

CLEAN ENERGY PARTNERSHIP

The Clean Energy Partnership was formed to accelerate the move to 100% clean energy while ensuring we meet the needs of transportation electrification, building decarbonization, and grid resiliency in the Greater Los Angeles Region by the time of the 2028 Olympic and Paralympic Games.

Contents

4	Messages from Partnership Leaders
6	Why Create the Clean Energy Partnership?
8	What is the Clean Energy 2028 Roadmap?
9	How to Read the Clean Energy 2028 Roadmap
10	Clean Energy 2028 Roadmap Targets
12	Understanding the Need for the Clean Energy Partnership
13	Understanding the Partnership Goal
15	Understanding the Pathways
28	The Clean Energy 2028 Roadmap: Modeling Sources
29	Key Terms
31	Acknowledgements

About LACI

The Los Angeles Cleantech Incubator (LACI), a City of Los Angeles-established nonprofit organization, is creating an inclusive green economy by: unlocking innovation through working with startups to accelerate the commercialization of clean technologies; transforming markets through partnerships with policymakers, innovators and market leaders in zero emission transportation, clean energy and sustainable cities; and enhancing communities through workforce development, pilots and other programs. Founded as an economic development initiative by the City of Los Angeles and its Department of Water & Power (LADWP), LACI is recognized as one of the most innovative business incubators in the world by UBI. Since 2011, LACI has helped 375 portfolio companies raise \$1 billion in funding, generate \$335 million in revenue, and create 2,626 jobs throughout the Los Angeles region, with a projected long-term economic impact of more than \$585 million. Learn more at laci.org and sign up for our quarterly Clean Energy Newsletter to join us in tackling the climate crisis via clean energy initiatives.

Letters



“The Clean Energy Partnership establishes potential pathways to reduce our carbon emissions and improve the lives of Angelenos.” – Mayor Karen Bass

Message from Mayor Karen Bass



The climate crisis represents one of Los Angeles' greatest challenges, increasing the risk of natural disasters, drought, and extreme weather. However, it also offers an unprecedented opportunity for the City to advance a clean energy transition that creates a more sustainable and equitable future. We must ensure that this green economy goes beyond net zero emissions to provide thousands of new, well-paying jobs, deploy retrofit and new technology in low- and moderate-income communities, and improve public health and livelihoods for all Angelenos.

LACI's Clean Energy Partnership establishes potential pathways to reduce our carbon emissions and improve the lives of Angelenos. I applaud this partnership's goals to ensure reliable, clean, and affordable energy powers our city. I encourage others in the region to engage in this vital Clean Energy Partnership to work together with government leaders, utilities, state regulators, energy solutions providers and other stakeholders to create a lasting impact.

Sincerely,
Karen Bass
Mayor, City of Los Angeles

Message from Chair David Hochschild



California has long led in climate action that has inspired others across the nation and the world to follow suit. To continue to lead on climate action and improve public health, we need to tackle the emissions from our buildings next while continuing to decarbonize the grid.

These shared commitments to action are why I am proud to co-chair the Clean Energy Partnership and the goals to decarbonize our buildings and the grid. The Partnership emphasizes the tools that will help us reach our state goals of having 3 million climate-friendly homes and 6 million heat pumps deployed by 2030. Furthermore, electrifying our buildings is not only critical for climate action, but also to improve the air quality of our homes and create grid-responsive buildings. CEP establishes itself as a leader in the Region and beyond in what we need to accomplish to create green buildings.

While there is much work still to be done, we are in a period of great momentum and I believe in the power of California's innovation landscape. I greatly look forward to supporting the Partnership as we implement the hard work necessary to integrate increased building electrification action into our bold energy goals to create a thriving, modern energy system.

Best,
Chair David Hochschild
California Energy Commission



“CEP establishes itself as a leader in the region and beyond in what we need to accomplish to create green buildings.” – Chair David Hochschild

Message from Chair Mary Leslie



As California moves at an impressive pace toward its clean energy goals, CAISO is pleased to support the Clean Energy Partnership as it will drive the innovation that is needed to build a greater resilient grid. For the state to continue to transform its grid to zero-carbon, a diverse set of clean energy solutions are needed, including smaller energy resources that make regions like Los Angeles more resilient in the face of escalating climate and extreme weather risks.

The Partnership will allow the region to tap into cutting edge technologies that are needed to create a modern local electric grid. We're proud to share these collective goals with the Partnership's emphasis on grid resiliency, and we look forward to supporting LA's leadership on the clean energy pathways identified.

Best,
Mary Leslie
Chair of Board of Governors,
California Independent System Operator
(CAISO)



“The partnership will allow the region to tap into cutting edge technologies that are needed to create a modern local electric grid.” – Mary Leslie

Message from Matt Petersen



In 2018, LACI convened the Transportation Electrification Partnership to accelerate transportation electrification through unprecedented regional collaboration. Since then, the Partnership has shown how we can go further faster together.

TEP's Zero Emissions 2028 Roadmap set ambitious yet achievable regional targets that helped demonstrate political will for bold moves, including Governor Newsom's zero emission vehicle executive order in 2020. TEP's efforts also led to the nation's first Zero Emission Vehicle Equity Advocate in state government; innovative pilots meeting the needs of disadvantaged communities; creating the nation's first Zero Emission Delivery Zone; securing \$100 million in the state budget for zero emissions drayage truck charging infrastructure; and committing \$10 million for the first public charging depot for drayage trucks at the Port of LA.

Now, LACI has launched the Clean Energy Partnership to support the transition to a 100% clean energy grid. To electrify Greater LA's buildings and transportation while ensuring grid resiliency, we need unparalleled regional collaboration as well as innovation. Thanks to the will demonstrated by the Partnership and the bold targets set in this Roadmap, we are able to leverage public and private funding to drive innovation through initiatives like a Virtual Power Plant to better improve our air quality and health while creating good paying green jobs that will uplift individuals and economy.

LACI is proud to work together with all our partners to accelerate equitable climate action before the world arrives in Los Angeles for the 2028 Olympic Games.

With gratitude,
Matt Petersen,
President & CEO,
Los Angeles Cleantech Incubator (LACI)



“LACI is proud to work together with all our partners to accelerate equitable climate action.” – Matt Petersen

Why Create the Clean Energy Partnership?

As the third largest municipal economy in the world, Greater Los Angeles is no stranger to the escalating, rippling impacts of climate change and extreme weather. Droughts, floods, and wildfires pose serious risks and challenges, including infrastructure impacts and health impacts.

With transportation and the energy to power our buildings being the two largest sources of greenhouse gas emissions across Greater Los Angeles, we need to accelerate equitable climate action. That is why in 2018 the Los Angeles Cleantech Incubator (LACI) launched our unprecedented public-private, regional Transportation Electrification Partnership (TEP). TEP created the Zero Emissions 2028 Roadmap to achieve a 25% additional reduction in GHGs and air pollution by the time of the 2028 Olympic and Paralympic Games through a range of bold targets and initiatives.

Now, LACI is launching the Clean Energy Partnership (CEP or Partnership) to accelerate the move to 100% clean energy while ensuring we meet the needs of transportation electrification, building decarbonization, and grid resiliency in the Greater Los Angeles Region by the time of the 2028 Olympic and Paralympic Games.

Beginning in 2022, LACI kicked off a convening of key players across the Greater LA Region's clean energy landscape. The resulting public-private Partnership represents expertise from state regulators, local governments, utilities, startups, industry leaders, and more. These stakeholders comprehend the complex challenges to advancing sustainable, equitable clean energy, as well as the massive opportunities the clean energy transition presents for growth in Los Angeles and beyond.

