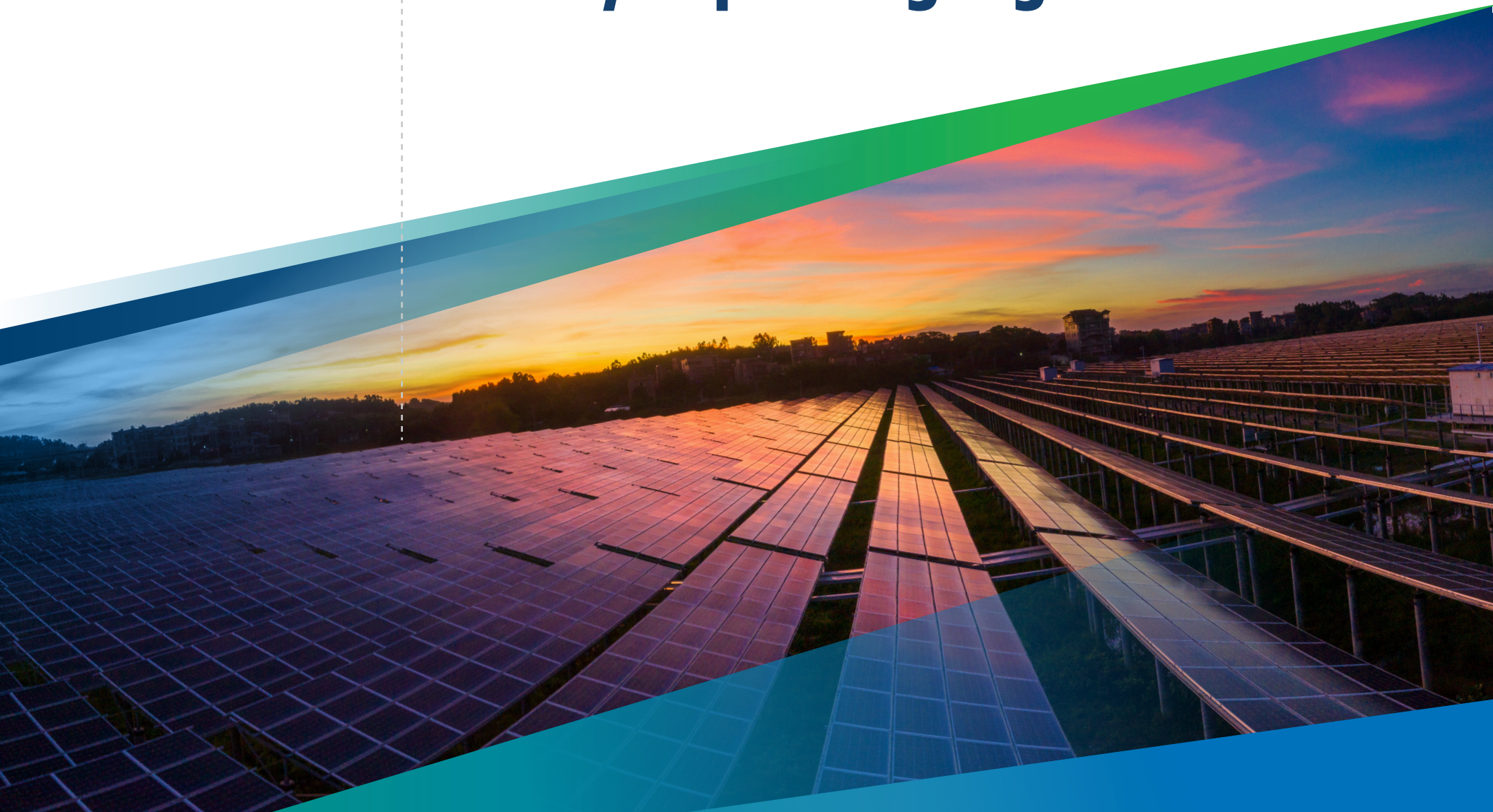
DOCKETED	
Docket Number:	21-IEPR-01
Project Title:	General Scope
TN #:	242559
Document Title:	2021 IEPR Highlights
Description:	2021 IEPR Highlights
Filer:	Raquel Kravitz
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	4/5/2022 10:50:22 AM
Docketed Date:	4/5/2022

