# 2022 Cleantech Market Landscape Report

BUILDING AN INCLUSIVE GREEN ECONOMY

# Executive Summary

The Los Angeles Cleantech Incubator (LACI)'s mission is to create an inclusive green economy by unlocking innovation, transforming markets, and enhancing community. LACI aims to build a regional innovation ecosystem that supports the discovery and commercialization of clean technologies by creating new companies, derisking the go-to-market process, and helping companies successfully deliver marketready cleantech solutions along with accompanying jobs in Southern California.

LACI's Cleantech Market Landscape Report is one of our two annual reports that analyzes the current cleantech landscape via policy, corporate and government agency activities, and investments. Based on these findings, we provide an industry forecast covering key market signals, emerging technology trends, and projected industry growth. These findings allow us to identify the key 'Sector Gaps' that need to be solved for within each of LACI's three priority areas: Clean Energy, Zero Emission Transportation, and Sustainable Cities.

## Zero Emissions Transportation

**Exciting policy passed concerning zero emissions transportation, as the California Air Resources Board officially banned the sale of gas-powered vehicles by 2035, setting the precedent for other states to follow. Similarly, 27 EU states voted for a fossil fuel car ban by the same year. Looking forward, domestic battery and electric vehicle manufacturing is booming, following a rush to increase US capacity following the stipulations of the Inflation Reduction Act, while researchers continue to explore alternative options to diversify battery supply. Still, 2022 EV car sales have hit all-time highs.**

## Clean Energy

**This year, building electrification and decarbonization efforts have taken off through technological innovations and large increases in rebates and subsidies for all-electric appliances and efficiency retrofit measures, many of which explicitly target low-income households. However, despite record investment in clean energy technologies, many US utilities are simultaneously extending the lives of fossil power plants in the face of challenges transitioning to cleaner energy sources and undergoing extreme climate events.**

## Sustainable Cities

**Sustainable cities and circular economy principles are gaining traction, both through government policy and corporate action. With attention to plastic reduction, both LA City Council and LA County's Board of Supervisors passed legislation phasing out single-use plastics for food serviceware. Additionally, startups focused on reducing food waste were a focal point for investor activity this year.**

***Based on 2022 market activity, LACI is looking into several specific sector gaps in 2023***

## Clean Energy

1. Diverse and sustainable energy storage systems
2. Flexible load technologies
3. Building decarbonization
4. Vehicle-to-grid (V2G) and vehicle-to-building (V2B)

## Sustainable Cities

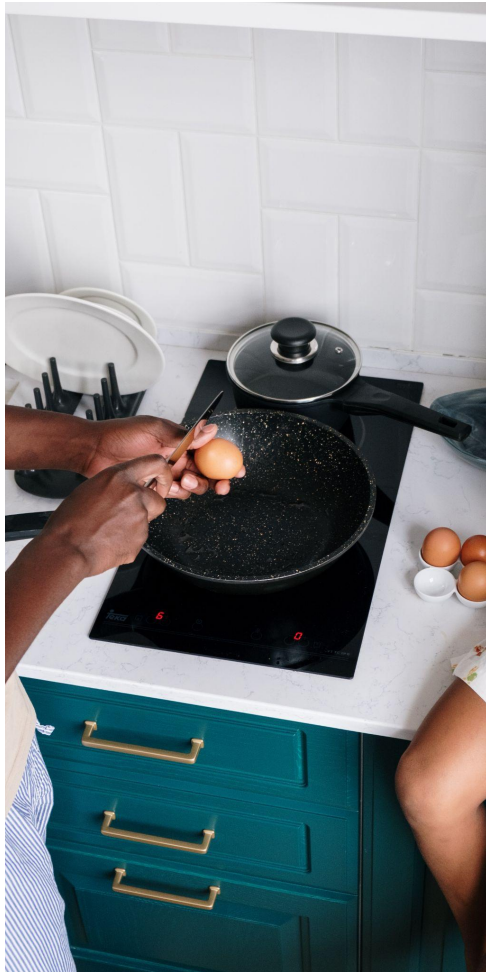
1. Digital tools to create an equitable and circular value chain
2. Next generation products and materials to reduce waste
3. Zero waste goals and waste diversion

## Zero Emissions Transportation

1. Curb, congestion and pollution pricing solutions
2. Electric vehicle sharing, charging infrastructure, and other access solutions for residents of multi-unit dwellings
3. Electrification of last-mile goods delivery
4. Electrification of school and transit bus fleets
5. Business models for electric heavy-duty truck infrastructure
6. Battery life cycle of lithium-ion batteries