The Partnership is convened by LACI and Co-Chaired by LACI CEO Matt Petersen and California Energy Commission Chair David Hochschild. Leadership Group members include the California Energy Commission, California Independent System Operator, Clean Power Alliance, Southern California Edison, Los Angeles Department of Water & Power, Los Angeles City Mayor's Office of Sustainability, and Los Angeles County Chief Sustainability Office. Advisory Group Members include Sunrun, Swell Energy, and Wells Fargo.

CLEAN ENERGY PARTNERSHIP

LEADERSHIP GROUP

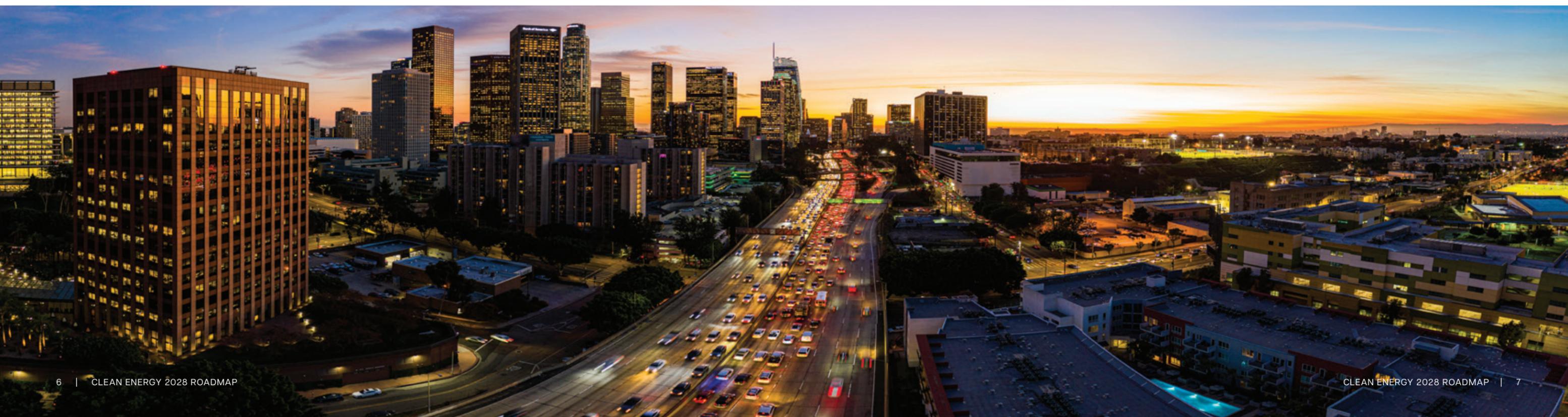


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What is the Clean Energy 2028 Roadmap?

The Clean Energy Partnership developed the Roadmap to accelerate the reduction of greenhouse gas (GHG) emissions in the Greater Los Angeles region by an additional 15% across the electricity, building, and transportation sectors ahead of the 2028 Olympic and Paralympic Games. This 15% GHG reduction will be met via building electrification, clean distributed generation, energy-transportation nexus, and grid efficiency and resiliency.

To achieve this goal, the Roadmap lays out three solution-oriented, priority pathways with related specific targets to spur innovation and accelerate implementation via recommended policies, pilots, and other initiatives to achieve in the Greater Los Angeles region by 2028:

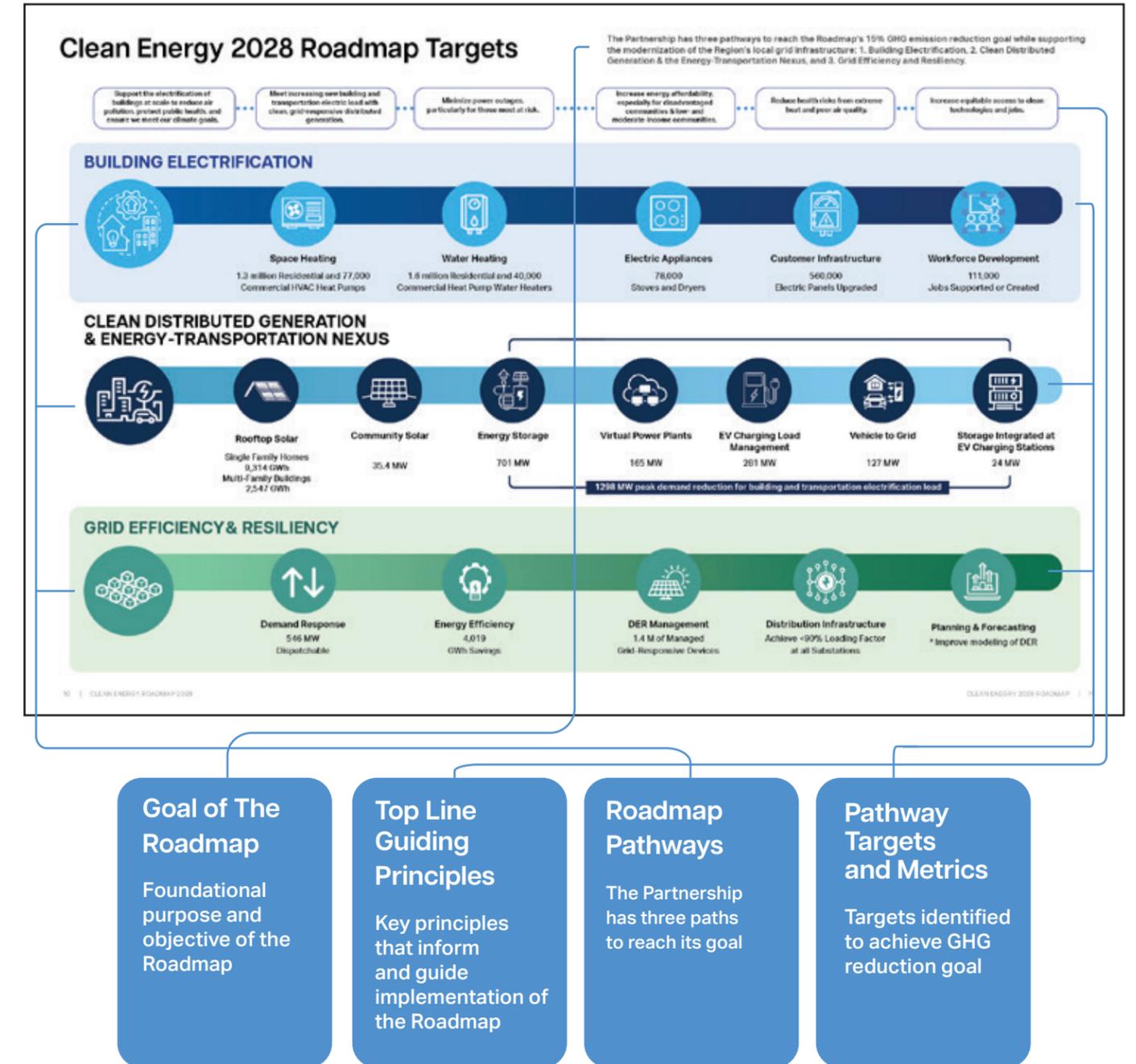


- 
1 Electrify and decarbonize buildings: Accelerating the electrification of buildings, thereby achieving an additional 29% reduction in GHG emissions from buildings.
- 
2 Building and Transportation electrification: Meeting new building and transportation electric load by deploying 1298 MW of clean, responsive distributed generation—including a Virtual Power Plant (VPP)—and energy-transportation nexus innovations.
- 
3 Grid Resiliency: Developing a smart, modernized local distribution grid to increase community resilience and enable clean technology innovations while improving affordability, creating green jobs, and reducing health risks.