2021

Integrated Energy Policy Report Highlights



About the Integrated Energy Policy Report

Senate Bill 1389 (2002) requires the California Energy Commission (CEC) to prepare a biennial integrated energy report. The 2021 Integrated Energy Policy Report (IEPR) provides the results of the CEC's assessments of energy issues facing the state. The IEPR has four volumes and an appendix, including:

- BUILDING DECARBONIZATION
- ENERGY RELIABILITY
- DECARBONIZING CALIFORNIA'S GAS SYSTEM
- THE CALIFORNIA ENERGY DEMAND FORECAST
- QUANTIFYING THE BENEFITS OF THE CLEAN TRANSPORTATION PROGRAM

Many of these issues in the IEPR require action if the state is to meet its climate, energy, air quality, and other environmental goals while maintaining reliability and controlling costs.

Volume 1: Building Decarbonization

Key Findings

- Decarbonizing buildings, which account for 24 percent of California's greenhouse gas (GHG) emissions, is needed to achieve state climate goals.
- Demand flexibility can help optimize the increased use of electricity.
- California is beginning to address embodied emissions – emissions from the manufacturing and transport of building materials, finishes, appliances, and on-site use of construction equipment.
- Decarbonizing the agricultural sector is hindered by technical and economic challenges, risk aversion, and lack of real-world data on emerging technologies. Such technologies include those that can increase or maximize use of water efficiency, non-fossil fuel energy from the grid, and zero-emission farm vehicles.

Recommendations

- A statewide heat pump goal to install 6 million of the electric heating and cooling technology will drive progress.
- Significant investments in retrofits and newly constructed buildings are needed to accelerate building decarbonization.
- Decarbonization must prioritize vulnerable populations who face barriers related to costs, lack of access to capital, potential lack of access to programs, and lack of control if they rent.
- Workforce development is needed and must include under-resourced and disadvantaged communities.
- Further work is needed on compliance and enforcement to ensure quality installation of HVAC systems.
- Demonstrating technologies and offering financial support are needed in the industrial sector where low-carbon hydrogen could be a long-term alternative to reduce emissions from processes such as high-temperature heating.
- Coordination across state agencies including the CEC, California Public Utilities Commission (CPUC), and California Air Resources Board (CARB) is needed to continue aligning energy efficiency and decarbonization goals and activities.

Volume II: Ensuring Reliability in a Changing Climate

Key Findings

- Climate change is a driving force in clean electricity planning as impacts including excessive heat, drought, and wildfires pose greater risks to the grid.
- The CEC is developing new analytics to ensure reliability including a summer stack analysis to help support contingency planning for the current year and a multiyear analysis, referred to as the California Reliability Outlook.

Recommendations

- The CEC, California Independent System Operator (ISO), and CPUC need to develop a common approach to incorporating climate change in planning.
- Integrated transmission planning among California ISO, CPUC, and the load-serving entities, such as utilities, is needed to bring new generation to load centers.
- Research should focus on developing and demonstrating new firm zero-carbon resources to provide greater reliability as the state's variable renewable portfolio expands.
- Demand response improvements are needed now to expand the resource in the state, while evolving to take advantage of new control technologies.
- Battery energy storage is growing and well-suited to store energy from periods with high solar production and corresponding low energy prices for use during the net peak period and higher energy prices.

Volume III: Decarbonizing the State's Gas Systems

Key Findings

- Gas is the largest energy source in the state, accounting for 28 percent of total energy use.
- The CEC, CPUC, and CARB play crucial roles in the long-term planning of the state's gas system.
- A key challenge in long-term planning is to strike a balance between competing objectives for the gas system.
- Priority objectives for the state are safety, reliability, prioritizing gas investments and maintenance, equity, and workforce development.
- An adequate workforce will be needed during the transition away from natural gas and a shrinking gas system can displace utility workers.
- Forecasts and assessments are critical components in the support of long-term planning and decision-making.
- Extreme weather, such as polar vortex events, could impact natural gas prices and out of state infrastructure that California relies on for supplies.
- Gas utilities' obligation to provide and maintain gas service to any customer willing to pay is a barrier to achieving all-electric new homes in the state.
- Research can help target electrification programs and efforts geographically, which will be needed to allow for the potential retirement of distribution assets.
- Renewable gas and renewable hydrogen may prove to be cost-effective alternatives in the long run for hard-to-electrify gas uses.
- The CEC is working to improve natural gas demand forecasts, long-term rate forecasts, and infrastructure assessments.

