#	Question	MTS Response
1	What steps is MTS taking to partner with SDGE/ San Diego Community Power for discount off- peak electric rates to reduce overall cost and /or Utility financing to ease the up-front cost to implement ZEB across the fleet.	SDG&E currently has submitted their EV/HP rate case to the California Public Utilities Commission (CPUC) for review and apporval. Once approved, MTS will transition from the current Commercial Commercial-TOU rate to the EV/HP rate that subsidizes the Commercial-TOU demand rates with a subcription fee lowering the overall electric charger energy costs. And, MTS is planning to partner with Power Your Drive
2	When deliver the new gilled this fall?	MTS is expecting the 2 Gilligs in October 2020.
3	Are we looking at smaller, electric buses that can increase the frequesncy of the buses? Is that going to be addressed as well?	We're are looking at minibus replacements for commercially available batter electric buses as they become available and meet our operational range. However, 40'/60' will be replaced with same size battery electric buses, and not be replaced with a minibus at this time.
4	Will the plan prioritize EJ communities most affected by pollution and will the process be transparent for public input?	The plan is to prioritize implementation of ZEBs in disadvantaged communties - charging infrastructure will first happen for South Bay division, then the Imperial Avenue Division (downtown).
5	Will this increase the fare?	No, not at this point, but the ZEB Transition incremental costs is $641 Mil and we'll need to secure/find additional funding to make up this shorfall.
6	Do you currently plan to install wireless charging for Electric Buses at Trolley locations, or along buss routes?	No, not at this time and early part of the transition, but we may look into it as we run into range limitations as we progress with deploying more ZEBs. In addition, MTS has been in discussion with SDG&E about an on-route inductive charging pilot that would most likely be placed at one of MTS's Transit Centers.

7	Comparing acquisition cost between ZEB and CNG is misleading. It leaves out the TRUE cost of CNG pollution and health impacts.	For the cost information, we focused on how this transition will impact the MTS budget. But you bring up a good point about health and environmental costs due to pollution.
8	Has the general reduction in ongoing maintenance on electric vehicles as opposed to traditional buses been considered in drawing up this budget?	Yes, it's included in the transition plan analysis. Note: that the battery electric bus maintenance cost reduction is an assumption. There's some unknown costs such as mid-life battery replacement, and how that may impact the costs.
9	where are the buses deployed? which routes, which communities, and how were they determined?	We update the ZEB webpage regularly with routes being served: https://www.sdmts.com/inside-mts-current-projects/zero-emissions-bus-pilot- We plan to use the electric buses on 27 routes for the pilot program. We will try to putthe buses on as many routes as we can within the daily 150 mile range and infrastructure limitation. Routes are priotrized based on environmental factors for the pilot. Meaning, varying topography, high speeds, and/or hot or cold temperature (climate) are the main factors we're using to determine routing.
10	Sorry if this was in the materials i haven't gotten all the way through --- So that's a 410k cost difference. Is that made up at all in long term fuel costs? (not including up front investment of charging infrastructure)	Assuming this is referring to the bus cost difference with the battery electric buses ($950,000), and Compressed Natural Gas buses ($540,000). In this case, no fuel costs are not included. This is strictly the incremental costs for purchasing a electric instead of a CNG bus. But, the costs of charging an electric bus is more expensive than fueling a CNG today.
11	The chairman stated that MTS wanted to become a leader in ZEB in California. Is he talking about timing of 100% transition to ZEB ?	MTS has been a long time leader among CA transit agencies in improving its emission reduction efforts. MTS plans to continue that leadership with its transition from gas-powered buses to electric buses.

