April 8, 2019

Carey Bylin
Manager, Energy Section
Industrial Strategies Division
California Air Resources Board
1001 I Street
Sacramento, California 95814

RE: Comments on Discussion Draft of Potential Changes to the Regulation of Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear

Dear Ms. Bylin:

Pacific Gas & Electric Company, Sacramento Municipal Utility District, San Diego Gas & Electric Company Southern California Edison Company, Modesto Irrigation District Turlock Irrigation District, Liberty Utilities, Bear Valley Electric Service, the Northern California Power Agency[1] and Southern California Public Power Authority[2] ("Utilities Group") appreciate the opportunity to offer comments on the California Air Resources Board ("CARB") 'Discussion Draft of Potential Changes to the Regulation of Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear' ("Discussion Draft"), released on February 25, 2019. The Utilities Group has worked diligently to review the Discussion Draft; although such technical and policy outreach to our diverse membership is not a quick endeavor, we took the extra time to ensure full participation.

General Comments

The Utilities Group represents the majority of electricity transmission and distribution system owners in California. The Utilities Group supports amendments that will help reduce emissions of high global warming potential (GWP) gases and phase out of sulfur hexafluoride (SF6) in insulated switchgear, but also ensure that critical uses of sulfur hexafluoride (SF_6) are preserved, particularly to warrant the continued safe and reliable operation of the statewide electricity grid in a cost-effective manner. It is within this context that the Utilities Group is pleased to offer the following comments for your consideration:

[1] The Northern California Power Agency (NCPA) is a nonprofit California joint powers agency established in 1968 to construct and operate renewable and low-emitting generating facilities and assist in meeting the wholesale energy needs of its 16 members: the Cities of Alameda, Biggs, Gridley, Healdsburg, Lodi, Lompoc, Palo Alto, Redding, Roseville, Santa Clara, Shasta Lake, and Ukiah, Plumas-Sierra Rural Electric Cooperative, Port of Oakland, San Francisco Bay Area Rapid Transit (BART), and Truckee Donner Public Utility District—collectively serving nearly 700,000 electric consumers in Central and Northern California.

[2] The Southern California Public Power Authority (SCPPA) is a joint powers agency whose members include the cities of Anaheim, Azusa, Banning, Burbank, Cerritos, Colton, Glendale, Los Angeles, Pasadena, Riverside, and Vernon, and the Imperial Irrigation District. SCPPA Members collectively serve nearly five million people throughout Southern California. Each Member owns and operates a publicly-owned electric utility governed by a board of local officials who are directly accountable to their constituents. This letter does not reflect the position of the Los Angeles Department of Water and Power.

I. §95350, Purpose, Applicability, and Exemptions.

The Utilities Group recommends that CARB revise the purpose of this regulation to align with the statewide goal to reduce greenhouse gas emissions from gas insulated equipment, and recognize all actions taken to meet this objective. The Utilities Group proposes the following amendment:

(a) Purpose. The purpose of this regulation is to achieve greenhouse gas (GHG) emissions reductions from the operation of electrical equipment ~~that uses GHG as an insulating medium~~.

II. Revise specific definitions

The Utilities Group recommends the following changes or clarifications to the definitions in the Discussion Draft:

DELETE ~~***"Active Gas-Insulated Equipment" or "Active GIE"*** *means GIE insulated with a GHG or gas mixture which contains at least one GHG that is non-hermetically sealed and is connected through busbars or cables to an electrical power system or that is fully charged, ready for service, and located at the site at which it will be activated. This does not include equipment in storage.*~~

Requested Action: CARB should delete the term **"Active Gas-Insulated Equipment" or "Active GIE"** from the regulation. This term was originally introduced to ensure consistency with the reported annual emission rate calculation. However since the Discussion Draft proposes to eliminate compliance based on an emission rate and move to a cap on mass emissions, the nameplate capacity of "Active" GIE is no longer needed for the annual emission rate. The Utilities Group recommends deleting this term altogether in the regulation and thereby resolve the following conflicts that arise: 1) avoid creation of "phantom emissions" when GIE is taken out of service in one year and the SF6 is evacuated from the GIE in a subsequent year; and 2) include in the GIE nameplate baseline new or 'spare' GIE that have not yet been placed into service.