Recommendations

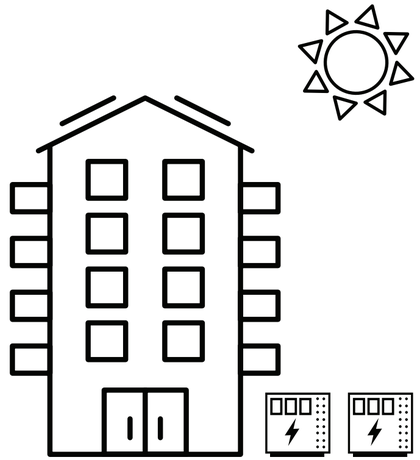
California must create a long-term, comprehensive, transparent, and inclusive gas planning process with input from a variety of gas stakeholders. The state also needs to:

- Consider gas and electric interdependencies to help ensure reliability and increase its planning for extreme events.
- Examine gas issues to support building electrification and the role of clean fuels to help meet California's climate and energy goals.
- Consider modifying or eliminating the gas utility obligation to serve.
- Align gas rate structures with long-term clean energy goals that support deep reductions in fossil gas usage and electrification efforts for residential and commercial customers.
- Leverage California's workforce development and educational systems to find equivalent roles for displaced workers.
- Align CEC-funded natural gas research and development for gas infrastructure decommissioning and safety.
- Focus electrification subsidies on low-income and disadvantaged community customers who are least able to afford new electric appliances.
- Expand interagency collaboration efforts.

Volume IV: California Energy Demand Forecast

Key Findings

- The CPUC and California ISO rely on the California Energy Demand Forecast for statewide energy planning efforts including energy procurement and transmission planning.
- Recent forecast improvements include providing results through 2035 and weighting recent historical years more heavily in the model to account for increasing climate impacts.
- The 2021 mid-case forecast projects electricity sales reach almost 280,000 gigawatt hours (GWh) by 2035, growing at a rate of 0.7 percent.
  - Transportation electrification is projected to reach 35,000 GWh by 2035 — or about 12 percent of load.
  - Behind-the-meter photovoltaic adoption and additional achievable efficiency combine to reduce load by 87,000 GWh in 2035 — by about 25 percent.
  - Additional achievable fuel substitution works in the other direction, increasing the sales forecast — by about 6,000 GWh.
- The managed peak forecast for the California ISO control area grows at a rate of 0.9 percent annually, reaching 52,400 megawatts by 2035.



Appendix: Assessing the Benefits and Contributions of the Clean Transportation Program

Key Findings

- The Clean Transportation Program has provided more than $1 billion in funding since 2009 and leveraged the additional investment of more than $734 million in private and other public funds.
- Benefits from commercial-scale fuel production projects funded by the program show large GHG reductions through 2030, but GHG reductions from zero-emission vehicle technologies will still be necessary to meet 2030 and later targets.
- Benefits can be assessed through two lenses: expected benefits, which represent the outcomes estimated to be directly supported by program funding such as the amount of GHG emissions reduced, and market transformation benefits, which represent a range of future investments enabled or supported by the funding portfolio of the program.

When aggregating these, projects funded by the program may reduce annual GHG emissions by roughly 4.3 million metric tons to as much as 8.3 million metric tons by 2030.

Recommendations

- Prioritize supporting closing key gaps in technologies with the greatest long-term market potential for transportation sector decarbonization and broader economic benefit.
- Continue to prioritize equity and clean transportation access for all Californians and ensure maximum benefit to communities most impacted by transportation-related air quality impacts.
- Support projects and technologies that contribute to a simple and seamless consumer vehicle refueling experience.
- Support projects that have the greatest potential for reducing refueling infrastructure costs.

STATE OF CALIFORNIA
ENERGY COMMISSION

MARCH 2022

energy.ca.gov | facebook.com/CAEnergy | twitter.com/CAEnergy | instagram.com/CAEnergy