Advanced Energy Group (AEG) New York Task Force:

Optimizing Fleet Electrification Infrastructure Planning White Paper

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Advanced Energy Group (AEG) 20Q4 NY Task Force:
Optimizing Fleet Electrification Infrastructure Planning

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Overview

Why & What

The transportation sector generates more greenhouse gas (GHG) emissions compared to any other sector, accounting for about 28.2% of the global GHG emissions in 2018 (USEPA, 2020). In order to meet clean transportation goals, significant infrastructure transformations are needed. One of the largest barriers to faster deployment is optimal infrastructure planning.

The implementation of zero-emission vehicle infrastructure comes with several challenges. One such challenge for the commercial success of electric vehicles is that charging stations need to be accessible, easy to use, and relatively inexpensive. Costs alone involve not only those of the electric vehicle supply equipment (EVSE) itself, but also those of installing the charging equipment and of utility system upgrades. In some locations, all of these costs are not financially viable. Another challenge is overcoming peak demand to avoid high loads (Lee & Clark, 2018). If the grid doesn't have enough capacity in a certain area, upgrades can be particularly costly. Maintenance and repair is also needed, which adds to the overall costs. Disadvantaged communities, in particular, may not have the resources available to install and maintain charging stations. In some locations, zoning or certain codes and standards may need to be updated in order to facilitate or even allow for the installation of charging stations (DOE,

2015). This is not nearly an exhaustive list of potential challenges to the implementation of EVSE. There are many challenges that require an in-depth planning process.

How

One of the groups working to overcome these challenges is the Advanced Energy Group (AEG) 20Q4 NY Task Force, which is a voluntary team that has a goal to optimize fleet electrification infrastructure planning. AEG is a stakeholder mobilization platform sponsored by over 50 public and private organizations in conjunction with the Mayor's Office of New York City, Boston, Washington DC and Chicago to achieve clean energy and equity promises. The AEG Task Force consists of members from the Advanced Energy Group, WSP, National Grid, S&C Electric Company, New York Power Authority, Con Edison, New York Department of Transportation (DOT), and DNV. This group is developing a framework for prioritizing centralized fleet charging sites to accelerate the transition to electric transportation for vehicles of all types in the Buffalo-Niagara area.

If individual fleet operators one-by-one approach their local electrical utility for upgraded service loads due to EV charging, this leaves utilities dealing with incremental and piecemeal upgrades to infrastructure. In this scenario, Fleet owners run the risk of being the unfortunate request in the queue that triggers the requirement for an expensive utility feeder upgrade or new substation. In an ideal world, all stakeholders would come to the table together, share costs and install new infrastructure optimally. This Task Force aims to develop and trial a path forward for stakeholders to collaborate on potential sites and minimize the total charging infrastructure investment needed through improved infrastructure planning and installation. Centralized charging sites can provide equitable access to clean transportation for community members, lower upfront project costs, accelerate project development, and optimize charging infrastructure utilization for fleet operators and the electric grid. This approach can create a replicable action plan to accelerate electric vehicle (EV) infrastructure planning throughout the Northeast region of the United States and beyond (AEG, 2021).

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Who: Fleet Operators

Fleet vehicles are crucial to electrify in order to meet the clean transportation goals outlined above. In contrast to the passenger vehicle market, fleet vehicles, which tend to be less efficient and often log more annual miles than passenger vehicles, provide a more significant opportunity to reduce CO2 emissions and air pollution and increase equitable access to clean transportation. The Task Force created the methodology presented here to maximize the community benefit from those 3 outcomes, including these driving factors:

- **CO2 reduction:** On a per vehicle basis, fleet vehicles emit more CO2 than passenger vehicles – fleet LDVs typically travel twice the annual miles as passenger vehicles (and therefore emit twice the CO2), and MHDVs emit 8-30 times the amount from a personal LDV.
- **Pollution reduction:** Particulate Matter 2.5 (PM2.5) is the largest environmental health risk factor in the US (responsible for more than 60% of the deaths from environmental causes), and fleet vehicles have a disproportionate health impact – fleet LDVs typically have twice the PM2.5 emissions of passenger vehicles, and MHDVs are 30-150 times worse per vehicle .
- **Equitable access to clean transportation:** Every community member deserves clean air and access to clean transportation vehicles, for both their own transportation needs and from the goods and services in their community. Electrifying vehicles that operate in EJC communities are an efficient and cost-effective way to bring clean air to all.

Fleet vehicles, while limited in EV adoption today with <1% adoption, will introduce significant new electric grid loads once they are electrified at scale. Compared to the distributed nature of passenger vehicle travel, fleet depots will create industrial-sized new loads for the electrical grid. Even just 10 MHDVs charging at 100 kW simultaneously results in a megawatt (MW) of load, dramatically impacting the distribution and transmission networks. For comparison 1 MW of load is the equivalent of over 2000 residential refrigerators. While passenger vehicle models typically have electrical energy (kWh) requirements of 60-100 kWh, MHDV fleet vehicles often require hundreds of kWh per day, due to the multiplicative effect of higher mileage and lower driving efficiency. For context, one single electric bus operating for a day is at least 8x the amount of daily electricity consumption of an average house.

On top of the higher energy requirements, a fleet's operating profile can often limit the charging availability time, creating a need for substantial DC fast-charging (DCFC) loads, potentially more than 1 MW for the largest vehicles. Aggregating the load of every vehicle at a specific site thus presents the potential for massive spot loads for fleet operators, requiring significant grid upgrades, high demand charges, and much larger electricity bills from the increased consumption. The combined effect of these concentrated fleet loads will be substantial: Bloomberg New Energy Finance (BNEF) projects that by 2040, electric buses and trucks will make up only 1.3% of the EV charging ports but will consume 25% of the total EV energy.

Fleets are going to electrify, and their loads will be significant. However, the cost of deploying charging infrastructure to these vehicles can be dramatically reduced with proactive planning. The primary goal of this taskforce is to enable a collaborative and open framework for creating centralized fleet charging hubs, which will reduce total infrastructure installation costs, minimize the need for grid upgrades, and maximize utilization of charging infrastructure.