Through the individual and collective actions of the Partnership, this Roadmap provides a path forward to help the region become one of the most energy resilient, innovative, and equitable metropolitan regions by 2028. Everyone has a role to play in the clean energy transition. Read on to learn how you can join us in developing an inclusive green economy in Los Angeles and beyond.



How To Read The Clean Energy 2028 Roadmap



Clean Energy 2028 Roadmap Targets

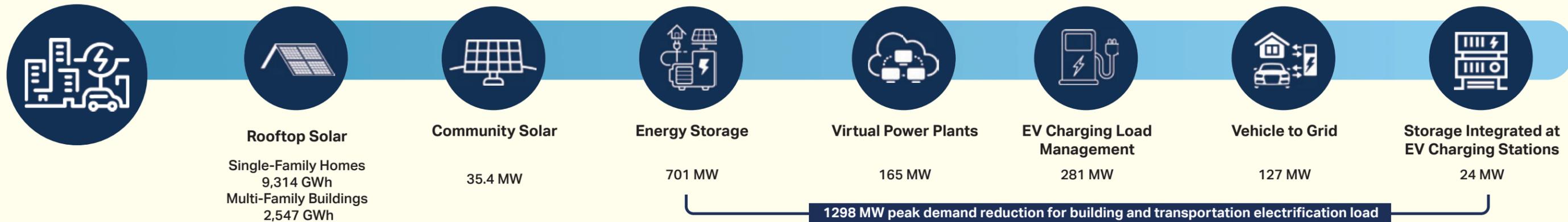
The Partnership has three pathways to reach the Roadmap's 15% GHG emission reduction goal while supporting the modernization of the Region's local grid infrastructure: 1. Building Electrification, 2. Clean Distributed Generation & the Energy-Transportation Nexus, and 3. Grid Efficiency and Resiliency.



Building Electrification



Clean Distributed Generation & Energy-Transportation Nexus



Grid Efficiency & Resiliency



Understanding the Need for the Clean Energy Partnership

Climate change is challenging the reliability of the electric grid and the health of our frontline communities

Throughout the world, the devastating impacts of climate change are becoming more frequent and intense. In recent years, the Greater LA Region has experienced record-breaking heat waves, an escalating number of severe wildfires, and a prolonged drought that has strained our energy infrastructure, increasing the risk of power outages and threatening the health of our communities. In particular, frontline communities with predominantly Black and Latinx populations have greater exposure to climate risks and impacts as well as disproportionate levels of air pollution, extreme heat, and other challenges (e.g., lack of access or ability to afford adequate cooling and ventilation solutions, more asphalt and concrete along with less urban tree canopy to help reduce the impact of urban heat island effect, increased asthma rates¹ and related hospitalizations², etc.).

Clean energy generation is needed to support the electrification of buildings and transportation

The building and transportation sectors account for ~80% of GHG emissions in the Greater LA Region, each accounting for about 40% of emissions³. To reduce our carbon footprint and meet our climate goals, we need to transition rapidly off carbon fuels and electrify our buildings and transportation. For this transition to be successful, we must accelerate and increase development of additional distributed clean energy generation in Greater Los Angeles. The development of this new clean energy generation should also be integrated with grid-responsive capabilities so that the resources can respond to extreme heat, grid disruptions, and other grid operator signals as appropriate and needed. Automated and flexible clean energy generation is critical to reduce our reliance on fossil fuels.

1 <https://ceo.lacounty.gov/wp-content/uploads/2021/10/LA-County-Climate-Vulnerability-Assessment-1.pdf>
 2 <https://ph.ucla.edu/news-events/news/how-dangerous-extreme-heat-your-neighborhood-map-tells-you>
 3 <https://ourcountyla.lacounty.gov/>

Modernization of the local distribution electric grid is critical to supporting innovation and resilient technologies

The local distribution grid needs to have infrastructure and operational upgrades to fully optimize and utilize the distributed energy resources (DERs) and load management opportunities they present. Historically, the electric grid was largely built to integrate large-scale resources on the high-voltage system and designed for one-way power flows. Incorporating smaller-scale, distributed energy resources is critical to increasing community energy resilience in the face of increased extreme weather events while reducing local reliance on fossil gas to meet our climate goals. These steps help move from a centralized system to a more distributed, local, decentralized electric system that better manages energy at the local distribution level.



Understanding the Partnership Goal

The Clean Energy Partnership goal aims to accelerate the reduction of greenhouse gas emissions in the Greater LA Region by an additional 15% across the electricity, building, and transportation sectors. This 15% GHG reduction will be met via pilots, policies, and other innovations to advance building electrification, clean distributed generation, energy-transportation nexus, and grid efficiency and resiliency ahead of the 2028 Olympic and Paralympic Games.

Methodology

The methodology the Partnership used in establishing the GHG emissions reduction goal was developed by considering existing utility and regulatory projections for emissions reductions in the Region's transportation, electricity, commercial and residential building sectors, and then specifically accelerating the Region's building

and transportation sector GHG reduction goals at an ambitious, yet achievable, rate. As demonstrated in the chart below, the Partnership's 2028 emission goal does the following:

- Maintains the electricity sector's GHG emission reduction goal
- Incorporates LACI's Transportation Electrification Partnership goal of further reducing GHG emissions from transportation 25% over 2019 projections by 2028
- Accelerates electrification targets by 2 years for the residential and commercial building sector

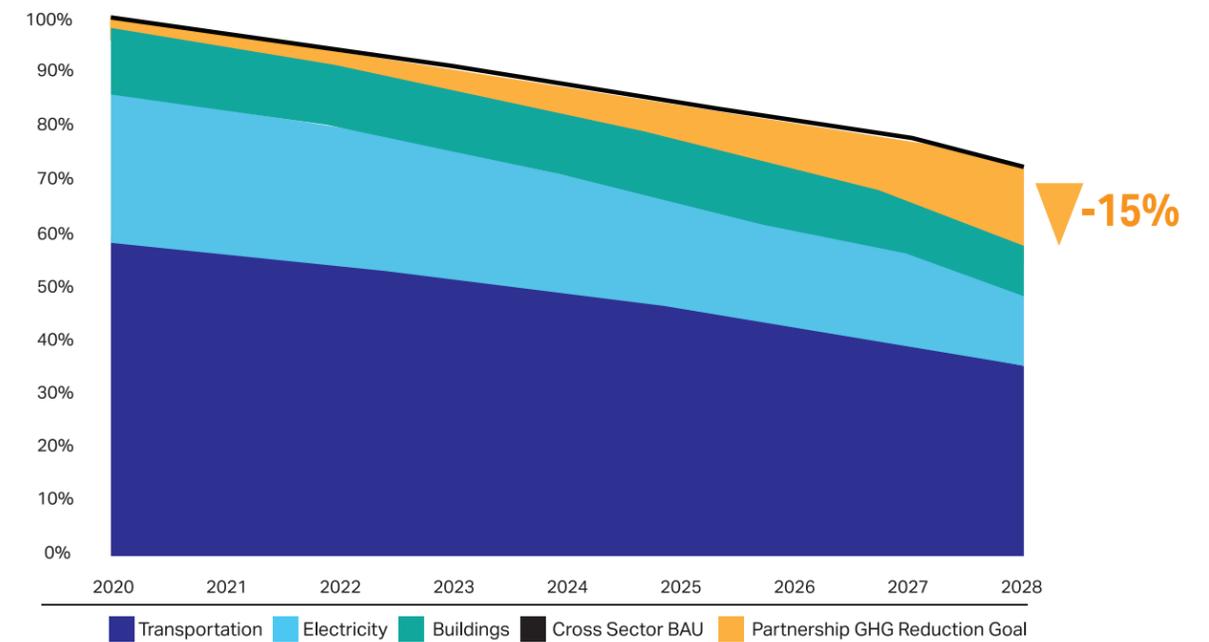


Figure 1: Partnership GHG Reduction Goal

Electrification Increases

As we continue to reduce the amount of GHG emissions across the building and transportation sectors, we will see an increase in the amount of electric demand on the grid. This is a direct result of shifting from fossil gas consumption to electricity powering our vehicles and

building appliances. As this transition occurs, we'll need to continue to build clean generation for the electric system to ensure we're supplying the increasing electric demand with renewable generation and not fossil gas.