12	Would route 41 be an example of a route with topology too extreme for the buses?	Route 41, has been a part of the pilot and will most likely continue to be. Currently, route 41 has a couple blocks that meet the range limitation.
13	Does the cost / mile include the value of LCFS credit revenues?	No, LCSF we're not inlcuded in the fuel costs comparison, neither electric or CNG. Both receive LCFS credits.
14	Do the ZEBs have same bike capacity?	Currently all 40' ZEBs will have 2 bike capacity. MTS is also transitioning 60' buses with 3 bike capacity.
15	Why are we not giving consideration to hydrogen fuel cell technology vs electiric busses	For the pilot, it isn't cost effective for a small fleet (1 or 2 buses) mainly due to the scaling of hydrogen stations which are being built for 25 to 50 bus capcities.
16	Do the buses have regenerative braking similar to an electric car? It seems this would be helpful with	Yes - these buses do have regenerative braking!
17	What exactly are there charger reliability issues?	The most common issue is between the bus and charger communition, causing a charger fault error. The result is the vehicle unable to charge the bus to capacity, causing the bus to not go into serivce.
18	Our organization (San Diego Energy District) initiated the community choice energy movement … how can we collaborate with MTS on grid integration to help emerging CCAs with vehicle to grid as well as grid to vehicle integration.	MTS is planning to utilize SDG&E's EV/HP rate case once approved by the CPUC, which will help reduce the demand charge cost. However, we are looking at all potential options including a CCA.

19	I'm assuming that the maintenance technicians are represnted by IBEW 465. Is MTS exclusively responsible for developing training programs for maintenance technicians or is the Local also involved in co-creating those programs and determing leves of funding for training?	Training programs are developed by the OEMs and industry suppliers. MTS in conjunction with their employees and Union integrate that training into the training programs or state accredited apprentices programs.
20	Do you have much control over when the buses are charged? Could we get under the 94 cents/mile by charging during off peak hours when more renewable energy is available?	Our buses need to be out on the road most of the day so charging will likely happen almost entirely at night. Majority of the charging has been during the super off peak for the pilot so far (12am - 6am), which has the lowest energy rates on the time of use scale. As part of the transition we will need to implement "smart charging" systems to limit charging to the most affordable timeframe while still ensuring vehicles will be ready for service each day. Our analysis indicates that at full transition, some buses will still need to be charged at higher rate tiers because of the length of time to charge and the amount of BEBs at each facility.
21	Is the cost per mile data based on what we've observed during the pilot or is it based on estimated full life cycle costs, including when batteries need to	Cost per mile data is what has been observed during the pilot
22	piensan poner los autobuses en comunidades como national city English Translation: Are you planning to put buses in communities like National City?	Spanish: Si, MTS planea poner autobuses eléctricos en rutas en National City English Translation: Yes, MTS plans to use electric buses on routes in National City.

23	The speciallized transportation fleet will be also Zero emission? Cost? Scheduling Time restricted as now? Users are to schedule usage and it takes a lot of time to go to their appointments	Although they are not currently required as part of the regualtion, MTS continues to evauate the avalibility and application of ZEBs for our Para and Mini bus fleets. There are some challenges with the minibus and paratransit fleet conversion due to limited comercially available vehicles and limited range but we expect improvements over the transition.
24	Since the vehicles are silent,has there been concerns as to pedestrian safety? As you know they are silent and unaware pedestrians will walk in front of the bus	There has been discussions within the industry to add sound devices on the exterior of the bus to indicate that a bus is near and/or pulling up to a stop.MTS policy has a horn protocol when pullng up to bus stops and areas where there's high pedestrian activity.
25	how many natual gas busses are currently in the system?	MTS currently has 800 buses in the fleet. The vast majority are compressed natural gas. The mini bus/paratransit fleet run on propane fuel (that's about 175 vehicles).
26	are you going to put any charging stations in city heights	At this time, MTS does not have plans to do in route charging due to limitations with the infrastructure. Current plans involve all depot based (at bus yard) charging.
27	How long does it take to charge a bus?	It depends on a couple factors, but the short anwser in a worst case scenario, if usable battery depleted and charging at 50 kWh, it could take up to 8 hours.
28	Don’t agree with focus on hydrogen fuel cells.	
29	Not sure the question was answered about bus deployment? I guess specifically are they deployed in City Council D4, 8 and 9?	Yes, the electic buses will be deployed in Council District 4, 8 and 9.

