Rondo Energy, Inc.
rondo.com

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Lauren Sanchez, Chair

Board Members

California Air Resources Board

Via Electronic Submittal: https://carb.commentinput.com/?id=pNeRj64MA

> **Re:** Rondo Energy, Inc. Comments on the Cap-and-Invest Initial Statement of Reason and Proposed Regulatory Updates Released January 20, 2026

Chair Sanchez and Board Members,

Rondo Energy, Inc. (Rondo) appreciates the opportunity to provide written comments on the Proposed Amendments (Amendments) to California's Cap-and-Invest Regulation. This well-established carbon pricing program is among the foundational policies that helped launch Rondo as a California clean energy company, and we are proud to submit these comments as both a technology developer and an active participant in California's decarbonization ecosystem. We continue to support the fundamentals of Cap-and-Invest: a steady, rising price on carbon emissions provides the investment signals necessary for the long-term capital commitments that deep decarbonization requires. We also support CARB's commitment to utilize the most recent science in setting policy to achieve California's intertwined climate, public health, and economic goals.

These comments focus on the new provisions related to the Manufacturing Decarbonization Incentive Allocation in newly proposed Section 95891(g), as well as the broader regulatory context within which those provisions will operate. We respectfully urge the Board to consider both the extraordinary opportunity and the formidable regulatory barriers that together determine whether California industry will decarbonize in place — or depart, taking jobs and supply chains with it.

I. THE SCALE OF THE CALIFORNIA INDUSTRIAL HEAT OPPORTUNITY

The decarbonization of California's industrial sector represents one of the largest and most consequential clean energy opportunities in the state. Industrial facilities account for roughly **one-fifth of California's total greenhouse gas emissions**, yet they have received comparatively little policy attention relative to the electricity and transportation sectors. The central reason is the persistent assumption that industrial heat — the steam and high-temperature process heat on which manufacturing depends — is uniquely difficult and expensive to electrify. Rondo's commercial deployments demonstrate that this assumption is now obsolete, but only if the regulatory environment is reformed to permit it.

California industry consumes more natural gas for heat and steam than the entire electricity sector burns to generate power. Process heat at temperatures ranging from 150°C to well above 1,000°C is required across a broad swath of the California economy: food and beverage processing (including the state's enormous tomato, dairy, wine, and tree-nut industries); cement and lime production; glass manufacturing; chemical processing; petroleum refining; and primary metals. Many of these facilities are located in the San Joaquin Valley and other environmental justice communities already bearing disproportionate pollution burdens from combustion of fossil fuels.

A 2024 analysis of California's industrial decarbonization pathways found that thermal electrification of process heat could eliminate **tens of millions of metric tons of CO_2-equivalent emissions annually** — a reduction comparable in scale to taking several million passenger vehicles off California's roads. The same analysis identified more than **800 industrial facilities** across the state with significant process heat loads that could, in principle, be served by electric thermal energy storage systems. The industries most amenable to near-term deployment include food processing, chemical manufacturing, and industrial minerals — sectors that collectively represent the backbone of California's inland agricultural and manufacturing economy.

Heat and steam together account for more than **60 percent of total industrial energy consumption** in California — and that heat is almost entirely supplied today by combustion of natural gas. The Cap-and-Invest program, by design, will make that combustion progressively more expensive. The critical question is whether California's policy framework will allow industry to respond by switching to clean electric heat, or whether regulatory barriers will instead force facility closures and out-of-state relocation.

II. RONDO HEAT BATTERIES: PROVEN TECHNOLOGY, GLOBAL DEPLOYMENTS

Rondo Energy has moved beyond the pilot and demonstration phase. Our heat batteries are operating commercially across multiple industries and geographies, providing a real-world evidence base for the policies under consideration here.