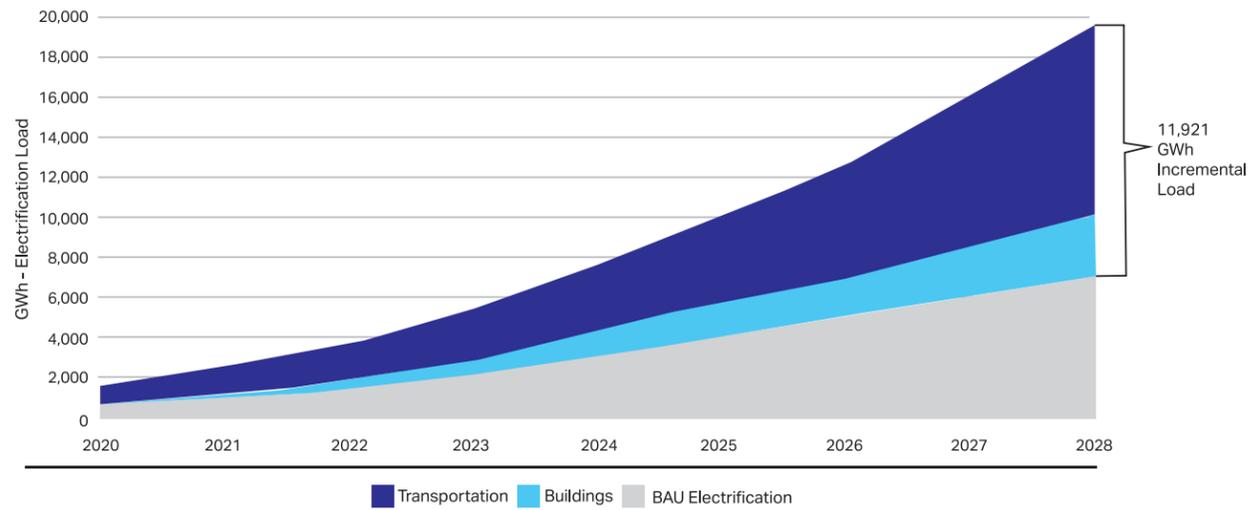


Figure 2: Incremental Building & Transportation Electrification Load

To support this shift from fossil gas to electricity in buildings and transportation, as laid out by the Partnership’s goal, we analyzed the amount of new electricity load that will be needed (Figure 2 above):

- The identified total load for buildings and transportation ahead of 2028 is 11,921 GWh.
- The other key number to identify within this goal is the incremental system peak demand that will come from this increase in electric load. The incremental system peak demand is important as this additional increase in demand specifically occurs when the Region’s main source of renewable generation (solar) declines in the evening (4–9pm).
- The identified incremental system peak demand of the Partnership’s goal is 1298 megawatts (See Figure 3 below).

These two identified load figures inform the regional support needed from clean distributed generation, energy-transportation nexus, and grid resiliency, and allow us to clearly identify CEP’s targets on these three areas within this Roadmap. Learn more about the targets in “Understanding the Pathways.”

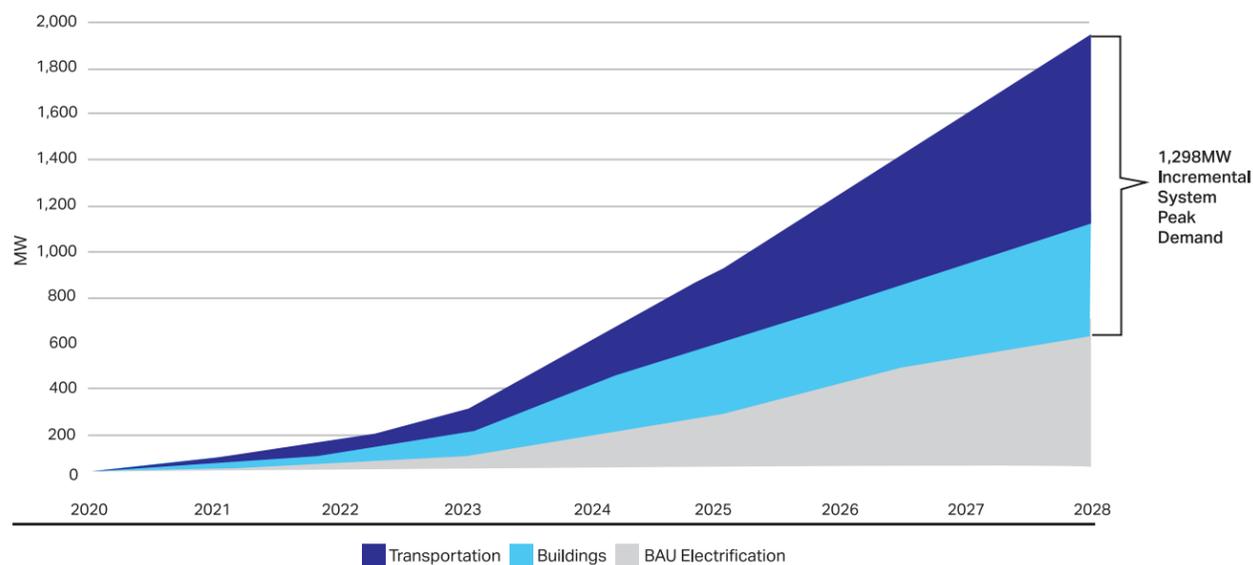


Figure 3: Building & Transportation Electrification: System Peak Demand

Understanding the Pathways

The Roadmap identifies three Pathways to meet its 15% GHG reduction goal - Building Electrification, Clean Distributed Generation and Energy-Transportation Nexus, and Grid Efficiency and Resiliency.

The following section provides greater detail around the modeling for each Pathway and its targets as well as key policies, innovations, and initiatives that will spur implementation to achieve our goal.





Building Electrification

In the Greater LA Region, buildings account for 40% of GHG emissions. The shift from powering buildings with gas to electricity helps reduce methane and protects our personal health as fossil gas contains toxic pollutants, such as carcinogenic benzene, formaldehyde, and carbon monoxide. Apart from climate and health benefits, building electrification (BE) also represents a significant opportunity to make buildings “flexible”—meaning buildings are transformed and equipped to respond to grid signals through automated software and grid-interactive electric appliances. Flexible resources are necessary for moving to and operating a 100% zero-carbon grid as flexible demand and load are needed to properly manage and integrate renewable energy.