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Who: Community

A key factor in the drive to electrify transportation fleets is the range of benefits that can be provided to local and regional communities. As such, it is important that any effort to prioritize sites and projects for vehicle charging incorporate metrics that will measure project outcomes in regards to impacts on surrounding communities. To evaluate these impacts, the task force focused on three specific issues: air pollution, social equity/environmental justice, and economic development/support from local governments.

Environmental justice is a necessary criterion so that all potential sites/projects can be evaluated in relation to historically underserved and vulnerable communities. Too often in the past, minority and low-income communities have been the disproportionate recipients of industrial activity that increased a variety of environmental hazards in the area (such as air pollution, hazardous materials, groundwater contamination, etc.). It is imperative that future projects that will bring environmental improvements ensure those benefits are brought to communities that bore the brunt of past harm. Related to environmental justice, pollution was chosen as a key metric due to the ability of vehicle electrification to improve air quality both in the broader region but also in the immediate vicinity of a specific project site (depending upon what the use characteristics will be).

In addition to addressing environmental impacts, another key community outcome is increased opportunity for **economic development**. Converting to electric vehicle fleets and installing the requisite charging infrastructure will require local investments and new jobs to complete the work. Particularly in regions enduring economic distress, the addition of new employment opportunities will help garner

support among community leaders and the public at large. It also presents the possibility of developing or enhancing local job programs for green infrastructure and the chance to hire from local, historically underserved, communities.

A focus on community outcomes in project evaluation also helps to better position a future project for potential **environmental reviews**. If a fleet electrification project and/or charging infrastructure implementation requires state or federal government permits, or uses state or federal funding sources, then there will likely be some level of review for environmental impacts. A key component of any environmental review procedure is impacts to environmental justice communities. Incorporating screening criteria for pollution and social equity helps to identify potential positive or negative impacts regarding environmental justice early in the evaluation process. Doing so will highlight projects that will be most beneficial to surrounding communities and which may move more easily through environmental review procedures.

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Methodology & Framework

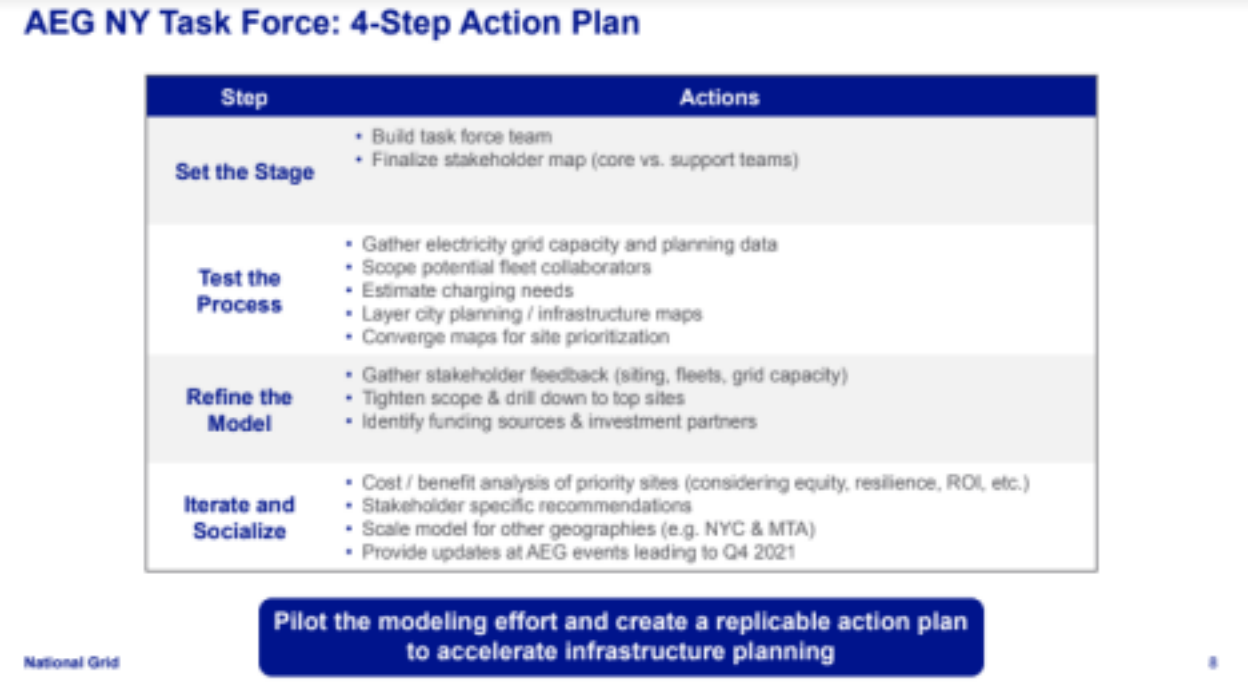

Figure 2: Framework Summary

Stakeholder Engagement

The AEG New York Quarter 4 2020 (20Q4) task force completed initial outreach with fleet owners and utilities in New York State using AEG's as well as their contacts. It quickly became obvious that the scope of fleet electrification across NY State was an ambitious project for the task force to take on. The task force established an aim to select a distinct local area which would limit the scope of the planning area and allow the task force to focus on the area as a test case for trialing the optimal infrastructure process.

Buffalo NY was chosen as the focus area based on the high initial level of engagement from stakeholders in the region, especially the Greater Buffalo-Niagara Regional Transportation Council (GBNRTC) and

National Grid (NG).

A Stakeholder Summit was planned and held on March 23, 2021 with presenters from GBNRTC, NG and WSP. Stakeholders were identified and invited through the task force member's networks. Attendees represented All Pro Parking, Site 1 Energy, E3, Erie County, Duane Morris, ECS Global Services, FedEx, First Group, NY DOT, NYSERDA, NextEra Energy, Speed Global Services, State University of New York at Buffalo, VBS Energy, Wendel Companies and Wisconsin Biogas Council.