# LACI will focus its 2023 Clean Energy priorities on:

| Identified Sector Gaps | The What | The Why |
|---|---|---|
| Diverse & Sustainable Energy Storage Systems | Non lithium-ion (li-ion) batteries, reduced mineral usage, increased efficiency li-ion batteries, long-duration storage. | Enables the US to curb dependence on the international supply chain acreate energy related jobs, and creates sustainable forms of batteries. Last 20% of carbon-free grid will require long-duration energy storage solutions. Additionally, following passage of the Inflation Reduction Act, domestic battery manufacturing and research and development of storage technologies are expected to increase. |
| Flexible Load Technologies | Demand response, bundling distributed energy resources (DERs), energy efficiency, acceleration of smart grid. | In part based on capacity shortage risks over the last few years, California utilities and energy state agencies are incentivizing more demand response capabilities, developing load management standards and integrating multi-DERs to offset peak demand. This will also include embracing more interconnected DER technologies (e.g. microgrids and virtual power plants). |
| Building Decarbonization | Electrification of appliances, energy efficiency, shifting of energy usage with smart technology. | Buildings account for roughly 40% of GHG emissions in the U.S. The electrification and development of smart buildings is necessary to enhance the grid's resilience and to meet our 100% zero-carbon grid goals. This is timely as more cities, including Los Angeles, are implementing restrictions or outright bans on gas infrastructure in new buildings, solidifying focus on building electrification and efficiency measures. |
| Vehicle-to-Grid (V2G) & Vehicle-to-Building (V2B) | Increased electrification levels, smart/electrified buildings, bidirectional charging capabilities. | Better integration of DERs are necessary as we reach greater electrification level. Clearer regulation, especially regarding nascent V2G technologies, is also necessary as electric vehicle manufacturers from light duty to school buses are beginning to integrate these technologies into their vehicles. Additional demonstration and pilots of V2G and V2B technologies is critical to incorporate learnings at scale into energy planning and policy. |



# LACI will focus its 2023 Zero Emissions Transportation priorities on:

| Identified Sector Gaps | The What | The Why |
|---|---|---|
| Curb, Congestion & Pollution Pricing Solutions | Introducing policies to price access to curbs and streets and prioritize zero emission vehicle use to reduce congestion and reduce pollution. | Congestion increases pollution in urban cores. Dynamic digital approaches for curb reservations, street access, and fee exemptions for zero emission vehicles will usher in a new means of reducing this congestion. |
| Electric Vehicle Sharing, Charging Infrastructure, and Other Access Solutions for Residents of Multi-Unit Dwellings | Increased access and availability of EV charging stations, car share programs and other solutions to provide access to EVs for populations living in multi-unit residential developments. | 50% of the US population lives in multi-unit dwellings with or without existing parking infrastructure and inadequate charging solutions. Focusing on charging solutions and overall access to EVs, including but not limited to ownership, for these residents is critical for increasing equitable access to the benefits EV technologies offer. |
| Electrification of Last-mile Goods Delivery | Form factors and business models for reduced pollution, emissions, congestion and noise associated with urban goods delivery. | Cities are clamping down on vehicle emissions while last-mile delivery continues to boom. Startups and companies are beginning to address this gap through a multitude of electric last-mile delivery technologies. |
| Electrification of School & Transit Bus Fleets | Form factors & business models that support decarbonizing bus fleets, adoption incentives, charging access & backup power capabilities. | As governments and school districts seek to decarbonize their fleets doing so will reap additional benefits. Fleet electrification supports significant fuel and maintenance cost savings, reduced pollution in vulnerable communities and V2G technology provides grid reliability opportunities and financial incentives. |
| Business Models for Electric Heavy-Duty Truck Infrastructure | Widespread, accessible charging infrastructure is needed to facilitate full transition to battery electric trucks for all fleets. | Today's charging business models are not compatible with the 1MW+ charging standards proposed by trucking OEMs, especially with utility challenges such as interconnection and demand charges. |
| Battery Life Cycle of Lithium-Ion Batteries | Second life battery utilization & recycling models, developing models for sustainably sourced battery supply chains. | Establishing recycling and repurposing models and standards for electric vehicle batteries is necessary to ensure environmental and social sustainability of battery production, reduce waste and increase accessibility of priority metals. |



# LACI will focus its 2023 Sustainable Cities priorities on:

| Identified Sector Gaps | The What | The Why |
|---|---|---|
| Digital Tools to Create an Equitable and Circular Value Chain | Hardware and software technologies that provide data analysis for smart water meters, tracking and analyzing food waste, virtual 3-D modeling and lifecycle tracking tools, and supply chain modeling or carbon accounting. | Unstandardized and limited tracking for reusable waste materials has resulted in poor connectivity between vendors and buyers in the recycled waste streams supply chain. 3-D modeling tools can help predicting and track materials needed and waste generated with fabrication. Inaccurate measurement of water consumption and associated energy use can lead to water loss and scarcity, delayed infrastructure maintenance and high costs for utilities and customers. |
| Next Generation Products and Materials to Reduce Waste | New sustainable textiles and fibers, sustainable housing materials, consumer products made from post consumer waste, and high performance competitive plastic alternatives. | The opportunities for second life cycle of textiles, fibers and other materials containing reusable elements are regularly not maximized as those viable materials often make their way into landfills. Incorporating post-consumer waste materials into new products can be costly compared to new materials, making it difficult for manufacturers to adopt cradle to cradle and circular design business models. Competitive sustainable alternatives, at scale, can transform the market. |
| Zero Waste Goals & Waste Diversion | Diverting waste from landfills via recycling, source reduction, composting, and circular design principles. Creating a circular supply chain for organic waste streams. | Last year, only 6% of US plastic waste was recycled and 85% went to landfills.[267] In the US, food is the single largest component in landfills and, in California, a third of landfill waste is comprised of compostable materials.[268, 269] Non-circular supply and value chains are exhausting landfills, releasing toxic pollution and GHG emissions, and creating the need to source new raw materials. |

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