Roadmap Targets

The Partnership accelerated the forecasted business-as-usual BE target by 29% ahead of 2028 given the urgency that is needed to combat climate change and the acknowledgement that we are in a pivotal period in which we must capitalize on the federal incentives and tax credits in the Inflation Reduction Act and the Infrastructure Investment and Jobs Act. To ensure the region can meet our BE goal, the targets below identify

the needed number of electric appliances (electric/ induction stoves and electric dryers), heat pumps for heating, ventilation, and air conditioning systems (HVAC) and water heaters (WH), and panel upgrades to support the electrification targets. The Partnership also identifies the number of green jobs (e.g., electricians, contractors, sales) needed to support this implementation.



Space Heating

1.3 million Residential and 77,000 Commercial HVAC Heat Pumps



Water Heating

1.6 million Residential and 40,000 Commercial Heat Pump Water Heaters



Electric Appliances

78,000 Stoves and Dryers



Customer Infrastructure

560,000 Electric Panels Upgraded



Workforce Development

111,000 Jobs Supported or Created





Building Electrification

Example policies, pilots, innovations and other initiatives we are exploring to advance progress toward this commitment



Policies

- **Establish comprehensive indoor air quality standards** that identify air pollutants and toxins and determine at what levels their presence is considered unsafe.
- **Prioritize deploying electric appliances** in neighborhoods and decommissioning gas system infrastructure in areas with higher:
 - Potential gas infrastructure cost savings (e.g., infrastructure that needs repair or replacement)
 - Energy burden
 - Gas demand
- **Prioritize tenant protections** so that lower-income communities are not disproportionately impacted or displaced by building electrification measures.
- **Electric-friendly rate structures or business models** to accommodate growing electric load, innovative technologies, and to avoid energy burden for households.



Pilots

Removing Barriers for Induction Stove Adoption

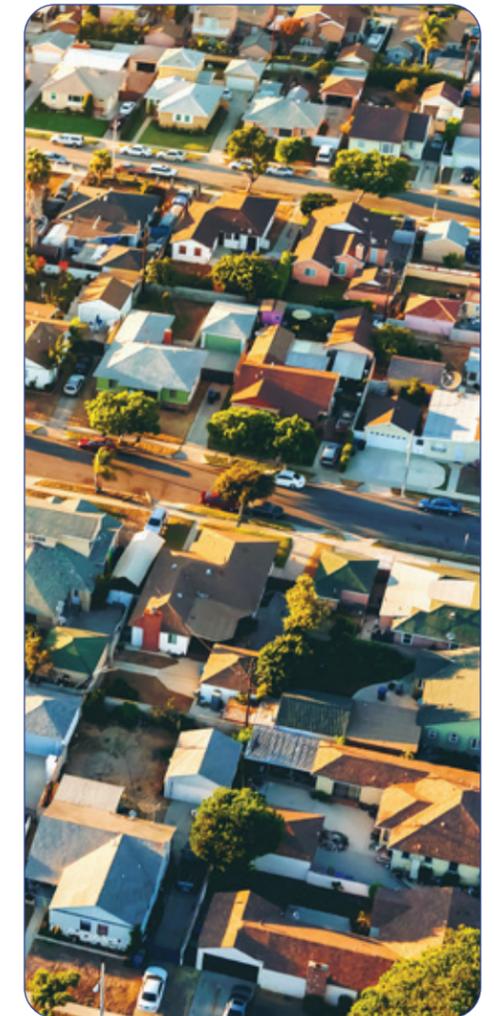
LACI, along with partners Day One, The Energy Coalition, and the University of California, Riverside, have launched an **induction stove pilot in Avocado and Bassett Heights**, which has a 95-100% CalEnviroScreen Score, qualifying as a disadvantaged, high-pollution-impacted community. Through this pilot, LACI and partners have installed an induction stove at the Jeff Seymour Family Center in collaboration with the El Monte School District to support educational workshops presented by community partner Day One. Further, the pilot is installing up to 20 induction stoves in low-income, single-family households and conducting indoor air quality monitoring in partnership with the University of California, Riverside's Center for Environmental Research and Technology. The induction stove pilot will provide further understanding about health benefits as well as technical and cultural barriers to electrification retrofits.



Affordable Housing Decarbonization in South Los Angeles

LACI will partner with Esperanza Community Housing Corporation to provide demand response-enabled heat pump air conditioners, along with an innovative energy storage solution or other clean technology solutions that efficiently manage energy load to enable affordability, at an affordable housing complex. Esperanza Community Housing is a social justice non-profit in South Central LA that achieves long-term, comprehensive community development. The proposed affordable housing complex has 23 units with little ventilation and is in a Local Historic District in South Los Angeles. The goals of this pilot include:

- **Increase affordable, clean energy access** for low-income renters.
- **Provide educational opportunities** for residents to learn more about clean energy technologies, energy usage, and ways to reduce electric bills.
- **Strengthen local grid reliability** through demand response/time of use program or devices.
- **Improve quality of life** for residents with clean energy technologies as more frequent extreme heat waves occur.
- **Support the electrification of multifamily buildings** while increasing or maintaining affordability for residents.
- **Identify process, technology, and/or policy recommendations** to make it easier for other multifamily affordable housing units to install a suite of clean energy solutions that improve energy affordability.



Other Innovations and Initiatives

Creating a Regional Coordination Platform for Building Decarbonization Technical Assistance

The Inflation Reduction Act and California's recent budget investments to encourage electrification and make our buildings more energy efficient have created a significant opportunity for LA area residents and property owners to decarbonize their homes and buildings. To assist homeowners, small business owners, and other building owners in accessing these opportunities, **we support the development of a central online platform with resources**, including: technical expertise assistance, financing opportunities, workforce development trainings, service providers in LA City and County, among other things, to help lay the infrastructure in place to enable this transition.

To further support these measures, there are opportunities to build upon and leverage key financing opportunities and incentives, including the Greenhouse Gas Reduction Fund within the Inflation Reduction Act and bridge financing.





Clean Distributed Generation and Energy-Transportation Nexus

Clean Distributed Generation

Clean distributed generation (DG), which refers to local or community clean energy, offers a variety of benefits for communities and the electric grid. For communities, clean DG provides the opportunity to lower electricity bills, increase local energy resilience by reducing the occurrence or minimizing the duration of local power outages, and improving public health by reducing local reliance on gas. Clean DG, especially as it is strategically utilized and located, also provides direct benefits to the electric grid by reducing local grid congestion, reducing energy costs, and improving reliability.

Energy-Transportation Nexus

As millions of electric vehicles are deployed onto our roads between now and 2028, there will be growth not just in the need for EV charging stations, but also for increased grid capacity, integration of emerging technologies, and other opportunities. The electrical grid that powers those charging stations is the lynchpin to this Roadmap. The foundation of an electric transportation future will be the grid and relevant infrastructure that can support the rapid escalation of electric vehicle charging demand. It is necessary to expand energy-transportation nexus infrastructure and integrate a variety of emerging technologies to support electric vehicle adoption at scale.

LACI's Transportation Electrification Partnership established a target of accelerating the adoption of light-duty passenger EVs to be 30% of all vehicles on the road and at least 80% of all vehicles sold by 2028. The Partnership has also prioritized ensuring the I-710 freeway is the first goods movement corridor in the nation with ample charging infrastructure to support the transition to 40% zero emission drayage trucks by 2028 and 100% by 2035. The I-710 is the Region's largest site of regional air pollution- approximately 36,000+ truck trips occur daily given the freeway is used to transfer goods from and to the Ports of LA and Long Beach. This vast amount of transportation electrification represents a tremendous opportunity to optimize EV charging times when renewable energy is in large supply, especially for EV fleets, as well as strategically provide electricity from EV batteries to the grid when EVs are not being used (V2G).