The Task Force presented the initial methodology for optimizing the infrastructure process during the summit (stakeholder engagement, site identification, site evaluation). A key theme presented was that infrastructure planning is improved by fleet owner and utility collaboration. If each fleet owner operates in a vacuum and proceeds with their own piecemeal infrastructure upgrades then utilities are forced to investigate each small additional load and determine required incremental upgrades. Fleet owners don't

want to be installing the EV charging station that overloads existing infrastructure and results in a feeder upgrade or a new substation being required. Instead if all stakeholders come to the table, share costs and install new right-sized infrastructure once in appropriate locations then the infrastructure installation can be optimized and costs can be reduced.

Following the summit, a survey was sent out to all attendees to gather key information about fleet size and potential EV charging locations. See Appendix 3 for the Survey questions.

Site Identification

The Stakeholder Survey requested information on fleet sizes and potential locations within Buffalo where future EV charging was being considered. The task force collated all the locations submitted via survey respondents.

Some key stakeholders were particularly engaged and eager to install EV charging and the task force was able to have one-on-one collaborative discussions with those stakeholders to look at the potential of specific sites.

Site Evaluation

The Task Force developed a set of specific evaluation criteria by brainstorming the key cost, environmental, and technical aspects of fleet electrification projects based on the collective group's experience and industry knowledge. These project aspects were then distilled into a list of key requirements to be evaluated in order to rank prospective shared EV charging infrastructure sites. Refer to the figure below for the final criteria list and weighting, and to Appendix 4 for a description of the evaluation methodology of each criteria.

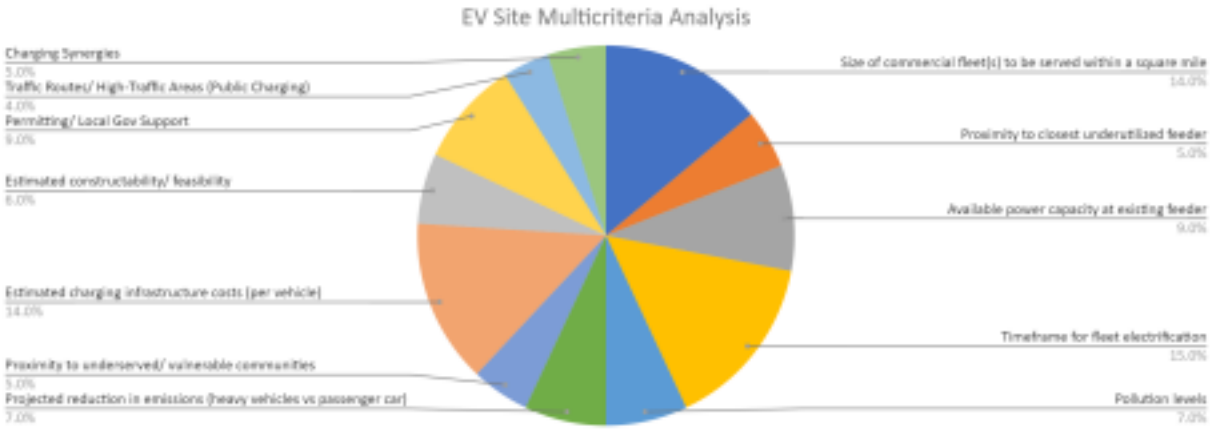

Figure 3: EV Site Multicriteria Analysis

Each potential site was evaluated by task force reviewers against the criteria in the table above, and a score out of 5 - where 0 is the lowest and 5 the highest score - was given to the sites for each criterion.

The Task Force used the “proximity to closest underutilized feeder” and “available power capacity at existing feeder” criteria to add a focus to underutilized infrastructure. There are locations across the State that already have excess power capacity available, and the task force wanted to prioritize EV charging in these locations where existing infrastructure could be better utilized.

In order to maximize objectivity between reviewers, each site’s scoring was then reviewed by the wider task force during a Task Force quality assurance review meeting where any comments or discrepancies in ratings given by the reviewers could be discussed and agreement reached on the appropriate rating. This process was designed for a consistent assessment approach across sites and reviewers. Once all sites were reviewed, a weighted score of all criteria was calculated to rank the quality of each site.

While it was not ultimately required for the number of sites that were analyzed in Buffalo, a future phase of the process is to map all sites geographically in a heat map of prioritization.

Outcomes

Vehicle Electrification Analysis / Grid Impact Assessment

As outlined in the Methodology and Framework section above, the process is designed to identify sites that have available grid capacity, fleet vehicles nearby for utilizing chargers, and site layouts suitable for EV charging traffic. See Appendix 1 for characteristics on estimating potential site loads.

For informing the multicriteria analysis and ranking process for the six sites analyzed, the team developed high-level estimates of potential charging loads:

Table 1: Grid Impact Assessment

Site 1	100+ 2.0 3.57 0.6
Site 2	50-100 2.5 0.79 3.2
Site 3	20-50 0.5 0.88 0.6
Site 4	50-100 0.5 0.47 1.1
Site 5	20-50 0.5 1.03 0.5
Site 6	50-100 0.5 0.95 0.5

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Prioritized List of Sites

Based on our site scoring criteria shown in the table below, weighted average scores were calculated. The weighted average scores take into consideration scoring on a scale from 0 to 5 as well as the criteria weight. The weighted average scores for the top two performing sites, Site 5 and Site 1, were 4.4 and 3.9 respectively.