Global Commercial Deployments: Proof of Concept at Scale

Thailand – Saraburi Cement Plant: Rondo's first large-scale commercial installation in Southeast Asia delivers high-temperature steam to a cement plant, increasing the efficiency and output of its heat recovery power generation system. The system charges from available grid power — including renewable surplus — and dispatches heat on demand, demonstrating that 24/7 industrial heat supply is achievable from an intermittent electric input.

Europe – Decarbonizing Continuous Process Industry: Rondo has contracted deployments in Europe with industrial partners seeking to comply with the EU Emissions Trading System and to insulate their operations from the extreme volatility of European natural gas markets that followed the 2022 energy crisis. These facilities operate around the clock, requiring guaranteed heat supply — a need that Rondo's fully dispatchable systems are designed to meet. European experience is directly applicable to California, where Cap-and-Invest creates an analogous long-term price signal for decarbonization investment.

California – From Birthplace to Proving Ground: Rondo was founded in California and built its first two heat battery projects within the state. California's food, fuels, cement, and industrial manufacturing sectors represent the natural first domestic market for heat battery deployment. The regulatory amendments under consideration here are directly relevant to whether those California projects move forward at scale, or whether development capital and manufacturing jobs flow to other jurisdictions with more favorable electricity access rules.

III. CALIFORNIA'S FOOD PROCESSORS: A CRITICAL VULNERABILITY

California's agricultural economy depends on a food processing sector that is uniquely exposed to the cost trajectory of the Cap-and-Invest program. Canneries, dairy processors, tomato paste

facilities, nut dryers, olive oil producers, and wine production facilities collectively process the output of California's $59 billion agricultural industry. Without proximate, cost-effective processing capacity, California's farmers — particularly in the San Joaquin Valley — have nowhere to sell their perishable harvest.

The thermal energy demands of food processing are well-matched to heat battery technology: they require steam and hot water at temperatures that Rondo systems readily provide, and many operations have sufficient flexibility in heat scheduling to serve as dispatchable loads. But today, these facilities are entirely dependent on natural gas combustion for their process heat, at a time when the cost of that combustion is about to rise dramatically.

The Compounding Cost Crisis Facing Food Processors

Cap-and-Invest allowance prices are structured to rise over time. Under the proposed amendments and the AB 398 cost containment provisions, compliance costs for natural gas combustion at a mid-size food processing facility are projected to **double or more within the program's planning horizon**. A tomato paste facility currently spending $2–3 million annually on natural gas could face $4–6 million or more in combined fuel and carbon costs within the decade — a margin-destroying increase in an industry already operating on thin margins.

This is not a theoretical concern. California has **already experienced food processor closures** driven by rising energy and regulatory costs. Each closure creates a cascading effect: orchards and field crop operations lose their only proximate buyer for perishable crops; small and medium farms face impossible economics; and valley communities lose jobs and tax base. The closure of a single large tomato processor or almond hulling facility can affect hundreds of farming families across multiple counties.

The Cap-and-Invest program is designed to drive decarbonization — but if the only available response for food processors is to bear ever-rising compliance costs until closure becomes inevitable, the program will achieve neither its emissions goals nor its economic equity objectives. CARB should treat the economic viability of California's food processing sector as an explicit objective in program design, not a casualty to be managed after the fact.

IV. THE ROLE OF HEAT BATTERIES IN INDUSTRIAL DECARBONIZATION

Rondo's heat batteries, and electric thermal energy storage (ETES) systems more broadly, offer a pathway to decarbonize California's industrial heat that does not require the deep process redesigns, novel chemistry, or hydrogen infrastructure on which other long-term pathways depend. The core technology is straightforward: electrical energy is converted to heat and stored in refractory materials at temperatures up to 1,500°C, then dispatched as steam or hot gas on demand, 24 hours a day, at costs and temperatures equivalent to or better than natural gas-fired systems.