Roadmap Targets

For this pathway, the Partnership analyzed the amount of new electricity load that is needed to support its building and transportation GHG emissions reduction goal. The identified amount of total electric load for buildings and transportation ahead of 2028 is nearly 12,000 GWh (11,921GWh). With this amount of load, the Partnership set targets of 9,314 GWh of rooftop solar on single-family homes, 2,547 GWh of rooftop solar on multi-family buildings, and 59GWh of community solar, culminating in 11,921 GWh of solar. While there are barriers to advance community solar (e.g., varying regulations, costly rooftop upgrades for those that own their home, etc), it represents a critical opportunity for low-income households to benefit from solar rooftop.

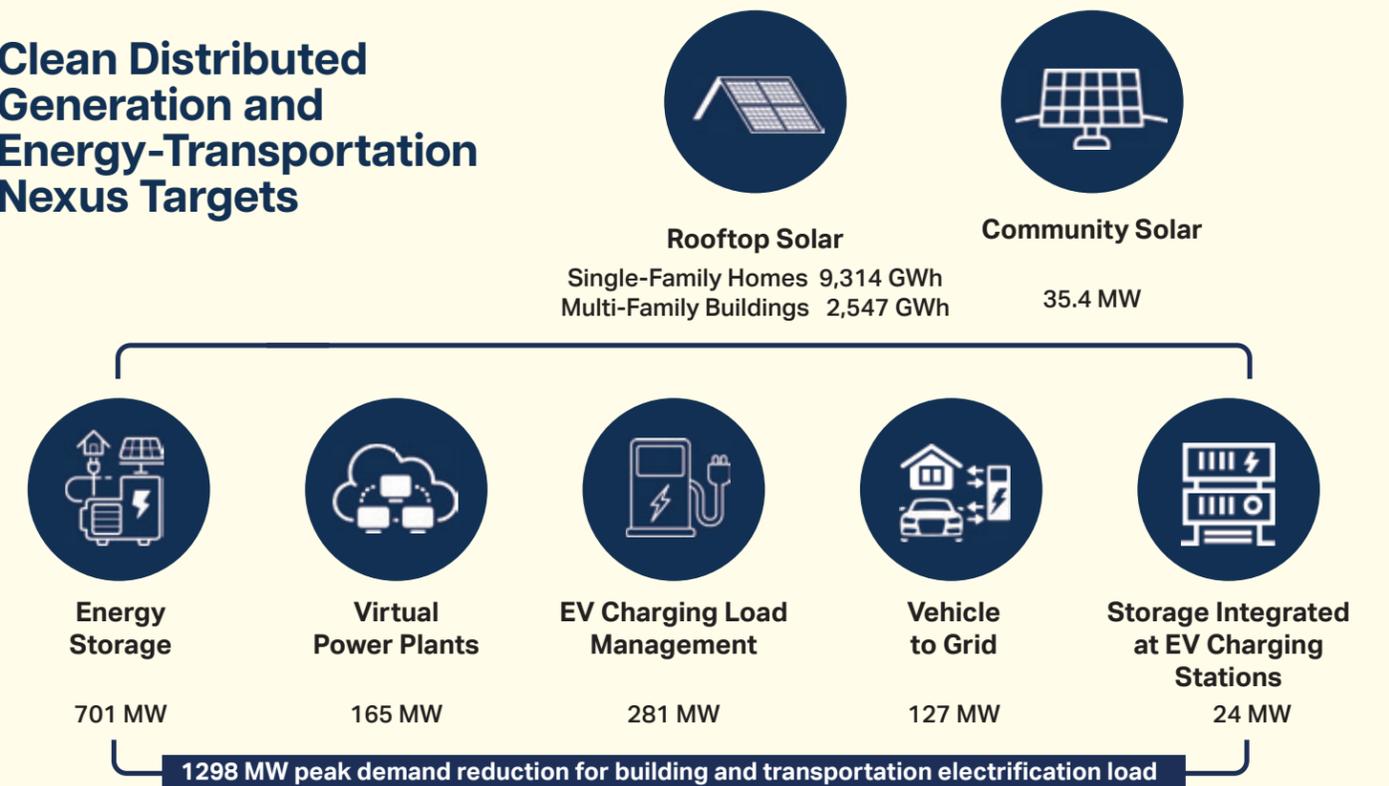
Apart from developing solar to supply the electrification of buildings and transportation, it's also critical to understand the incremental shift during peak demand periods (4:00-9:00 pm) that will occur. This is necessary as solar production largely declines during peak demand and has historically been powered by fossil gas generation. The Partnership identified that nearly 1300 MW (1298 MW) are needed to meet the incremental peak demand from the building and transportation electrification goal.

The targets to support this peak demand reduction are broken down into:

- 701 MW of energy storage,
- 127 MW of vehicle to grid (V2G),
- 281 MW of EV charging load management,
- 165 MW of a virtual power plant, and
- 24 MW of energy storage integrated at EV charging stations.

It's important to note that most of the increased electrification load comes from transportation. Therefore, transportation load should be strategically managed as a contributor to grid needs with the direct ability to provide bi-directional power from vehicle to grid (i.e. V2G) or reduce direct EV charging from the grid during peak demand periods (e.g., tapping into storage that is integrated at an EV charging station, using charging software to charge EVs during non-peak demand periods when there is an abundance of solar power, etc.). Additionally, CEP's virtual power plant target incorporates a subset of the various DERs and energy-transportation nexus technology targets as not every technology will enroll in a VPP project

Clean Distributed Generation and Energy-Transportation Nexus Targets





Clean Distributed Generation and Energy-Transportation Nexus

Example policies, pilots, innovations and other initiatives we are exploring to advance progress toward this commitment



Policies

Designation of Priority Distributed Generation Areas

To ensure there is sufficient capacity for transportation electrification, particularly charging for medium- and heavy-duty vehicle fleets, **the Region should identify key areas that are optimal for local distributed generation.** These areas should be prioritized by expediting local building and safety permitting and interconnection for EVSE and DERs given the need to meet our climate goals and the benefit these resources will provide to the local constraint grid.



Pilots

Scaling Energy-Transportation Nexus Solutions

LACI, the Clean Energy Partnership – and the Transportation Electrification Partnership – are committed to **prioritizing the deployment of demand response-enabled charging infrastructure paired with distributed generation (e.g., storage) for EV fleets** at local grid constrained locations. We are exploring the potential to create a large-scale deployment of EVSE paired with DERs and behind-the-meter optimization software at one of LA's sport venues or with a fleet of electric school buses. This deployment would create immediate charging access and grid resiliency benefits for the surrounding communities, while also creating an opportunity to learn lessons and gather data on how to scale these solutions at large venues where fleets of vehicles will be stationed.



Other Innovations and Initiatives

Powering our Communities with a Virtual Power Plant by the Time the World Arrives for the 2028 Olympics

The 2028 Olympic and Paralympic Games present an opportunity for the Region to develop a large, innovative virtual power plant that lowers electricity bills and directly provides clean energy technologies to low-income households. To ensure the VPP can bolster the grid and add power when it is needed, **the VPP should incentivize battery adoption for new customers.** VPPs have demonstrated to be useful, coordinated tools to improve resiliency during adverse grid events, reduce power outages, and lower electric bills. The development of the VPP should prioritize:

- Households and small business owners near venues associated with Olympic Games - South and Central LA - to ensure they directly benefit from the clean energy technologies such as solar power, demand response-enabled heat pumps, and energy storage
- Neighborhoods that are located in critical grid areas that can meet local reliability needs and reduce local reliance on the gas system

Ensuring Grid Reliability Through Community Solar + Storage

Support low-to-moderate income communities that seek to pursue community solar projects through funding and financing opportunities, while also prioritizing adding storage to projects. Adding storage is a critical step that will enable a greater number of residents to power their household's peak demand while reducing larger grid strain and demand traditionally placed upon gas-powered peaker plants.