Table 2: Criteria Matrix

	Site 1 Site 2 Site 3 Site 4	**Site 5**	**Site 6**
	3.9 3.3 3.6 3.2	**4.4**	**3.4**
	3.0 5.0 2.0 3.0	3.0	4.0
	5.0 5.0 5.0 3.0	5.0	5.0
	5.0 1.0 4.0 2.0	5.0	5.0
	4.0 2.0 5.0 5.0	5.0	1.0

Pollution levels	3.5 3.5 2.0 2.9	4.0	3.5
	5.0 5.0 2.0 1.0	3.0	2.0
	4.0 4.0 2.0 1.8	5.0	4.0
	4.0 2.0 4.0 4.0	5.0	5.0
Estimated constructability/ feasibility	4.0 3.0 4.0 2.0	5.0	1.0
	3.0 4.0 5.0 4.0	5.0	4.0
	2.0 3.0 4.0 3.0	3.0	4.0
	4.0 4.0 3.0 3.0	4.0	2.0

Some key reasons for the top scores were:

- For “Available power capacity at existing feeder” Site 1 achieved a score of 5 because it is an existing waste-to-energy generator with a large distribution utility feeder already installed. ● For “Projected reduction in emissions (heavy vehicles vs passenger car)” Site 1 achieved a score of 5 because it is the end of a route for heavy duty waste trucks with the potential opportunity to electrify these high emissions vehicles.
- Site 5 achieved a score of 5 for half of the site scoring criteria. For its weakest performing criteria, Site 5 achieved lowest scores of 3, which were comparably higher than the lowest scores from other sites.

Other reasons these sites scored higher than the others are due to lower estimated costs, closer proximities to underserved communities, and closest proximities to underutilized feeders. Other sites did not score as high in all of those categories combined. Costs and feasibility are major drivers in the implementation of electric vehicle supply equipment.

Based on our weighted average scores from thesite scoring criteria, Site 5 and Site 1 are our recommended sites.

The main determinants of unselected sites were their delayed timeframe to electrify, not a significant reduction in emissions, and high construction costs.

Project Path Forward

With the scoring process complete, the next steps in this project are to complete detailed analyses on each of the recommended sites (Site #1 and Site #5), connect the chosen locations with funding sources, refine the model, and scale to other territories. The in-depth analyses will include a vehicle electrification

analysis to determine specifics such as number of charging stations, a grid impact assessment to minimize upgrades to the grid, project cost analysis, and a detailed analysis on community outcomes such as estimated pollution reduction and economic development. As far as funding, there are many programs in New York that can offer financial assistance. This step in the process would be tailored specifically to each site depending on what funding is available and eligibility. In New York State, for example, there are programs such as Charge Ready, Make Ready, Zero Emission Vehicle Drive Clean Rebate, Zero Emission Vehicle Infrastructure grant program, and others such as in New York's Clean Transportation Prizes.

Based on stakeholder feedback and hurdles overcome during the process the model will be refined, then the criteria evaluated and steps taken throughout this process can be outlined in a way that can be tailored to other regions. Similar to what this Task Force has done, other regions could use a survey to determine what interest there is in the implementation of EVSE. After that, a criteria matrix with the same or similar evaluations that were done by this team could be created to optimize locations of the infrastructure. This planning process developed by the AEG Task Force will help to create centralized charging locations that can provide equitable access to charging equipment, lower costs, accelerate the transition to electric transportation methods, and optimize charging infrastructure utilization to maximize use without overloading the grid.

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Replicability

Figure 4: Replicability Steps

Our methodology was created to determine where community charging infrastructure is needed most. Our goal is to further refine this methodology so that it can be scalable and used as a tool or resource for infrastructure planning for a larger system like the MTA.

The steps in our framework are to determine a location, stakeholders, and required data. Then use the criteria matrix to assess sites and ultimately determine which has the best potential to move forward with for funding opportunities.

The following sections outline the key steps to replicate the process this Taskforce trialed in other locations:

Location of Study

The first step is to identify a location to focus the study on, for example a neighborhood of a larger town, one with multiple fleets in the area that could benefit from community charging.

Data Sourcing

Next, heat maps should be used to determine the critical points of need for electrification in the location of study. We layered 3 maps [Appendix 1]: electric infrastructure/grid constraints, fleet data, and disadvantaged community geographies on top of each other to show **hot spots**. Note that access to utility distribution asset grid data would be needed for the first map. This exercise helped narrow down an area to focus on. The next step is to get the community involved.

Stakeholder Engagement

Various stakeholder groups need to be involved, including but not limited to:

- Utility stakeholder
- Consulting stakeholder
- Community organizations
- Fleet operators
- City planning agency
- Transit agency (ex. Greater Buffalo-Niagara Regional Transportation Council)

In order to encourage community engagement. The following options can be used: ● Create a working group with at least one representative from each of the above groups ● Outreach to corporate fleets (in form of email, survey, etc)

- Host roundtable/stakeholder workshop/summit
    - Option of working groups within call:
        - Fleet Operations (Intermodal Operations, routes, etc...)
        - Electrification & Infrastructure
        - Financial Incentives
        - Air/health Quality Challenges (including emissions, parking and congestion)
- Post roundtable survey [Appendix 3] to record site & fleet data

Ranking of Sites

After compiling a list of sites, prioritize the list based on critical metrics for the area. The goal is to minimize grid and customer cost.

Use the defined Evaluation Criteria [Appendix 5] to rate the sites in each category. The criteria categories focus on vehicle-related, emissions-related, cost, and timeline criteria. A majority of the info is readily publicly available, beyond the electric utility data needed for the technical criteria.

The site ratings can then be weighted and ranked on the overall weighted average score.

Funding Opportunities

The final step would be to assess availability of funding opportunities in the location chosen. With prioritized sites selected and compared to funding opportunities, the most promising locations should be selected for the detailed analysis and design described above in Project Path Forward.

Lessons Learned

It is important to keep in mind that the objective of this Taskforce is to develop and trail a process for improving fleet electrification infrastructure planning. As such, it is critical to remain flexible while staying focused on the process, and to be prepared to "refine as you go."