The **economic case for heat batteries in California depends critically on access to intermittent electricity**, the lowest-cost electricity available — specifically, the curtailed and negatively-priced renewable generation that is increasing rapidly as California adds solar and wind capacity. This opportunity is immense and growing:

- **Curtailment is rising steeply.** California curtailed more than 2.5 million MWh of renewable generation in 2023, and the volume is projected to increase substantially as solar capacity additions continue to outpace storage deployment. This is energy that is generated at near-zero or negative marginal cost and currently wasted — a resource that industrial heat batteries can productively absorb.

- **Negative-price events are multiplying.** Negative wholesale electricity prices — once rare — now occur with increasing frequency during midday hours, particularly in spring and fall. Industrial facilities equipped with heat batteries can be programmed to charge preferentially during these periods, capturing effectively free energy and converting the economic burden of renewable curtailment into a competitive manufacturing advantage.
- **Heat batteries can operate as dispatchable loads.** Unlike conventional industrial electricity consumers — which require continuous, guaranteed power supply and thus force the grid operator to dispatch generation to match load — heat-battery-equipped facilities can invert this relationship. They can serve as dispatchable loads that CAISO dispatches to follow generation, absorbing surplus power when it is available and drawing down stored thermal reserves when the grid is stressed. Research by Jenkins at Princeton University and Brandt at Stanford University has quantified the grid resilience, reliability, and cost benefits of this operating mode, finding material reductions in system-wide electricity costs when flexible industrial thermal loads are integrated into grid operations at scale.
- **Benefits to all ratepayers.** When industrial heat batteries absorb curtailed renewable generation, they reduce the need for other forms of energy storage, increase the capacity factor and economic return of renewable projects, and reduce the frequency with which gas peakers must be dispatched. These system-wide benefits translate into lower electricity costs for all ratepayers — residential, commercial, and industrial alike.

V. THE REGULATORY BARRIER: CALIFORNIA'S ACCESS CHARGE STRUCTURE

Despite the technical and economic viability of heat battery systems, electrification of industrial heat in California is today **economically infeasible** for the vast majority of potential adopters — not because of the technology, but because of California's electricity access charge structure. This is the most important and underappreciated impediment to industrial decarbonization in the state, and it requires urgent attention from CARB and the Governor's office alongside the proposed Cap-and-Invest amendments.

California's electricity rates for large industrial customers include a substantial layer of non-bypassable charges (NBCs) — fixed fees assessed per unit of electricity consumed regardless of when that consumption occurs. These charges fund public purpose programs, nuclear decommissioning, competition transition costs, and other legacy obligations. In aggregate, they currently add **$50 to $80 per megawatt-hour or more** to the effective electricity cost for large industrial consumers.

The Access Charge Gap: Why Electrification Is Currently Impossible

Natural gas for industrial steam costs approximately **$25–$40 per MWh-equivalent** at current California prices. California's non-bypassable electricity access charges alone — before adding the actual cost of electricity generation, transmission, and distribution — already exceed this figure. A food processor that installed a Rondo heat battery and connected it to the grid today would pay **two to four times more** per unit of process heat than it currently pays burning natural gas, even if the underlying electricity were free.

This situation does not exist in most of the United States. In ERCOT (Texas), PJM (Mid-Atlantic), MISO (Midwest), and other organized markets, transmission access charges are assessed on a cost-causation basis — reflecting when and where a consumer draws power, and scaled to the actual grid costs that consumption creates. A factory that charges heat batteries at 2 a.m. on a spring Sunday, when solar generation is abundant and the grid is uncongested, pays very little for access. A factory that draws peak power on a hot August

afternoon pays more. This time-differentiated structure creates the price signal that makes industrial electrification economically rational.

California's current flat-rate NBC structure, by contrast, makes no distinction between power consumed during curtailment events and power consumed during peak demand hours. Both are assessed the same fixed charge — a charge that, by itself, exceeds the cost of burning natural gas. This effectively prohibits economically rational industrial electrification, regardless of how low the marginal cost of electricity falls during renewable surplus periods.