30	Why aren't any offered in north county	Electric buses will run in some parts of the northern service territory - such as Miramar and Mira Mesa. For areas like Scripps Ranch, Rancho Bernardo and Poway, MTS runs the smaller minibuses. Techology is still emerging for the smaller electric buses and a commercially viable option isn't ready just yet. We hope that will happen soon and we can get electric buses running in northern areas. Additionally, MTS serves the communities south of Escondido and Del Mar. North County Transit District has its own plan for deploying zero emission in North County communities.
31	Rancho Bernardo? I did not see north county as one of the options in the last poll	Same as above.
32	Curious if bike racks are standard on MTS buses and the buses that will be replacing the current fleet.	Yes bike racks are standard on all of our fixed route buses. Currently all buses have capacity for 2 bikes and MTS is converting their 60ft fleet to 3 bike capacity racks
33	Why not use old land fill spots to get greater. acreage yards for charging only, I-5& Friars Rd area, and then North/South of I-52,west of 163	MTS is examining at on-route charging options. Right now, MTS is focused on building charging infrastructure at its divisions in South Bay and Imperial (East Village).
34	Im really surprised that cutaways are only 45% in 2040 since they are smaller and i thought they'd be easier to charge in denser clusers and have longer range.	The challenge is actually that the technology for those vehicles isn't widely available at this point, and the range in incredibly limited.

35	A concern about a silent vehicle in being aware of the vehicle. You usually hear it before seeing it and are aware of it before visually seeing it. A quiet vehicle could be a little more difficult to detect while out in the community.	There has been discussions within the industry to add sound devices on the exterior of the bus to indicate that a bus is near and/or pulling up to a stop. I believe MTS policy has a horn prtotcol when pullng up to bus stops and areas where there's high pedestrian activity
36	what about hydrogen and or natural gas for the "mini bus" even hybrid a step in the right direction	Minibuses are running on propane fuel now and MTS is continuing to monitor technology advancements for our mini and para transit fleet to include the possibility of hydrogen. Currently no vehicle in this class is produced.
37	Did the emissions reductions cited of propane refer to criteria emissions? The GHG reductions of natural gas and propane are roughly 10% compared to diesel, depending on the extent of natural gas leaks. https://blog.ucsusa.org/jimmy-odea/electric-vs-diesel-vs-natural-gas-which-bus-is-best-for-the-climate	We have estimates for criteria pollutants for the CNG and Gasoline vehicles in MTS' fleet, but we didn't present that in the workshop. There is no data from Argonne National Labs for criteria pollutants for propane transit vehicles; however GHGs from propane vehicles are roughly 50% that of Diesel and CNG vehicles. Our best estimate for propane vehicle criteria pollutants is based on a similar gasoline vehicle. Comparing a comparable gasoline vehicle to CNG transit bus, a gasoline vehicle produces 79% of the CO, 85% of the NOx, 56% of the PM10, 50% of the PM2.5 pollutants of a CNG transit bus, but 251% more VOC.

38	How can WE increase Ridership w/ same amount of buses 2040? And w/ 2028 Nat Gas end para transit?	As the region's population grows, ensuring transit is a good option and competitive to taking a car. By providing fast, frequent, and high quality transit service, ridership will grow. Having a fleet of electric buses adds to the quality of the ride and an important element to marketing efforts. MTS has already been building community awareness about the electric buses and will continue to do so as more and more of them start serving our neighborhoods. This transition will not eliminate our paratransit service
39	Could you Model Two Alternate Scenarios to Accelerate ZEB Transition and Include GHG Analysis for all scenarios? In addition to the Base Case scenario that has already been prepared, please provide two additional scenarios. One should outline steps to transition by 2030, the other should model a minimum of 25% of MTS bus purchases from 2020 to 2023 are ZEBs. Include GHG analysis for all three scenarios.	MTS's consultant modeled multiple GHG reduction scenarios. Slides 41-46 om the powerpoint. 1. 2040 transition 2. Early adoption - speeding up purchase of electric buses 3. 2030 transition
40	This is also semi related - but how does electrification apply to your fleet vehicles (e.g. MTS staff cars, maintenance trucks)? Is there a plan to lower the GHG for that fleet too?	Yes - MTS is looking into hybrids and electric vehicles for the "non-revenue" vehicles - meaning those vehicles that do not pick up passengers.
41	who would you be purshing the batteries from	Battery manufacturers are the following for each bus manufacturer: New Flyer = Xalt & Gillig = Cummins