Grid Efficiency & Resiliency

Grid efficiency and resiliency refers to the ability to mitigate from and recover after power disruptions. Given climate risks, continued actions and protocols need to be taken to increase the efficiency and resiliency of the grid. The growing amount of electrification from buildings and transportation and rise in clean DERs represents an opportunity to utilize these technologies and electricity load in a manner that increases local grid efficiency and resilience, instead of overloading the grid. For example, the critical load in a specific building and/or sets of buildings in vulnerable communities can be designed to “island” from the larger grid with the incorporation of solar plus storage systems, or a microgrid. Even during a wider grid outage, this technology would allow the community to avoid or minimize local power outages. In another example, EVs can tap into portable battery-integrated charging solutions and/or EV charging connected to off-grid storage to charge during power disruptions. Crucially, these types of innovations require a local grid that can proactively incorporate and plan for these technologies.



Roadmap Targets

For this pathway, CEP’s targets focus on customer and utility solutions to mitigate grid balancing and power quality risks as rapid electrification and an increase of DERs change grid operations and strain existing infrastructure. Flexible load management, leveraging grid-connected customer devices, and modernizing the distribution system will enable electric load growth and additional DERs without decreasing system reliability.

To support flexible load and management, CEP established a Roadmap target of 546 MW of demand response, which is a change in power consumption to better align with power supply, and 4019 GWh of energy efficiency savings. Energy efficiency refers to the ability to reduce our overall power usage through improved or smart technologies, as well as building upgrades or systems to reduce wasted energy. EE is the first tool to reduce GHG emissions as it automatically reduces power that would have been consumed otherwise.

The Partnership also set a target to establish interconnectivity among DERs to the grid with a total of 1.4 millions of managed grid-responsive devices. Without this interconnection to the larger grid, DERs cannot appropriately operate in a way that enhances the resilience and reliability of the grid. To improve grid infrastructure, the Partnership established a target to achieve less than 90% loading factor at all substations. This target encourages greater amounts of electrification to be integrated into the local grid by creating more capacity on the distribution system. Lastly, the Partnership acknowledges the importance of continuing to improve DER grid planning and modeling to account for and enable the innovation that is occurring as well as better prepare our communities for the impacts of climate change.

Grid Efficiency & Resiliency Targets



Demand Response
546 MW Dispatchable



Energy Efficiency
4,019 GWh Savings



DER Management
1.4 M of Managed
Grid-Responsive Devices



Distribution Infrastructure
Achieve <90% Loading Factor
at all Substations



Planning & Forecasting
* Improve modeling of DER



Grid Efficiency & Resiliency

Example policies, pilots, innovations and other initiatives we are exploring to advance progress toward this commitment



Policies

Distribution grid planning **should include relevant local and state electrification policies** to accurately account for and predict future distribution upgrades and optimal areas for local distribution generation.

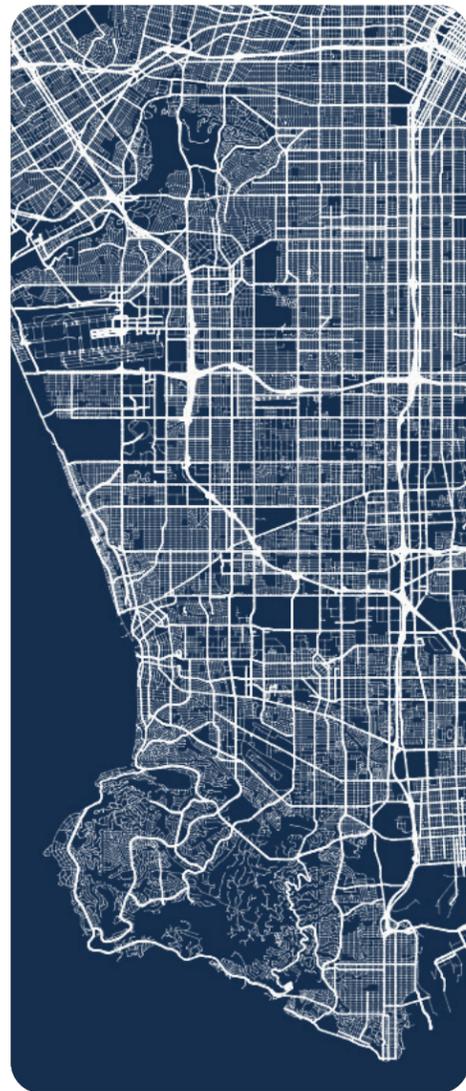


Pilots

Developing a Two-Way Electric Grid

To manage the increasing proliferation of DERs reliably and efficiently, **the Region should implement a Distribution Grid Orchestration software platform.** The platform should provide day-ahead forecast, real-time grid visibility, and direct management of electric appliances and technologies to efficiently and reliably optimize DERs.

- The Distribution Grid Orchestration platform **should be demonstrated in a complex grid location that may encompass a diverse set of technology systems** (e.g., batteries, solar rooftops, virtual power plants, electric vehicles) to showcase the intricate capabilities and necessity of this technology to support the transition to a 100% clean energy grid.



Other Innovations and Initiatives

Los Angeles Resiliency Scorecard

Develop a composite, region-based, resiliency performance metric in the form of a **scorecard that incorporates preventative and mitigative measurements for grid and community resiliency factors.** The purpose of the scorecard would be to:

- Create an **index of the wide range of drivers and multi-stakeholder perspectives** involved in a complex problem
- Provide a **framework for evaluating the effectiveness** of policies and interventions
- **Drive new investment and innovation** where it's needed most
- **Track comprehensive regional resiliency performance** over time
- Assess the **relationship between 'disadvantaged communities' reliability and resilience**

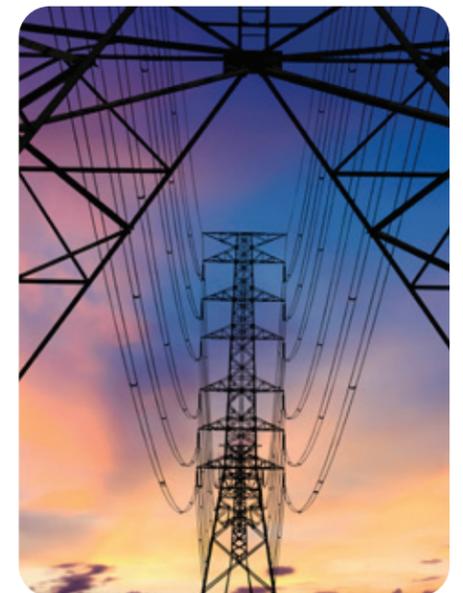
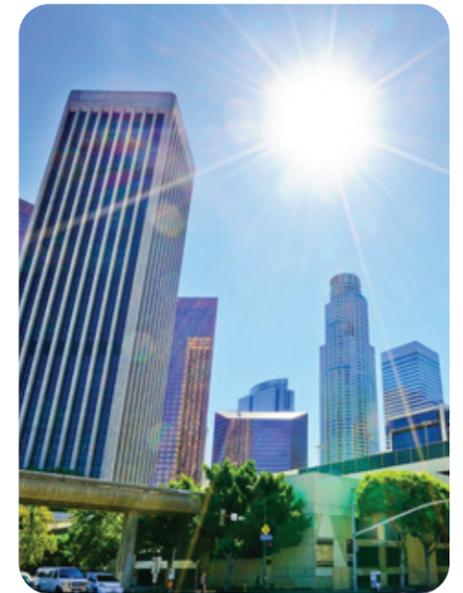
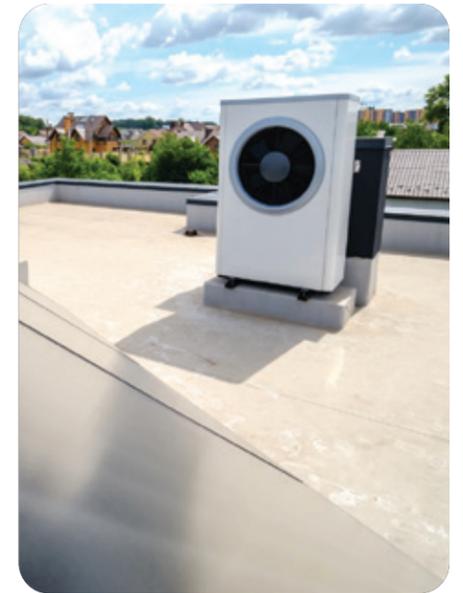
Preparing for Extreme Heat in Grid Planning