CLARIFY ***"Greenhouse Gas" or "GHG"*** *means CO2, methane, nitrous oxide, SF6, hydrofluorocarbons, perfluorocarbons, and other fluorinated GHGs or GHG groups included in Table A-1 to Subpart A of Title 40, CFR Part 98 as published to the Federal Register on December 11, 2014.*

Requested Action: CARB should address chemicals, such as 3M™ Novec™ gases that are not listed in 40CFR§98.

REVISE ***"Insulating Gas"*** *means the gas used in GIE to ~~interrupt electrical currents~~ provide dielectric insulation and/or interruption of electrical currents from themselves or grounded parts.*

Requested Action: The definition of Insulating Gas should be changed to clarify the applicability of the term.

REVISE ***"Substantive Error"*** *means an error that affects calculated emissions, data used to calculate emissions, or any other data element required to be reported pursuant to section 95353(a), (b), (e), (f), (g), (h), (i) and (j) of the annual report, resulting ~~from a nonconformance of this regulation.~~****in a change in emissions greater than 5%.***

Requested Action: The Utilities Group recommend a change in the definition of 'Substantive Error' to be consistent with other CARB GHG regulations such as the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (MRR) and the Low Carbon Fuel Standard, and avoid unintended risks of non-compliance by reporters in case of minor administrative errors associated with recordkeeping and reporting.

III. §95352 Sulfur Hexafluoride Phase Out

(a) (1) Phase Out Schedule

The regulation must ensure that phase-out of SF6 does not compromise the utilities' ability to provide safe and reliable electricity. The Utilities Group has previously expressed support for a tiered phase-out schedule for new GIE purchases that is dependent upon the commercial availability of non-SF_6 equipment for each voltage class of equipment, that is cost-effective, and is linked to a robust technical exemption mechanism to ensure the SF_6 GIE phase-out does not compromise the safety, reliability and integrity of the electricity system. The Utilities Group notes that individual utilities have separate processes to introduce new products into their operations that include varying times to: a) ensure compatibility with existing equipment and electricity systems, b) purchase equipment through competitive solicitation or bids, c) test the operation and maintenance of such equipment, and d) provide sufficient time for workforce training and education. Such diversity in existing administration of this technology requires regulatory understanding and flexibility. It is not enough that a single manufacturer has a product available if there has not been sufficient time for a utility to test the equipment on its system, or without adequate time to appropriately train the workforce. As a result the Utilities Group is unable to offer comment on the proposed phase-out schedule at this time.

The Utilities Group understands that the proposed SF6 phase out schedule in the Discussion Draft addresses transmission level GIE but the Discussion Draft did not consider availability of non-SF6 alternatives for distribution level GIE. Therefore the Utilities Group recommends that CARB implement a separate phase out schedule that specifically addresses electrical distribution level equipment (rated ≤ 38kV) as follows:

Table 1b. Distribution-level Equipment Phase-out Dates

Voltage (kV)	***Phase-out Date***
≤ 17.5 kV (Aboveground[1])	*January 1, 2025*
17.5 < kV ≤ 38 (Aboveground[1])	*January 1, 2031*
≤ 38 kV (Belowground)	*January 1, 2031*

[1] Aboveground distribution GIE includes pad-mounted or pole-mounted equipment

The acquisition of GIE requires extensive advance planning, procurement and significant investment by a utility; however in some cases an in-service GIE may require rapid replacement following a catastrophic failure. The Utilities Group proposes that CARB add the following sections to address each of these anticipated situations:

ADD ***(a)(1)(A)(3) This provision does not apply to a GIE owner who has placed a firm order for purchase or import of SF6 GIE prior to the phase out dates provided in Table 1.***

ADD ***(a)(1)(A)(4) This provision does not apply to a GIE owner who supplements gas insulated switchgear in an existing substation or expands a gas insulating substation that already uses SF_6 gas insulating switchgear.***

ADD ***(a)(1)(A)(5) This provision does not apply to the purchase and installation of GIE parts required for the repair or maintenance of GIE in-service prior to the phase-out date.***

ADD ***(a)(1)(A(6) This provision does not apply to the replacement of an existing in-service GIE that has failed due to an emergency event***

(a) (2) Marking and Labeling of GIE and Gas containers
DELETE ~~(a) (2) *Starting January 1, 2022, GIE owners must ensure that all GIE and gas containers are clearly marked or labeled such that it is readily apparent which gas they are to be filled with.*~~

Requested Action: CARB should strike §95352(a)(2). These activities will not further the intent of the regulation to reduce sulfur hexafluoride emissions. Since the regulation was first adopted, utilities have successfully reported inventories of both gas insulated switchgear and gas containers. In particular some utilities have large numbers of in-service distribution equipment that were installed several years ago and are difficult to access. In such cases, although utilities have an accurate inventory of their GIE, it may be physically impossible and unsafe to verify labels attached to each GIE. The Utilities Group is concerned that this requirement will significantly increase administrative cost, labor burdens, worker safety risk and have the potential to adversely impact system reliability.

The Utilities Group also requests that the cost-effectiveness considerations applied when the regulation was originally adopted in 2010 be applied to this rule amendment[3].

IV. §95352.1 Determining Emissions Limit Applicability

Based on the rationale provided above to delete the definition of "*Active Gas Insulated Equipment or Active GIE*" the Utilities Group recommends that this section also remove references to *active* GIE, and requests that the regulation incorporate the following recommendations:

Include all GIE (active and in-storage GIE) when developing the average system nameplate and average CO2e capacities: Since equipment is normally procured several months in advance for scheduled GIE projects, GIE that have already been purchased or are already part of a GIE owner's inventory should be included when determining the average system nameplate and average CO2e capacities, regardless of whether the GIE is in service or in storage.

Include changes to the SF6 nameplate capacity for installations that receive a Technical Infeasibility Exemption: Since a technical infeasibility exemption will be granted in cases where non-SF6 GIE cannot be installed, we believe that it is appropriate to include the newly added SF_6 nameplate capacity in the average system nameplate and average CO2e capacities.

V. §95352.2 Annual Emissions Limit

The Utilities Group supports CARB's proposal to establish an annual emissions limit to replace the current annual emission rate limit. However CARB should amend the discussion draft to recognize planned and upcoming load growth projects through 2024 in which alternative technologies are not presently available and change the first data year from *after* 2018 as follows:

[3] https://www.arb.ca.gov/regact/2010/sf6elec/sf6elec.htm

(a)(1) GIE owners that are subject to the annual emissions limit shall establish their emissions limit using the following formula:

Emissions Limit = AEF/100 * Average CO2e Capacity

Where:

Emissions limit	=	The GIE owner's emissions limit in data year i (MTCO2e).
AEFi	=	The annual emission factor from Table 2 for data year i.
Average CO2e capacity	=	*The GIE owner's average CO2e nameplate capacity value for data year i,* ***until 2025****, in which average CO2e capacity is equal to or greater than 5,500 MTCO2e*

Reason for Change: We believe that a change in the effective year aligns with the Discussion Draft, Table 1, *Phase-out Dates* and will recognize projects where GIE have already been purchased or planned prior to the phase out dates.

Revise Table 2 - Annual Emission Factors: The changes proposed in the discussion draft will achieve the objective to reduce emissions primarily by phasing out new SF6 GIE. However after implementing the regulation over the past decade the Utilities Group also recognizes the real challenge to sustain a 1% leak limit over time based on the established emissions calculation methods. Additionally even with rapid adoption of non-SF6 GIE across California, individual utilities will need to maintain robust programs to manage SF6 GIE inventories for several decades. Therefore the Utilities Group recommends the following changes to Table 2 to recognize these challenges while still establishing a stringent emission limit.

Table 2. Annual Emission Factors

Year (i)	***AEFi***
2020 through 2034	*1.0*
2035 through 2039	*0.95*
2040 ~~through 2042~~ and beyond	*0.90*
~~2043 through 2045~~	***~~0.80~~***
~~2046 through 2048~~	***~~0.70~~***
~~2049 and beyond~~	***~~0.60~~***

VI. §95352.3 Nameplate Capacity Labeling

Nameplate capacity accuracy: The Utilities Group understand that it is very difficult for GIE manufacturers to meet the proposed nameplate capacity accuracy to within one pound of gas or one percent and recommend that CARB staff consult with equipment manufacturers to develop an appropriate accuracy standard for GIE nameplates. Additionally the nameplate capacity accuracy standard should apply to new GIE introduced after January 1, 2021 and not to equipment in a GIE owner's inventory prior to January 1, 2021.

VII. §95353 Reporting Requirements

Since entities are subject to the regulation irrespective of organizational changes The Utilities Group recommends that notifications for '(a) Retirement' and '(b) Changes in Ownership' be made within 60 days following the effective date of a change. Additionally we recommend that CARB remove the notification requirement in '(c) Designated Representative' since the reporting entity assigns the

Designated Representative within the organization to certify, sign and submit the GHG emissions data report annually. We believe that this requirement is unnecessary.

The Utilities Group also requests that the annual SF6 report due date be changed to June 30 or the following business day if June 30 falls on a weekend. Many of the reporting entities subject to this regulation are also required to report as an Electric Power Entity (EPE) under CARB's GHG MRR regulation. The EPE report also has a reporting deadline of June 1. Having two complicated entity-level reports due on the same date is a significant burden on limited utility resources and could impact the reporting accuracy and quality of reports.

We also propose the following changes to section (g)(5):
(5) For gas containers owned by or stored on the property of the GIE owner, the weight of insulating gas in each container (pounds):

(A) At the end of the data year. ~~The measurement must occur between December 1 and December 31 of the data year~~. **This value is also used as the weight at the beginning of the next data year**;

(B) **Ensure that beginning-of-year container inventory matches end-of-year inventory from the previous year.** ~~At the beginning of the data year. For containers reported in the previous data year, this value must be the same as the value reported for the end of the previous data year;~~

Reason for change: The Utilities Group recommends these changes to clarify the intent and that the cylinders only need to be weighed once to obtain both the end-of-year and beginning-of-the next year weight. The rule language needs to be clear yet flexible enough to allow utilities with large service territories and hundreds of SF6 cylinders to complete their end-of-year cylinder weighing in a timely manner and allow for accurate reporting for the emission year.

VIII. §95355 Measurement Procedures

The Utilities Groups requests that CARB reconsider the stipulation that GIE owners electronically submit written procedures to track gas containers to CARB as outlined in §95355(a)(1)(A). While we recognize the value of maintaining written plans for tracking gas containers, we propose that reporters maintain inventory management plans (IMPs) at their respective sites. IMPs could be made available to CARB staff for inspection within a reasonable amount of time upon request. This will allow reporters to maintain IMPs without a specific regulatory requirement to submit a document that will not impact calculated emissions. IMPs may also contain sensitive or business confidential information (including locations of substations, GIE, and cylinder storage facilities) which may negatively impact or present unforeseen liability to utilities if disclosed. This approach is consistent with the GHG MRR §95105(c), wherein GHG Monitoring Plans are retained onsite "for review by…ARB" and other GHG reporting protocols.[4]

IX. §95355.1 Calculating Annual Emissions

As noted in our recommendation to strike the terms "Active Gas-insulated Equipment" or "Active GIE" the annual emissions by GHG should be calculated based on all GIE in an owner's inventory. This will prevent "phantom emissions" when gas-filled equipment is removed from active service and stored pending redeployment or final disposal, or if fully charged GIE is maintained in storage. Accounting for active GIE was relevant when the regulation required the annual leak rate to be calculated, but is no

[4] Regulation for the Mandatory Reporting of Greenhouse Gas Emissions, 17CCR§95105(c) (LINK)

longer relevant since the regulation is changing from an emission rate based limit to a mass emissions based limit.

X. §95355.2 Nameplate Capacity Adjustments

The Utilities Group appreciates CARB including a provision that allows GIE owners to make nameplate capacity adjustments to their existing GIE. However, such adjustments should be optional for GIE Owner. Additionally, instead of including a prescriptive methodology within the regulation, the Utilities Group recommends that the GIE owner be permitted to use either an *Acceptable Industry Method* or a methodology that is approved by CARB. Further, acceptable methods include formal correspondence from the manufacturer.

XI. §95355.3. Technical Infeasibility Exemption

The Utilities Group supports CARB staff adding this section in the regulation as it provides GIE owners the ability to install SF6 GIE when alternatives are unavailable. Additionally, CARB should address the following issues within this section:

a) Include the cost of non-SF6 alternatives in excess of 10% of an equivalent SF6 GIE as a criterion that will qualify a request for a technical infeasibility exemption, and availability by at least two suppliers to allow competitive bidding.
b) In addition to exemptions for specific projects or applications, allow categorical exemptions for a class of equipment that may be installed at multiple locations within a reasonable period of time (minimum of 1 year). This will streamline to application, review and approval process, and help contain increased costs with the procurement process.
c) Revise the proposed timeline for the submission, review and approval of the technical infeasibility exemption.

During the workshop on February 25, 2019 CARB staff stated that a technical infeasibility exemption would be valid for lifetime of the equipment. For purpose of clarity, the duration of an exemption should be stated in the regulation.