Data Gathering Challenges

- Identifying data sources for site evaluation can be challenging and may require engagement with partners, including utilities, transportation planning councils, and environmental groups. In particular, the following data may not always be easily accessible but is helpful to accurately evaluate prospective sites:
    - Utilities: feeder location, feeder utilization, and planned infrastructure upgrades ○ Transportation planning councils: Traffic patterns, travel corridor locations
    - Environmental groups: Data on environmental justice communities, local historical emissions
- The ability to integrate multiple data streams to visualize overlapping data layers is a powerful tool for explaining the shared EV charging infrastructure philosophy and comparing prospective sites.
    - Showing fleet operators a map that overlays the location of numerous local fleets, local GHG and air pollution levels, and spare utility feeder capacity quickly helps the concept "click" in their minds.
    - Once sites have been evaluated, presenting them on a map is a simple way to compare various sites geographically as well as visualize their evaluation scores.

Stakeholder Summit & Follow-Up Obstacles

- When organizing a stakeholder summit, it is critical to involve local stakeholders early in the process to leverage their networks and generate awareness and interest from local fleets. These local stakeholders can help signal boost to increase enrollment at events and general awareness of the effort, ensure that local fleet operators' needs and interests are incorporated into initial outreach and educational materials, and increase the credibility of the event.
- Sustaining interest and engagement can be challenging and requires persistence. For our Buffalo summit, we fielded an online survey following the event to collect information on attendees'

fleets, including the number and type of vehicles and general information on location and duty cycle. We also collected data on attendees' electrification plans, including timeline considerations and level of interest in a shared infrastructure solution. While an online survey did seem to be the appropriate mechanism for collecting this information, the response rate was relatively low. In the future, we would consider fielding the survey prior to the event, featuring the survey link more prominently in event outreach materials, and conducting dedicated follow-ups with interested fleets to streamline the data collection and site evaluation processes.

Resourcing

- As an effort primarily run on a volunteer basis to-date, the Task Force has at times struggled to maintain forward momentum and secure reliable time from its members. Assuming this volunteer-basis organization structure persists as this process is replicated, future Task Forces in other locations will be well-served to recruit a large team of individuals who are passionate about transportation electrification, engaged in the process, and capable of taking the lead to push specific initiatives over the finish line.
- A primary achievement of the group so far has been the development of a framework and reusable materials - including educational materials, an online survey, a data intake form, and a site evaluation workbook - that will streamline the group's efforts as they replicate this process in other locations.

Timeline

- It is recommended to set a schedule with milestones to accomplish for each step. The following steps should be evaluated on a case-by-case basis in order to determine an approximate timeline:
    - Duration for planning a stakeholder summit
    - Duration for collecting and analyzing data
    - Duration for discussing and evaluating the results, engaging stakeholders, and moving forward with the selected sites

Conclusion

Through the 2020 Q4 AEG New York Stakeholder Challenge on Mobility and Transportation, this Task Force was established to develop and trial a process for optimal infrastructure planning. The Task Force engaged stakeholders, held a Stakeholder Summit, collated EV charging site locations, developed a prioritization criteria matrix, ranked sites and selected the most promising locations.

This group developed a framework for prioritizing centralized fleet charging sites to accelerate the transition to electric transportation for vehicles of all types in the Buffalo-Niagara area. A path forward has been developed for stakeholders to collaborate on potential sites and minimize the total charging infrastructure investment needed.

This approach can be used as a replicable action plan to accelerate electric vehicle (EV) infrastructure planning throughout the Northeast region of the United States, and other regions as well. The survey used to determine interest in charging station infrastructure implementation as well as the criteria matrix developed can be tailored for other regions as part of electric vehicle infrastructure planning

processes.

A positive outcome of the Task Force's work throughout 2021 has been to connect stakeholders together and educate them on specific metrics to analyze for potential sites and bring awareness to the planning phase of EV Charging infrastructure implementation.

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Appendix

Appendix 1: Vehicle Characteristics

For estimating potential site loads, the team used the following vehicle characteristics:

School Bus	Jouley, Lion Electric	80-220 65-155 60-80	19
Shuttle Bus	Ford Transit, Greenpower Synapse, Lightning Systems	45-200 25-200 35-70	19
Transit Bus	BYD, New Flyer, Proterra	230-600 50-350 100-120	50
Cargo Van	Arrival Van, Ford Transit	43-150 60-160 45-70	19
Step Van	UES, Workhorse C650	35-150 40-200 55-80	19
Box Truck	Peterbilt 220EV, UES Ford E-450	50-350 30-250 55-80	50
Refuse Truck	BYD, SEA Electric	215-300 55-250 65-90	50

Regional Freight	Freightliner eCascadia, Peterbilt 579 EV	260-550+ 75-250 150+	250

