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Electric Program Investment Charge 2026â€“2030 (EPIC 5) Research Concept Proposal Form

Additional submitted attachment is included below.

CALIFORNIA ENERGY COMMISSION

CALIFORNIA NATURAL RESOURCES AGENCY

Electric Program Investment Charge 2026–2030 (EPIC 5) Research Concept Proposal Form

The California Energy Commission (CEC) is currently soliciting research concept ideas and other input for the Electric Program Investment Charge 2026–2030 (EPIC 5) Investment Plan. For those who would like to submit an idea for consideration, please complete this form and submit it to the CEC by **August 8, 2025**. More information about EPIC 5 is available below.

To submit the form, please visit the e-commenting link: https://efiling.energy.ca.gov/EComment/ECommentSelectProceeding.aspx and select the Docket **25-EPIC-01**. Enter your contact information and then use the "choose file" button at the bottom of the page to upload and submit the completed form. Thank you in advance for your input.

1. Please provide the name, email, and phone number of the best person to contact should the CEC have additional questions regarding the research concept:

   GJ la O', Ph.D.
   CEO and Co-Founder
   Tyfast Energy Corp.
   617-319-6618
   gj@tyfast.energy

2. Please provide the name of the contact person's organization or affiliation:

   Tyfast Energy Corp.

3. Please provide a brief description of the proposed concept that you would like the CEC to consider as part of the EPIC 5 Investment Plan. What is the purpose of the concept, and what would it seek to do? Why are EPIC funds needed to support the concept?

Electrifying heavy-duty trucks will not happen by simply upsizing passenger-car batteries.

Today's big-rigs need cells that can survive a million-mile duty-cycle, recharge as fast as diesel refuels, and stay light enough to protect truck payloads.

However, standard battery chemistries used in passenger cars hit a hard wall on fast-charge tolerance, durability, and range, so deployment remains “murky” for anything beyond short-regional routes.

Why propose this new EPIC-5 topic?

- Heavy duty trucks will require purpose-built battery chemistries.
- High-power, fast-charge and long-life chemistries that achieve energy density equal or better than existing LFP can unlock the million-mile target while maximizing vehicle uptime.
- 10-minute refueling at every stop is essential so trucks can accept ≥6 C charging even in -20 °C mountain passes.
- Demonstration at module or pack level will be crucial to ensure line of sight for heavy duty vehicle manufacturer testing. Funding should support integration studies with heavy duty truck makers are project partners

4. In accordance with Senate Bill 96[i], please describe how the proposed concept will "lead to technological advancement and breakthroughs to overcome barriers that prevent the achievement of the state's statutory energy goals.” For example, what technical and/or market barriers or customer pain points would the proposed concept address that would lead to increased adoption of clean energy technology or innovation? Where possible, please provide specific cost and performance targets that need to be met for increased industry and consumer acceptance. For scientific analysis and tools, provide more information on what data and information gaps the proposed concept would help fill, and which specific parties or end users would benefit from the results, and for what purpose(s)?

Despite rapid progress in light/medium duty vehicle electrification, fleets still cite three sticking points :

- **Weight & range trade-off.** Extra batteries erode payload, while smaller packs limit corridor distance.
- **Charging speed & infrastructure.** Utility lead-times stretch 18-24 months; batteries must tolerate “opportunity” top-ups to shrink site footprints .
- **Total-cost uncertainty.** Up-front pack cost and cycle-life risk overshadow prospective fuel savings.

A new EPIC 5 that focuses on novel material science, aging studies and techno-economic modeling that directly resolve these gaps will be important.

5. Please describe the anticipated outcomes if this research concept is successful, either fully or partially. For example, to what extent would the research reduce technology or ratepayer costs and/or increase performance to improve the overall value proposition of the technology? What is the potential of the innovation at scale? How will the innovation lead to ratepayer benefits in alignment with EPIC's guiding principles to improve safety,[ii] reliability,[iii] affordability,[iv] environmental sustainability,[v] and equity?[vi]

Well-designed heavy duty truck battery systems would:

- **Slash operating costs.**
  - Swapping 10,000 gal per year of diesel (70k miles/yr at 7 mpg) that costs $51,700 ($5.17/gal)
  - For 140,000 kWh electricity (70k miles/yr at 2 kWh/mile) that costs $19,600 ($0.14/kWh)
  - Can reduce fuel spend by $32,100 per truck annually, resulting in a >60% cost reduction
- **Cut criteria pollution.**
  - Heavy trucks generate *one-third* of on-road NOx in California despite being < 10 % of vehicle fleet
- **Strengthen the grid.**
  - Ultra-fast charging batteries and packs can soak excess midday solar (strong alignment with daytime operating hours for heavy duty trucks) and can minimize evening peaks with managed charging.
- **Advance equity.**
  - Nearly all disadvantaged communities sit alongside freight corridors; zero-tailpipe trucks directly reduce their exposure to diesel PM.