The increased heat waves in LA will bring additional air conditioning (AC) load that has previously been unexpected. To support the new electric demand that will come from the increase in AC, **the CEP Roadmap will be updated with forecasted increased AC load ahead of 2028.** As a result of this new modeling, the Roadmap targets will be updated to support the increased AC load with clean distributed generation.

Proactively Planning for the Highly Distributed Energy Future

Given a growing abundance of clean technology options and financial incentives (including forthcoming IRA incentives), **there is a need to develop and utilize data that predicts customer energy technology adoption and usage,** within the Region over the next 5 years (2023-2028) to:

- **Understand how and where to proactively plan and upgrade** the distribution grid for future electric demand
- **Provide targeted technology education and adoption assistance programs to residents** with anticipated lower technology adoption rates to decrease technology disparities across communities



The Clean Energy 2028 Roadmap: Modeling Sources

Since October 2022, LACI has convened stakeholders representing over 40 organizations over six official sessions, with additional individual meetings and additional leadership group expertise from partners. To complement comprehensive industry insight offered by these individuals, the Roadmap relies on extensive modeling to determine realistic yet ambitious emissions reductions targets in the Greater Los Angeles Region, drawing from the data in some of the key sources listed below.



Los Angeles Department of Water & Power and National Renewable Energy Laboratory: The Los Angeles 100% Renewable Energy Study

The Study identified multiple paths for LADWP to achieve a 100% renewable and carbon-free grid as early as 2035.

Southern California Edison and Clean Power Alliance: 2022 Integrated Resource Planning Filings

Integrated Resource Planning Filings, or IRPs, are electricity system planning documents where publicly owned utilities outline their resource needs, policy goals, physical and operational constraints, and proposed resource choices.

California Air Resources Board: 2022 Scoping Plan

This Scoping Plan outlines the path to carbon neutrality and reducing GHG emissions by 85% below 1990 levels no later than 2045.

California Public Utilities Commission: 2022 Integrated Energy Policy Report

The IEPR assesses and forecasts all aspects of the energy industry supply, production, transportation, delivery and distribution, demand and prices to develop energy policies accordingly.

California Energy Commission: New Zero-Emission Vehicle Sales Report

This CEC tool updates zero emission vehicles sales quarterly by conducting specialized analysis of DMV data across California.

LACI's Transportation Electrification Partnership: Zero Emission 2028 Roadmap 2.0

TEP's Roadmap 2.0 conducts extensive modeling to lay out sector targets, calls to action, detailing plans, policy actions, and pilots to meet an additional 25% GHG emissions reduction in Los Angeles by 2028.

If you'd like to learn more about the specific methodologies for each goal and target, please visit our Clean Energy Partnership webpage at laci.org.

Key Terms

Groups & Organizations

CEP - Clean Energy Partnership

CEP is a public-private partnership, convened by LACI, accelerating the move to 100% clean energy while meeting the needs of transportation electrification, building decarbonization, and grid resiliency in the Greater Los Angeles Region by the 2028 Olympic and Paralympic Games.

TEP - Transportation Electrification Partnership

TEP is a public-private partnership, convened by LACI, committed to accelerating transportation electrification and zero emissions goods movement throughout the Greater Los Angeles Region in advance of the 2028 Olympic and Paralympic Games by pursuing bold targets, pilots, initiatives, and policies that are equity-driven, create quality jobs, and grow the economy.

CEC - California Energy Commission

California's primary state energy policy and planning agency, which plays a critical role in leading the state to a 100% clean energy future.

LADWP - Los Angeles Department of Water & Power

The nation's largest municipal utility, with 8,019 megawatt electric capacity and serving an average of 435 million gallons of water per day to the City of Los Angeles.

SCE - Southern California Edison

One of the nation's largest investor-owned public utilities delivering power to 15 million people across central, coastal and Southern California.

Energy Terminology

ADMS - Advanced Distribution Management System

A software platform providing real-time data and integrated systems to utilities to automate processes such as service restoration, optimization of grid performance, or peak demand management.

BE - Building Electrification

Promotes the transition to electric over fossil gas in buildings, particularly in appliances used for heating and cooking. Often associated with 'Building Decarbonization' efforts, a broader term that includes energy efficiency (EE).

DER - Distributed Energy Resources

Small-scale electricity supply or demand technologies, often on the consumer side of the meter, including smart thermostats, solar panels, home battery systems, and residential EV charging.

DERMS - Distributed Energy Resource Management System

A platform using real-time communications infrastructure to enable utilities to monitor, control, coordinate and manage DERs within their territory at the local level.

DG - Distributed Generation

Smaller electricity generation technology, such as solar panels, near wherever it will be used, be that a single building or part of a microgrid.

DR - Demand Response

Engaging energy consumers by alerting them to reduce or shift their use of electricity outside of peak demand periods and/or in response to time-of-use rates, often with financial incentives for customers.

Key Terms

Energy Terminology Continued

EE - Energy Efficiency

Physical, behavioral, technological, and policy-based measures that enable the use of less energy to perform the same task.

EV - Electric Vehicle

Vehicle using an electric motor and battery instead of a traditional internal combustion engine.

EVSE - Electric Vehicle Supply Equipment

Charging equipment that is necessary to recharge the battery packs inside EVs.

GHG - Greenhouse Gas

Gas emissions that include carbon dioxide, a byproduct of burning fossil fuels and other activities, which remain in the earth's atmosphere and trap heat, leading to global temperature increases and compounding climate impacts.

IOU - Investor-Owned Utility

Private enterprises that distribute large-scale electricity and issue stock owned by shareholders.

POU - Publicly Owned Utility

Nonprofit, public agencies that supply and deliver electricity to their communities.

Region - Greater Los Angeles Region

In our data analysis, the Greater LA Region refers to LA County.

V2B - Vehicle-to-Building

Technology that is dependent on bi-directional charging capabilities in an EV, meaning power can flow both into an EV battery and from EV battery back to power a building, often during peak demand.

V2G - Vehicle-to-Grid

Another technology using bi-directional charging from an EV, but instead of supplying power from an EV battery to a building, V2G sends power to support the larger electrical grid.

VPP - Virtual Power Plant

Aggregations of DERs such as rooftop solar with behind-the-meter (BTM) batteries, EVs and chargers, electric water heaters, smart buildings and their controls, and flexible commercial and industrial loads that can balance electricity demand and supply and provide utility-scale and utility-grade grid services like a traditional power plant.

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