. |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |