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To: California Air Resources Board

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Comments on 21-9-5: Public Hearing to Consider Proposed Amendments to the Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities Where TRUs Operate.

1) Recent scientific findings have underlined the necessity of quickly and drastically reducing high GWP refrigerants.[[1]](#footnote-1) This is the ideal opportunity to do that.

2) CA has to bear in mind that it is a model for the rest of the US states and many other countries. So far on refrigerants, we have come up short. The so called “lower GWP” refrigerants still have 1500 to 2200 more GWP than Carbon Dioxide. This is a chance to move the dial significantly with no risks or costs.

3) Cryogenic refrigeration has a long history, is widely used in Europe and should be the only option for the new rule making. In 2016 CARB was already promoting cryogenic refrigeration for TRUs in a presentation that is still available on the web: https://ww2.arb.ca.gov/sites/default/files/classic/cc/cold-storage/documents/clean\_tru\_technology\_webinar\_slides\_handout.pdf

4) European use of cryogenic refrigeration (liquid nitrogen or CO2) in TRUs is widespread, and a rule requiring them would mean immediate expansion of the US market. At the time of the 2016 CARB webinar, models by CryoTech and ThermoKind were already available. You heard in the hearing from Tom Keller, a representative of cryogenic technology, that his company is ready to go. Cryogenic units have several advantages: They are quiet and emit no odors; they are more efficient at maintaining temperatures over time in a closed container; they have a lower cost to operate; and the drastic reduction in moving parts means little wear and tear to the system.

Please remove the option to use 2200 GWP refrigerants.

1. [*Daniel M Kammen*](https://arxiv.org/search/eess?searchtype=author&query=Kammen%2C+D+M)*,*[*Teenie Matlock*](https://arxiv.org/search/eess?searchtype=author&query=Matlock%2C+T)*,*[*Manuel Pastor*](https://arxiv.org/search/eess?searchtype=author&query=Pastor%2C+M)*,*[*David Pellow*](https://arxiv.org/search/eess?searchtype=author&query=Pellow%2C+D)*,*[*Veerabhadran Ramanathan*](https://arxiv.org/search/eess?searchtype=author&query=Ramanathan%2C+V)*,*[*Tom Steyer*](https://arxiv.org/search/eess?searchtype=author&query=Steyer%2C+T)*,*[*Leah Stokes*](https://arxiv.org/search/eess?searchtype=author&query=Stokes%2C+L)*,*[*Feliz Ventura*](https://arxiv.org/search/eess?searchtype=author&query=Ventura%2C+F)*, Accelerating the timeline for climate action in California, March 2021,*[*https://arxiv.org/abs/2103.07801*](https://arxiv.org/abs/2103.07801) [↑](#footnote-ref-1)