The following changes to this section of the Discussion Draft address some of the issues identified above:

(a) A GIE owner may submit a technical infeasibility exemption to allow for the acquisition of SF6 GIE after the phase-out date indicated in Table 1 if either:

(1) Non-SF_6 GIE ~~meeting~~ ***does not meet*** *the specifications for the particular project or application~~ are unavailable~~; or*

…

(4) ~~Available n~~ Non-SF_6 GIE is not suitable based on safety or reliability requirements; ***or***

(5) Non-SF6 GIE technology must be available for purchase from more than one (1) manufacturer

(6) The cost of available non-SF6 equipment is more than 10% higher than the equivalent SF_6 GIE

(c) The Executive Officer shall **review and respond to the exemption request within 30 calendar days and** ~~acknowledge receipt within 15 days. Subsequently, the Executive Officer~~ shall notify the submitter of her or his approval or denial of the technical infeasibility exemption, pursuant to section 95355.3(b). If necessary, the Executive Officer will solicit additional data from the submitter to inform the decision. In the event the Executive Officer has not responded to the submitter within **30 days of the initial electronic submittal of the technical infeasibility exemption request, or within 10 days of electronic submittal of additional data from the**

submitter, the technical infeasibility exemption is deemed approved. ~~60 days of acknowledging receipt of the technical infeasibility exemption, or within 60 days of receiving additional data from the submitter, the technical infeasibility exemption is approved.~~

XII. Additional Comments

(a) CARB should exempt GIE owners whose total GIE nameplate capacity is below 10,000 $MTCO_2e$, from having to comply with the mass based emissions limit. In its comment letter to CARB on May 3, 2018[5] the Utilities Group suggested that an exemption to the annual emissions limit be set at 10,000 MT CO_2e, instead of the 5,500 MT CO_2e proposed by CARB. A 10,000 MT CO_2e threshold exemption is consistent with the applicability threshold in CARB's MRR regulation, and would provide regulatory relief for small entities with circuit breakers or circuit switcher inventories without a material impact on the environmental performance of the SF6 Regulation.

(b) CARB should exempt Hermetically Sealed GIE from the phase-out schedule: In its letter to CARB on March 29, 2018[6] the Utilities Group recommended that the phase-out requirement only apply to non-hermetically sealed SF_6 GIE since manufacturers design and build hermetically-sealed SF_6 GIE to be 'sealed for life' with no routine maintenance or in-the-field refilling required. Moreover, since hermetically sealed SF_6 GIE typically contains less than 35 lbs. SF_6, and operational emissions from hermetically-sealed GIE are unlikely, thus such a change would not adversely affect the environmental performance of the Regulation.

(c) Economic Analysis Assumptions: The Utilities Group looks forward to providing more specific comments on the Economic Analysis Assumptions as CARB provides more details. The proposed regulatory amendment requires installation and/or replacement of non-SF6 equipment and compliance with an emissions limit, whereas the original regulation was intended to manage equipment leaks to meet a declining annual emissions leak rate. Therefore the economic analysis should consider this fundamental change.

Utilities found that the level of effort and cost of compliance with the existing regulation was orders of magnitude higher than originally anticipated by CARB[7]. The original estimates grossly underestimated the administrative cost of compliance from reporting and recordkeeping, so more realistic administrative costs should be considered to include the cost for recordkeeping and reporting and the increased costs to prepare Technical Infeasibility Exemption request packages. Finally the Utilities Group also requests more details on the potential GHG reductions associated with this rulemaking that will aid both regulated entities and policymakers to fully understand the impact of this regulatory amendment.

Conclusion

The Utilities Group represents both larger and smaller electricity providers in California; the Discussion Draft regulation contains provisions that will not have the same impact on all of the utilities. The Utilities Group thanks CARB staff for the opportunity to offer comments to the Discussion Draft regulation and continue to support the state's goal to reduce high GWP gas emissions and ensure the continued safe and reliable operation of the statewide electricity grid.

[5] JUG Comments to the May 3, 2018 SF6 Technical Working Group Meeting, June 12, 2019 (link)
[6] JUG Additional Comments – November 28, 2017 Strawman Version of Potential SF6 Regulation Changes
[7] Proposed Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear, Staff Report: Initial Statement of Reasons, Appendix D - SF6 Emission Detail, Cost Information and Calculation Tables; January 7, 2010 (LINK)