CARB should use its convening authority and statutory role under AB 32 and SB 32 to formally recommend that the CPUC and the Governor's office prioritize the following reforms:

- **Reform non-bypassable charges to reflect cost causation,** following the model established in ERCOT and most organized markets. Charges should be time-differentiated so that consumption during surplus periods bears minimal access costs, while consumption during peak stress periods pays appropriately. This single reform would unlock the economics of industrial electrification for hundreds of California facilities.
- **Establish a dispatchable industrial load program under CAISO authority.** Industrial heat batteries should be eligible to participate in local real-time electricity markets as dispatchable loads, subject to CAISO dispatch signals. Facilities participating in this program would receive locational marginal pricing for the energy they consume and would be compensated for the flexibility services they provide to the grid. This structure has been successfully implemented in other markets and is directly applicable to California's industrial base.
- **Create an industrial electrification tariff** that provides large heat-battery-equipped facilities access to wholesale energy markets while paying access charges calibrated to actual grid cost causation. Such a tariff would not require eliminating contributions to public purpose programs — it would simply ensure that those contributions are structured to encourage, rather than foreclose, the decarbonization investments the program exists to promote.

VI. THE SIZE OF THE PRIZE: SYSTEM-WIDE BENEFITS OF INDUSTRIAL DECARBONIZATION

The potential system-wide benefits of successfully decarbonizing California's industrial heat sector are substantial and extend well beyond the direct emissions reductions at individual facilities. CARB should understand and communicate these broader benefits as it designs the Cap-and-Invest amendments and engages with sister agencies on the access charge reforms described above.

When heat batteries absorb curtailed renewable generation at scale, the economic benefits flow through California's interconnected energy and carbon markets in several reinforcing ways:

- **Reduced allowance prices in the Cap-and-Invest market.** Each metric ton of emissions eliminated at an industrial facility is a metric ton that does not need to be covered by a purchased allowance. At the scale of hundreds of industrial facilities, this represents a meaningful reduction in the total demand for allowances — putting downward pressure on allowance prices that benefits every covered entity in the program, from refineries to cement plants to natural gas utilities. Lower allowance prices mean lower costs passed through to consumers of transportation fuel, electricity, and manufactured goods.
- **Lower system-wide electricity costs.** Industrial heat batteries that function as dispatchable loads reduce the need for dedicated battery storage to manage renewable

intermittency, increase the utilization rate and economic return of solar and wind projects, and reduce the frequency and magnitude of curtailment events. Studies by researchers at Princeton and Stanford have found that integrating flexible industrial thermal loads into grid operations can reduce system-wide electricity costs by several percentage points — benefits that flow to residential ratepayers in the form of lower bills.

- **Lower costs for California-made goods.** Tomato paste, canned goods, cement, glass, dairy products, and wine are all manufactured using industrial heat. If that heat can be decarbonized at a cost below the current cost of burning natural gas — a threshold achievable with reformed access charges and access to curtailed power — California manufacturers gain a competitive cost advantage rather than bearing a decarbonization penalty. This is the path to decarbonizing without deindustrializing.
- **Avoided leakage and preserved California jobs.** Industrial leakage — the relocation of California manufacturers to other states or countries with lower carbon costs — is both an economic failure and a climate failure, since it transfers emissions rather than eliminating them. Every industrial facility that decarbonizes in place is a facility that retains California jobs, supply chains, and tax revenue while delivering genuine global emissions reductions. The Manufacturing Decarbonization Incentive Allocation proposed in Section 95891(g) is a step in the right direction; it should be designed to be as broadly applicable and as generous as the program's design allows.

VII. COMMENTS ON SPECIFIC REGULATORY PROVISIONS

Within the specific provisions of the proposed amendments, Rondo offers the following comments:

Support for Thermal Energy Storage Recognition: Rondo is very pleased that CARB has recognized the value of thermal energy storage in decarbonizing the industrial sector through the proposed Manufacturing Decarbonization Incentive Allocation. This recognition is timely and well-grounded. Given that California industry burns more natural gas for heat than the state's entire electricity sector, prioritizing thermal decarbonization is essential to meeting California's 2030 and 2045 goals.