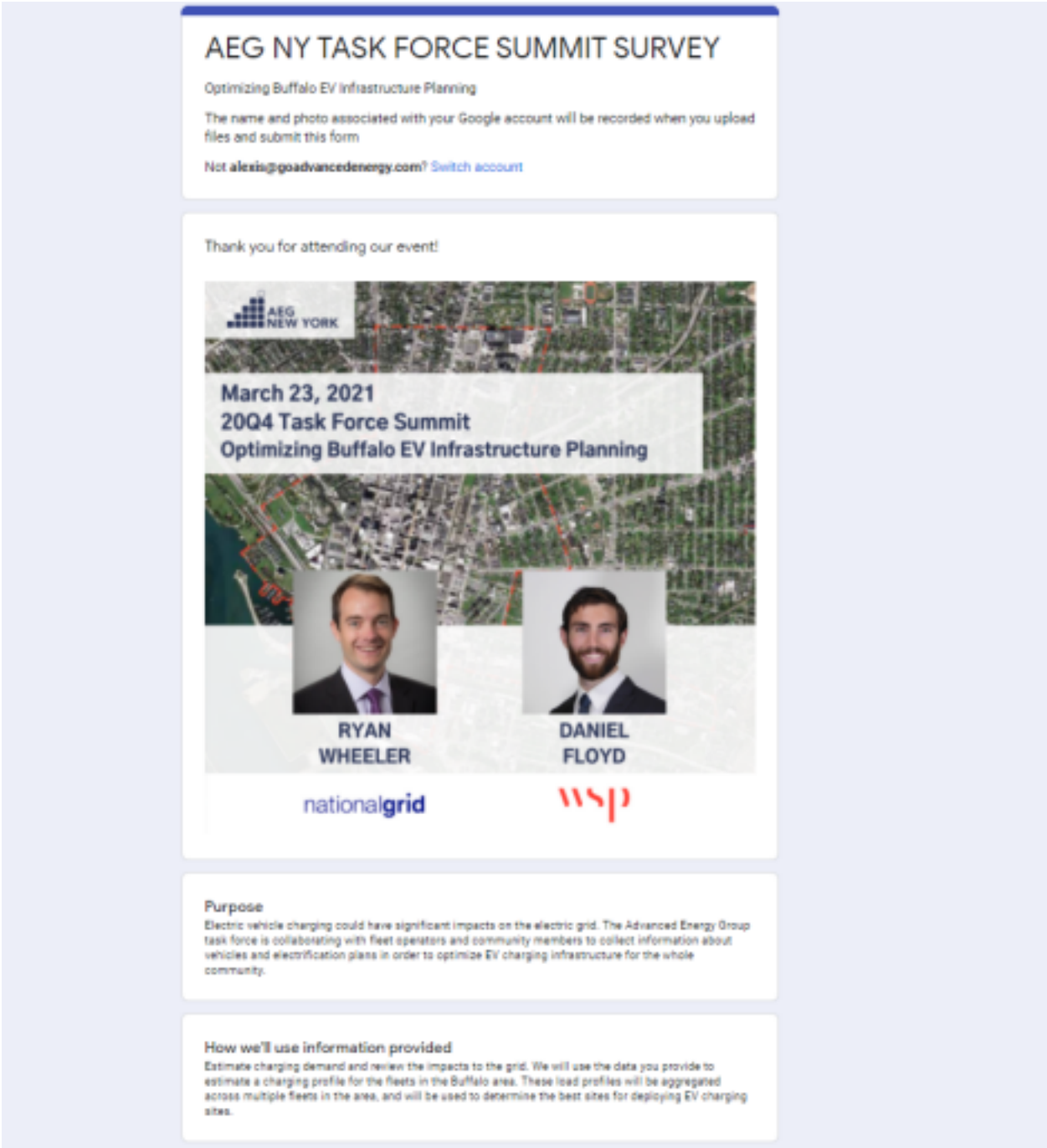
Appendix 2: Maps

Appendix 3: Stakeholder Summit Agenda

AEG NY Taskforce: Stakeholder Summit Agenda

Item	Topic	Description
1	Project Intro	Describe AEG Taskforce, goals, and objectives
2	EV Industry 101	Vehicle Types and Emissions, Vehicle availability, Charging 101, National Grid Programs, Grants & Incentives, TCO / Economics
3	Challenges/ Collaboration Opportunities	Upfront CapEx, Charging costs (hardware + energy), siting/property challenges, other "soft costs". Advantages of collaboration vs. "Going Alone": Lower upfront cost, shared utilization, public access funding opportunities, etc.
4	Buffalo Region Transportation Needs	Overview of transportation in Buffalo from GBNRTC: Transportation needs, fuel needs, goals of the Climate Change Task Force
5	Define Outcomes	Prioritized list of charging stations, mapped to stakeholders' transportation needs: XX Customers need YY MW of charging, so rank potential sites to meet needs cheaply
6	Brainstorm Potential Locations	Stakeholders create a parking lot of potential locations to investigate as part of the prioritization process (goal of completion by end of Q2)
7	Wrap Up	Next steps, survey to follow, soft close

Appendix 4: Site Information Survey



AEG NY TASK FORCE SUMMIT SURVEY

Optimizing Buffalo EV Infrastructure Planning

The name and photo associated with your Google account will be recorded when you upload files and submit this form

Not **alexis@goadvancedenergy.com**? Switch account

Thank you for attending our event!

Purpose

Electric vehicle charging could have significant impacts on the electric grid. The Advanced Energy Group task force is collaborating with fleet operators and community members to collect information about vehicles and electrification plans in order to optimize EV charging infrastructure for the whole community.

How we'll use information provided

Estimate charging demand and review the impacts to the grid. We will use the data you provide to estimate a charging profile for the fleets in the Buffalo area. These load profiles will be aggregated across multiple fleets in the area, and will be used to determine the best sites for deploying EV charging sites.

