MEMORANDUM

To: Deirdre, Rachel, and Team
Subject: Follow-Up on Cost Effectiveness of Zero-Emission Vehicles (ZEVs) in Vermont

First, thank you for the listening session today. I appreciated the opportunity to discuss the implications of section 592(d)(1) requirements. As a reminder, the Climate Action Plan mandates:

"(d) specific initiatives, programs, and strategies contained in the Plan and updates to the Plan shall further the following objectives:

(1) to prioritize the most cost-effective, technologically feasible, and equitable greenhouse gas emissions reduction pathways and adaptation and preparedness strategies informed by scientific and technical expertise."

This raises the question: isn't the Advanced Clean Trucks (ACT) regulation considered a specific program or initiative in support of the Plan?

Concerns Regarding Zero-Emission Vehicles (ZEVs) for Medium and Heavy-Duty Trucks

The trucking industry has significant concerns about the cost-effectiveness and technological feasibility of Battery Electric Vehicles (BEVs) in Vermont. Below is a summary of key points and data based on our research:

Projected Savings Per Truck

- **Fuel savings:**
  - 60,000 miles/year = 10,000 gallons of diesel.
  - At $3.76/gallon = **$37,600/year per truck**.
- **Maintenance savings:**
  - $0.15/mile = **$9,000/year per truck**.
- **Total savings per truck per year:** $37,600 + $9,000 = **$46,600/year**.
- **5-year savings for 4 trucks:** $46,600 x 5 years x 4 trucks = **$952,000**.

Known Costs (2024-2025)

1. **Vehicle Costs**:
   a. Class 5 trucks (15,001–19,500 lbs): **$223,000 more per truck** than diesel.
   b. Class 8 trucks (26,001+ lbs): **$279,000 more per truck** than diesel.
2. **Charging Infrastructure**:
   a. Level 3 DC fast chargers (500–800 kW): $50,000–$200,000 per charger.
   b. Mid-range estimate: **$125,000 per charger** (serves 2 trucks).
3. **Battery Replacement**:
   a. Replacement every 100,000 miles: ~$65,000 per battery.
   b. Trucks driven 60,000 miles/year = 2 replacements within 5 years.
   c. **$65,000 x 2 = $130,000 per truck**.
4. **Payload Reduction**:
   a. BEV trucks weigh ~13,000 lbs more, reducing payload capacity by ~30%.
   b. This means **5 BEVs are needed to replace 4 diesel trucks**.

Example Cost Analysis

Scenario 1: Replacing 4 Diesel Trucks with 5 BEVs

- **Vehicle cost**: $279,000 x 5 = **$1,395,000**.
- **Charging infrastructure**: $125,000 x 2.5 chargers = **$312,500**.
- **Battery replacements**: $65,000 x 2 x 5 trucks = **$650,000**.
- **Total cost:** $1,395,000 + $312,500 + $650,000 = **$2,357,500**.
- **Net cost (after savings):** $2,357,500 - $952,000 = **$1,405,500**.

Scenario 2: Replacing 4 Diesel Trucks with 4 BEVs

- **Vehicle cost**: $279,000 x 4 = **$1,116,000**.
- **Charging infrastructure**: $125,000 x 2 chargers = **$250,000**.
- **Battery replacements**: $65,000 x 2 x 4 trucks = **$520,000**.
- **Total cost:** $1,116,000 + $250,000 + $520,000 = **$1,886,000**.
- **Net cost (after savings):** $1,886,000 - $952,000 = **$934,000**.

Additional Challenges

1. **Range Limitations**:
    a. Real-world BEV range is 100–200 miles per charge under load, with hills and variable temperatures.
    b. Unsuitable for long-haul operations requiring higher reliability and range.
2. **Charging Infrastructure**:
    a. Limited space at already crowded truck stops makes adding charging stations for long-haul routes infeasible.
3. **Permitting and Insurance Costs**:
    a. Renovation permits for adding chargers are costly and time-consuming.
    b. Insurance costs may increase due to charger safety requirements.

Conclusion

The trucking industry remains committed to reducing emissions, but the current cost and technological challenges of BEVs are prohibitive. With additional costs of **$50,000 per truck per year**, transitioning within the proposed timelines may be unfeasible without significant price reductions or alternative technologies.

If any data presented here is outdated or incorrect, we welcome your input to refine our analysis. Collaboration on practical solutions remains our priority.

Thank you again for your time and engagement.