42	Regarding paratransit buses, my understanding is the ICT will require purchase of zero-emission cutaway buses beginning in 2026. https://ww2.arb.ca.gov/sites/default/files/2019-10/ictfro-Clean-Final_0.pdf	This is correct. The ICT regulation states starting in 2026 the purchase mandate will include paratransit/cutaway, over the road coaches, and artic buses. However, they also mention there will be a market analysis the prior year to determine if this is feasible.
43	I belive school buses are begining to transition as well, given the high cost of EVSE and ingrastructure, has MTS considered working with school districts as partners investing in infrastructure?	Not yet. But this could happen in the future as more and more government agencies make progress on fleet transition.
44	Thank you for the great information about MTS work!	You are welcome. Thanks for the kind words!
45	Have you developed additional implementation scenarios that look at an accelerated approach that includes a cost analysis?	We have developed GHG scenarios, but not cost scenarios yet. It will cost substantially more to accelerate though. We would need to purchase two electric buses (150 mile range, $950K/bus) for every gas-powered bus (300 mile range, $540K/bus) we have in the fleet to continue to meet the service standards our passengers are accostumed to right now. But we think the costs will slowly decrease and range to improve. So an accelerated path could happen at a future date. The transition plan can be modified to an earlier time point at a later date.
46	will the charging station have "batteries" that can stabilize the grid, for Soler panels? store power for sdg&e sell back?	We are designing for micorgrids at each site, but depending on cost and efficiency will determine the scale we'll be able to install. We will most likely store energy onsite to help peak shave and/or provide redundancy before selling back to SDG&E.

47	Has tghe workforce development portion of this project been shared with communities in addition to IBEW?	Yes. It is part of this presentation and other outreach
48	Have you considered distributing the depot? Sounds like consolidating it was a legacy decision. Can they be charged/overnighted at various transit centers instead to spread out the charging infrastructure/spacing? Can the range issue be overcome by mixing the use of distance route and shorter routes rather than having long distance dedicated buses?	Charging will need to be done at our depots since this is where maintenance, washing, revenue recovery, and that charging times can be lengthy (up to 8 hours). Currently, approximately 49 % of our schedules can be covered by electric buses. MTS will continue to monitor all deployment/transition options that provide the most efficient and effective way to complete the transition assuming a one for one replacement.
49	Will SDMTS be hiring for apprenticeship programs?	Yes. Keep up to date on the MTS Human Resources Careers webpage: https://www.sdmts.com/inside-mts/careers
50	But SDGE might not be here after next year after Franchise negociations!?! I.m w/ SD350 transit/transportation group.	MTS will continue to work with SDG&E at this time. If a different provider becomes our main source of electrical power, MTS will continue to ensure our zero emissions bus transition continues.
51	Will MTS be investing in solar PV and battery storage infrastructure to generate and store energy on site?	Yes, we're are currently designing are South Bay site for ZEB transition, and this design includes a microgrid setup to allow for battery storage, and solar.
52	Is there any extra cost for taxpayers with this project?	From an MTS budget standpoint - yes. Extra costs are associated with vehicle purchases and infrastructure improvements. MTS must also purchase land and build a new bus division.

53	Are there plans to deploy some buses to North County	Electric buses will run in some parts of the northern service territory - such as Miramar and Mira Mesa. MTS serves the communities south of Escondido and Del Mar. North County Transit District has its own plan for deploying zero emission in North County.
54	Where is the PR campaign? Zero Emission, Made in America, Lower Operating Cost, Truly clean energy buses to transport San Diegans to a cleaner, healthier future!	MTS has had a steady public presence with the Zero Emissions Bus Pilot Program. MTS has developed a brand identity, held media events, promoted on social media and much more. As more milestones are hit and social life opens back up, MTS will continue to market the electric bus service to get more and more residents excited and interested in taking transit.
55	Are there any plots of land that you know of already that could be used for Gantry systems?	Yes. MTS is planning to install gantry systems at its bus facilities in South Bay and Downtown San Diego first. We are also in early discussion to acquire an additional facility off of the 94 freeway.
56	When do you expect the electric bus charging stations to be 100% powered by clean energy (vs. continued dependence on natrual gas)?	This is a question for SDG&E since we are using 100% grid power at this time. I believe their timeline for 100% renewable is 2045 - but need to verify with SDG&E. There also may be some opportunity for on-site generations for MTS, however it will be difficult to meet the power demand needed when we begin to deploy a large number of electric buses.
57	Does the use of multiple manufacturers pose a challenge to equipping your maintenance facilities?	No, there should be no impact to the facility side with different electric bus manufacturers. We currently have both Gillig and New Flyer buses in our Compressed Natural Gas fleet (which are the current pilot program electric buses).