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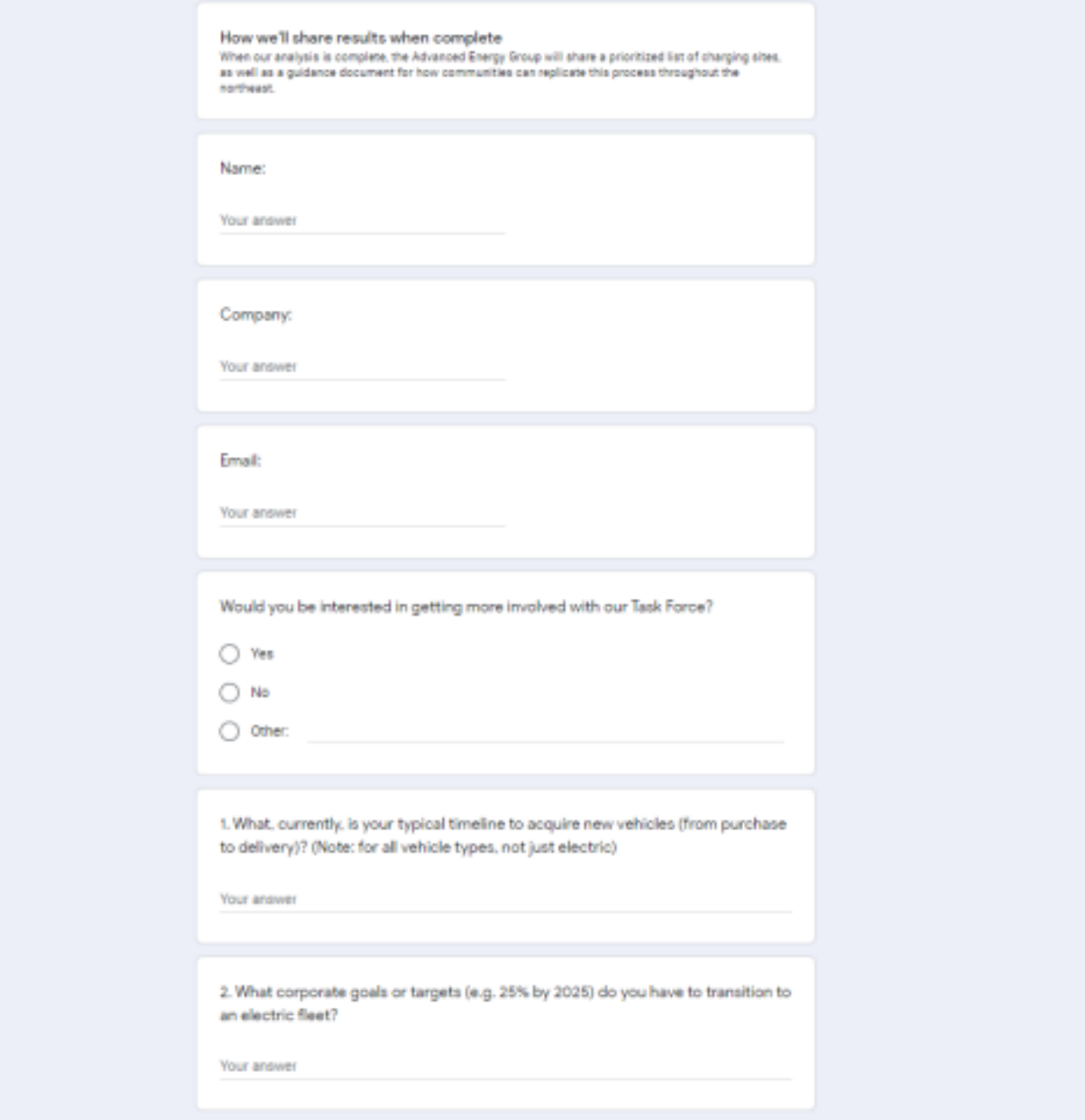

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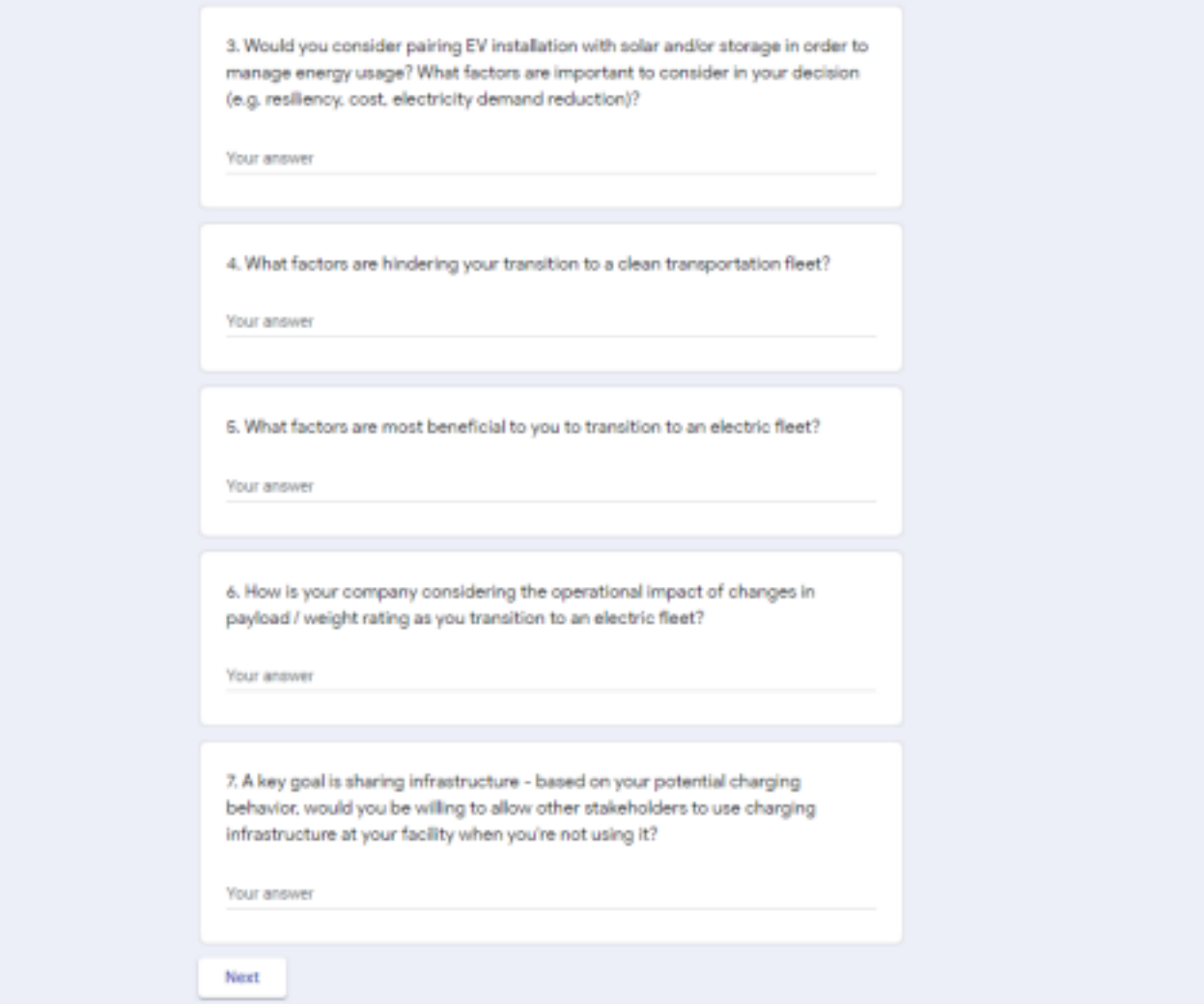