6. Describe what quantitative or qualitative metrics or indicators would be used to evaluate the impacts of the proposed research concept.

A summarized set of metrics for success could be:

- ≥10,000 full-depth cycles at 80 % end-of-life capacity
- Rapid 6-10C charging capability with no impact on cycle life
- Demonstrating wide operating temperature range to meet all weather conditions
- Calculated <5-year payback versus diesel ownership cost.
- Identify demos based in disadvantaged-community ZIP codes
- Quantified PM, NOx and other criteria pollution reduction per year.

7. Please provide references to any information provided in the form that supports the research concept's merits. This can include references to cost targets, technical potential, market barriers, equity benefits, etc.

- *Heavy Duty Trucking* "Electric Truck Progress Report"
  - details weight/range roadblocks that keep long-haul electrification
  - https://www.truckinginfo.com/10207406/electric-truck-progress-report
- *Fleet Owner* "Run-on-Less Lessons"
  - Identifies cost-, weight- and infrastructure barriers gleaned from 122 depot interviews
  - https://www.fleetowner.com/perspectives/ideaxchange/blog/21273994/some-early-run-on-less-lessons-from-electric-trucks
- CARB fact sheet on *Zero-Emission Medium- & Heavy-Duty Strategies* –
  - Sets 100 % ZEV goal by 2045 and Advanced Clean Trucks sales mandates
  - https://ww2.arb.ca.gov/resources/documents/zero-emission-road-medium-and-heavy-duty-strategies
- CARB 2024 research call *"Determining energy-use patterns for zero-emission HDVs"*
  - quantifies HD trucks' share of GHG/NOx and flags 300 + mi long-haul as outstanding challenge
  - https://ww2.arb.ca.gov/resources/documents/determining-energy-use-patterns-and-battery-charging-infrastructure-zero

8. The EPIC 5 Investment Plan must support at least one of five Strategic Goals:[vii]
   a. Transportation Electrification
   b. Distributed Energy Resource Integration
   c. Building Decarbonization
   d. Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas
   e. Climate Adaptation

   Please describe in as much detail as possible how your proposed concept would support these goals.

The proposal directly advances **Transportation Electrification** by tackling the *only* remaining combustion stronghold on California roads – heavy duty trucks.

CARB's own roadmap ties statewide air-quality compliance to aggressive Class 8 ZEV uptake.

Seeding chemistry, pack R&D with project teams having heavy duty vehicle manufacturer participation will close the technology gap, de-risk fleet investment, and deliver outsized climate and health dividends for rate-payers.

About EPIC

The CEC is one of four EPIC administrators, funding research, development, and demonstrations of clean energy technologies and approaches that will benefit electricity ratepayers of California's three largest investor-owned electric utilities.

EPIC is funded by California utility customers under the auspices of the California Public Utilities Commission.

To learn more about EPIC, visit: https://www.energy.ca.gov/programs-and-topics/programs/electric-program-investment-charge-epic-program

EPIC 5 documents and event notices will be posted to: https://www.energy.ca.gov/proceeding/electric-program-investment-charge-2026-2030-investment-plan-epic-5

Subscribe to the EPIC mailing list to stay informed about future opportunities to inform the development of EPIC 5: https://public.govdelivery.com/accounts/CNRA/signup/31897

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i See section (a) (1) of Public Resources Code 25711.5 at: https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=PRC&sectionNum=25711.5.

ii EPIC innovations should improve the safety of operation of California's electric system in the face of climate change, wildfire, and emerging challenges.

iii EPIC innovations should increase the reliability of California's electric system while continuing to decarbonize California's electric power supply.

iv EPIC innovations should fund electric sector technologies and approaches that lower California electric rates and ratepayer costs and help enable the equitable adoption of clean energy technologies.

v EPIC innovations should continue to reduce greenhouse house gas emissions, criteria pollutant emissions, and the overall environmental impacts of California's electric system, including land and water use.

vi EPIC innovations should increasingly support, benefit, and engage disadvantaged vulnerable California communities (DVC). (D.20-08-046, Ordering Paragraph 1.) DVCs consist of communities in the 25 percent highest scoring census tracts according to the most recent version of the California Communities Environmental Health Screening Tool (CalEnviroScreen), as well as all California tribal lands, census tracts with median household incomes less than 60 percent of state median income, and census tracts that score in the highest 5 percent of Pollution Burden within CalEnviroScreen, but do not receive an overall CalEnviroScreen score due to unreliable public health and socioeconomic data.

vii In 2024 the CPUC adopted five Strategic Goals to guide development of the EPIC 5 Investment Plan. A description of the goals can be seen in Appendix A of CPUC Decision 24-03-007 available at: https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M527/K228/527228647.PDF