Five-Year Spending Window: We support the proposed five-year window to deploy the additional allowance value. Project development timelines in California — encompassing permitting, interconnection, equipment procurement, and construction — are long. A five-year window is a reasonable accommodation of those realities. We encourage CARB to provide maximum flexibility within this window to allow facilities to proceed at the pace their project development timelines require.

Clarification of Cap Adjustment Factor Modifier: Additional clarity in the rule language may be necessary to clearly distinguish the assignment of the Cap Adjustment Factor Modifier and the Alternative Cap Adjustment Factor Modifier with reference to the columns in Table 9-2. We encourage CARB to provide illustrative examples in guidance documents that accompany the final rule to reduce ambiguity in compliance planning.

Remove the Eligibility Limitation in Table 9-1(a): Rondo urges CARB to delete Table 9-1(a) in its entirety. The ISOR's stated rationale for excluding certain facility types — concern about double-crediting for transportation fuel entities — is too blunt an instrument. Ongoing and increasing Cap-and-Invest costs will dramatically impact the leakage risk for all large industrial facilities. Every lever California has to incent real GHG reductions at industrial scale should be used. If the technology merits support for a glass or cement facility, it equally merits support for facilities in the transportation fuels sector that face the same heat decarbonization challenge.

VIII. CONCLUSION

California stands at a consequential decision point for its industrial economy. The Cap-and-Invest program, working as designed, is raising the cost of fossil fuel combustion in a way that will eventually make clean alternatives economically superior. But "eventually" is not a business plan. California's food processors, manufacturers, and industrial facilities need a clear, near-term pathway to affordable decarbonization — or they will exit, taking emissions, jobs, and economic vitality to other jurisdictions.

Rondo's heat batteries represent a commercially proven, immediately deployable pathway to decarbonize industrial heat at competitive cost. Our global deployments in Thailand, Europe, and California demonstrate that the technology is ready. What is not yet ready is California's regulatory framework for electricity access — specifically, the non-bypassable charge structure that today renders industrial electrification economically impossible regardless of how low renewable electricity prices fall.

We call on CARB to:

- Adopt the proposed Manufacturing Decarbonization Incentive Allocation in Section 95891(g) with broad eligibility, including the deletion of Table 9-1(a);
- Use the authority and convening role available to CARB under AB 32 and SB 32 to formally recommend that CPUC and the Governor's office prioritize cost-causation-based reform of non-bypassable electricity access charges;
- Advocate for CAISO to establish a dispatchable industrial load participation program that allows heat-battery-equipped facilities to provide flexible demand response under system operator control; and
- Ensure that California's food processing sector, on which the state's agricultural communities critically depend, is explicitly included among the priority beneficiaries of the decarbonization pathways this program seeks to open.

The benefits of getting this right — lower allowance prices, lower electricity costs, decarbonized manufacturing, and a preserved industrial base — will be felt by every California household and business. The cost of getting it wrong will be felt by the farmers, workers, and communities who depend on California's manufacturing economy.

Rondo appreciates the opportunity to provide these comments and looks forward to continued engagement with CARB, CPUC, and CAISO on the policies that will determine whether California's industrial decarbonization succeeds at the scale and speed the climate requires.

Respectfully submitted,

John O'Donnell

Chief Innovation Officer

Rondo Energy, Inc.

References and Notes

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2. Brandt, A.R. et al., Stanford Doerr School of Sustainability, research on energy system integration and flexible industrial demand. Available at sustainability.stanford.edu.

3. California Air Resources Board, 2022 Scoping Plan for Achieving Carbon Neutrality, Chapter on Industrial Decarbonization. Available at carb.ca.gov.

4. California ISO, Annual Curtailment Reports (2021–2024). Available at caiso.com.

5. SB 941 (Chapter 595, Statutes of 2024), California industrial decarbonization scoping plan requirements.