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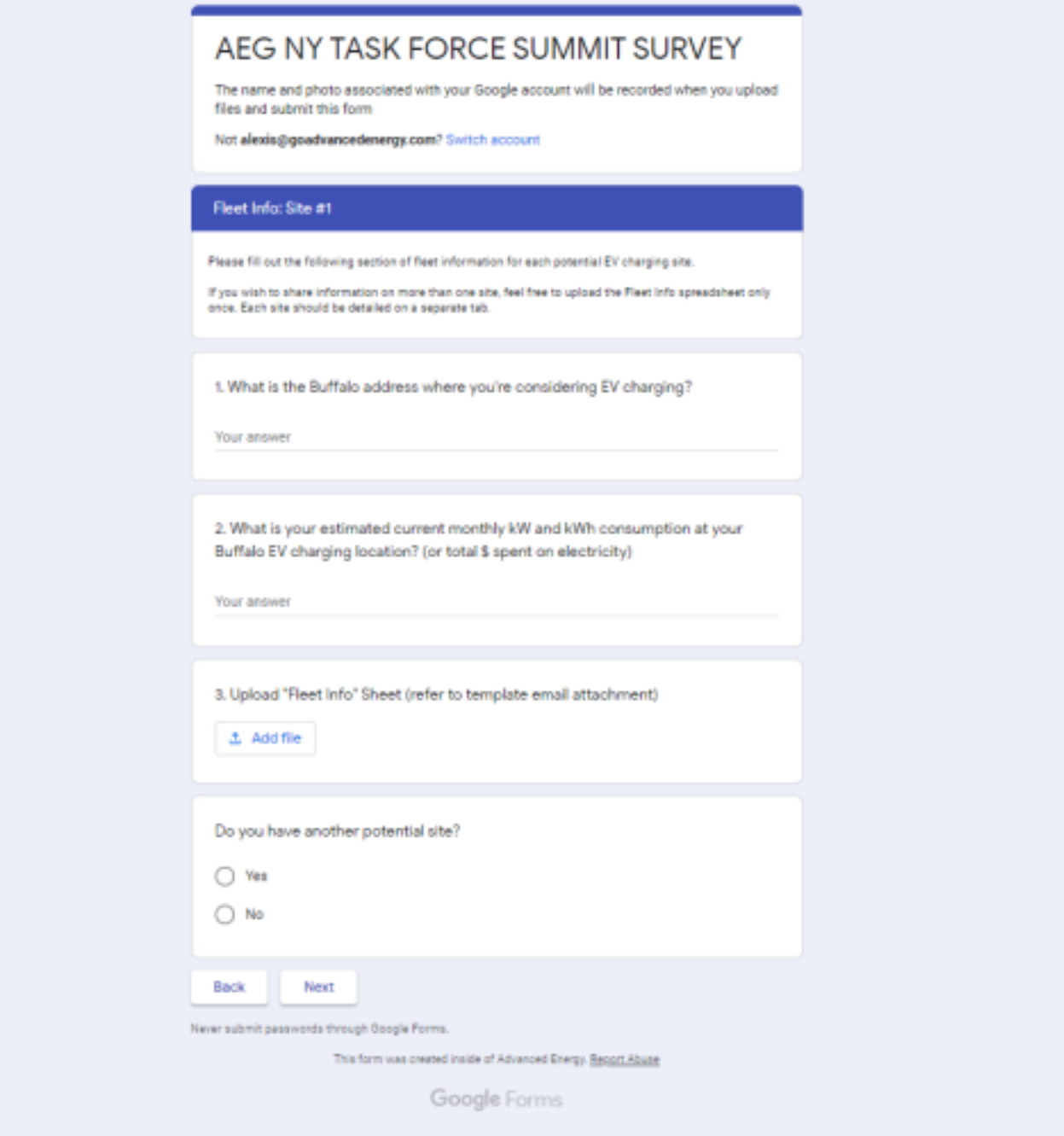

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Appendix 5: Site Evaluation Criteria

Criteria	Criteria Weighting	Evaluation Based Upon
Size of commercial fleet(s) to be served within a square mile of	14%	Survey Responses

prospective site	
Proximity to closest underutilized feeder	5% Electric Utility
Available power capacity at existing feeder	9% Electric Utility
Timeframe for fleet electrification	15% Survey Responses
Pollution levels in vicinity of prospective site	7% EPA Maps https://ejscreen.epa.gov/mapper/
Projected relative emissions reduction potential (heavy vehicles vs passenger car) Proximity to underserved/vulnerable communities Estimated charging infrastructure costs (per vehicle)	7% Survey Responses (based on fleet vehicles to be electrified) 5% Publicly available Environmental Justice (EJ) community maps: https://ejscreen.epa.gov/mapper/ NG EJC Map (for Make-ready funding eligibility): https://ngrid.maps.arcgis.com/apps/webappviewer/index.html?id=e90cc8f135d545378d93cf8b43eca615 14% Engineering Judgement
Estimated constructability & feasibility	6% Engineering Judgement
Permitting & local government support	9% Local Knowledge & Media Coverage
Proximity to traffic routes/high-traffic areas (Public Charging)	4% https://gisportalny.dot.ny.gov/portalny/apps/webappviewer/index.html?id=28537cbc8b5941e19cf8e959b16797b4
Charging synergies (i.e., how compatible are the local fleets' duty cycles and charging schedules for optimizing infrastructure utilization?)	5% Client's operational data

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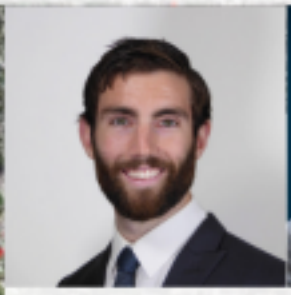
Credits

AEG NEW YORK

SPECIAL THANKS TO 20Q4 TASK FORCE



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