58	Are there battery disposal costs? Are those included in the fleet cost comparison against baseline analysis and are there assumptions about costs with respect to compliance on any environmental regulations on battery disposal?	No end of life battery disposal/recycling was not included in the cost. This is still an unknown within the industry.
59	It was mentioned electric busses only have a 5-7 year lifespan - what is expected to force the retirement?	FTA guidelines determine Minibus/cutaway are 5-7 years. 40', 45', & 60' buses are 12 years.
60	Do you see autonomous buses being readily available within the next 20 years that will change things again?	Not likely that autonomous buses will be implemented at full scale for an entire fleet the size of MTS. But the technology keeps improving.
61	would it be possable too get funding from the county?	MTS is not aware of any funding sources at the County for Zero Emission Bus transition plans.
62	Because I don't have a copy of the slides, forgive me if I do not recall numbers perfectly. But if memory serves, the pilot showed a per mile cost of ZEBs that was approximately 50% higher than your current CNG busses. The GHG reduction demonstrates a 70% reduction by MTS, which is only a part of the 5% overall GHG emission inventory from the 2012 SANDAG data. If fares will not go up, what is the financial tradeoff between GDG reduction and other opportunity costs for investment by MTS (e.g., increased numbers of routes, etc.)	The mixed fleet scenario (BEB & Fuel Cell buses) for MTS's ZEB tranistion = $ 615,111,000 over the basline cost MTS would pay to continue with CNG buses. We are able to apply costs to the GHG emission savings. Using current SCC (Social Cost of Carbon) estimates for the year 2040, the attributed carbon cost savings are roughly $3 million at a rate of $38.60 per ton.

63	How would service levels be impacted, how would that look like?	Service levels are planned to remain steady throughout the transition.
64	Can this powerpoint or presentation be made available for a presentation to the OB Planning Board?	MTS posted the presentation to the ZEB webpage. If you would like a presentation to the group, please email mark.olson@sdmts.com.
65	what is the one route entirely in a DAC?	Route 5, which runs from Euclid Avenue Transit Center to downtown along Market Street, currently runs either within or along the border of SB 535 DAC census blocks for its entire length. Note that actual routes within SB 535 DACs are subject to change over time as the CalEnviroscreen is updated and the MTS route network adjusts.
66	To achieve or support the deliverables in the area of analysis of operations and capital cost components, I would recommend collaborating with other agencies/partners such as AB617 CAPP Steering Committee or San Diego Air Pollution Control District who may have funds/grants available on air pollution and facilitate the implementation of this pilot program in the EJ communities especially in the Portside Communities such as in the cities of National City and Barrio Logan.	Thank you for your comments. We will take them under consideration.

67	I am assuming this is being coordinated with SANDAG's Big 5 moves?	The "5 Big Moves" are the strategies behind the 2021 Regional Plan that SANDAG is currently drafting. MTS expects that transit buses will continue to play a very large role in the 2021 Regional Plan network, especially in the more urbanized areas where a robust fixed-route system can be supported by the densities and land uses. One of the 5 Big Moves is called "Transit Leap" and envisions high speed services that would be largely additive and complementary to the existing urban bus network. "Transit Leap" and two of the other 5 Big Moves, "Flexible Fleets" and "Mobility Hubs", may together reduce some bus requirements for longer distance commuter trips and travel in lower demand locations and times, but the vast majority of our bus fleet is dedicated to shorter and higher-density core network services that will continue to be a part of the next Regional Plan. Note also that the 2021 Regional Plan is a very long-range vision looking out towards 2050. Our bus fleet is continually cycled on a 12-14 year basis, with typically 50-75 bus retirements and new deliveries each year. Our bus fleet size and make-up can be adjusted relatively nimbly as new needs and developments arise.