

Transforming Transportation in Los Angeles County: 2024 Update of the 2017 Sustainable LA Grand Challenge Undergraduate Research Scholars Program (SLAGC URSP) LA County Energy Report Card

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Introduction

To effectively address climate change, we must transform global economic, energy, and transportation systems. While the urgency spans the globe, local efforts are pivotal. Los Angeles County exemplifies these shifts with programs targeting adapting transportation for sustainability, showcasing how localized actions contribute to the broader global mission for climate resilience. The need for human mobility will persist, and cities like Los Angeles play a crucial role in shaping a sustainable future through innovative solutions and clean energy alternatives. Currently, LA County is home to the largest seaport complex in the country, a major international airport, three other smaller commercial airports, freight and passenger rail, numerous bus lines, and over 20,000 miles of freeways and roads, all of which can serve as avenues for potential innovations within the transportation sector. With such a diverse transportation infrastructure, LA County is primed to lead in sustainable mobility solutions.

By revising the 2017 Sustainable LA Grand Challenge Environmental Report Card for Los Angeles County Energy and Air Quality (2017 Report Card), we aim to offer data-driven perspectives that will guide strategic choices for transportation planning. The 2017 Report Card assigned LA County transportation an “incomplete” grade when evaluating energy and air quality metrics associated with the sector. This provides us the opportunity to update and expand upon previous gaps identified. Furthermore, we will ensure a cooperative approach engaging important stakeholders, which promotes inclusive and long-lasting solutions within the realms of sustainability, equity, and public health. Our research aims to guide the development of effective, user-centric, and resilient transportation strategies that align with the LA community's evolving needs and contribute to the overall improvement of the transportation landscape.

Focusing on the pivotal role of public transportation within the broader context of transportation planning, our evaluation examines the effects of public transportation investments and historical travel patterns in LA County. Common metrics previously used include passenger miles traveled (PMT) and unlinked passenger trips (UPT), as recorded in the Federal Transit Authority's National Transit Database for the years 2005 through 2014. PMT measures the total average distance covered by each transit passenger, which witnessed a notable increase of 22% since 2005, reaching 3.3 billion miles in LA County. Despite this growth in PMT, there was a 4.3% slowdown from 2009 to 2014. On a broader scale, the Southern California Association of Governments (SCAG) aims to achieve a 30% increase in daily transit miles by 2040. Further research is needed to determine whether the SCAG goal of increasing daily transit miles by 30% is the appropriate target for achieving the State's 2040 emissions target.

Another transportation metric, unlinked passenger trips (UPT) is defined as the total boardings passengers take on public transit. As per the 2017 Report Card, from 2011-2014, UPT has

increased steadily despite annual declines of 3.4% between 2007 to 2011. Counterintuitively, the decrease in UPT witnessed from 2007 to 2011 may be linked to the expansion of the transit system, including the Gold Line extension in 2009 and subsequent extension in 2016. Since this metric is based on the total number of passengers boarding public transit vehicles, an expansion of the transit system implies passengers have fewer transfers along their commutes. This decline could also signify reduced transit ridership overall in LA County or a combination of both factors. This complex dynamic warrants further research to understand the trend of ridership over time.

In addition to examining general trends in public transportation usage, our research will analyze sustainable shifts in vehicle usage at the individual level. One metric in which progress has been made since 2011 is Personal Electric Vehicle (PEV) sales. California Executive Order N-79-20 approved in September 2023 mandates that by 2035, all new cars and passenger trucks sold in California must be zero-emission vehicles, including plug-in hybrid electric vehicles. To reach this goal, PEV sales must continue to drastically increase in the coming years. Other challenges related to electrifying personal vehicle use are the development of charging infrastructure, and the accessibility of PEVs to the general population.

The high cost of transportation, constituting almost 20% of the total income for a typical household in the LA Metropolitan Region, contributes to the concentration of PEV ownership in predominantly higher-income areas, according to The Center for Neighborhood Technology (CNT) Housing and Transportation Affordability Index (2016 H+T Index). To begin to remedy this, LA launched the EV-sharing pilot program in underprivileged areas in December of the same year. Clean transportation is especially important in locations that have experienced the brunt of the impact of environmental harms, meaning programs like EV-sharing in addition to the expansion of public transportation will be paramount going forward.

Expanding our investigation from PEVs, our research will examine walking, scootering, and biking, defined together as micromobility, as a potential sustainable transportation option at the individual level. This would add a previously unexplored category to the 2017 Report Card, reflecting an alternative to powered vehicular travel.

Overall, a lack of comprehensive data assessing the effectiveness of transportation investments and limited information on historic travel patterns presents challenges in determining the impacts of various transportation initiatives in LA County. As we revise the 2017 Report Card, our research will attempt to fill these gaps, update the six indicators previously assessed on the report, and add new categories, such as PEV affordability and micromobility data, to reflect the evolving transportation landscape.

Methods

In the 2017 Report Card, six indicators were used to assess the overall environmental impacts of transportation in LA County. These included: gasoline and diesel fuel sold, vehicle miles traveled, commute times and mode of transportation, use of transit: passenger miles traveled and passenger trips, number of registered electric vehicles, and number of EV charging stations. As mentioned previously, the 2017 Report Card ultimately cited an “incomplete” grade for transportation.

Our team not only wishes to compile this exact data since the 2017 Report Card’s publication, but also to add additional data that corresponds with new indicators. In contrast to the broad categories covered in the 2017 Report Card, such as stationary energy usage, renewable energy

usage, and greenhouse gas emissions, the 2024 SLAGC URSP LA County Energy Report Card focuses on linking these categories to specifically associate with transportation usage in LA County. For example, we will distinguish between nonrenewable and renewable energy usage in the county by examining two indicators: the amount of fuel sold and the number of electric vehicles present.

To expand upon social, political, and physical aspects of transportation, we will add specific assessments of environmental justice and the relative equity (or inequity) of transportation, transportation-related health impacts, policy changes, and new transportation technologies. We propose the following tentative additional categories and indicators:

- Transportation infrastructure
 - Parking space utilization (e.g. occupancy rates)
 - Parking space construction (e.g. number of new parking spaces built)
 - Insights from newly implemented ridesharing initiatives (e.g. number of passengers)
 - Number of shared bikes and scooters available in LA through public initiatives
 - Number and mileage of bike lanes
- Transportation equity
 - Distribution of last-mile connectivity
 - Fare affordability
 - Accessibility for people with disabilities (e.g. Access Services)
 - Accessibility and affordability of PEVs
 - Use of transit options by demographics (e.g. income level, ethnicity, and race, socioeconomic status)
- Health impacts
 - Traffic-related injuries and fatalities
 - Traffic emission-related health effects (CalEnviroScreen)

As in the 2017 Report Card, these indicators will be graded based on positive outcomes; for instance, more equitable transportation merits a higher grade, as do fewer traffic-related injuries and fatalities.

We have met with several energy and transportation experts, who will review the report, including:

- Dr. Kate Anderson, Chief of Staff for Energy Systems Integration at the National Renewable Energy Laboratory
- Dr. Evelyn Blumenberg, Director of the Lewis Center for Regional Policy Studies and an Urban Planning Professor within the Luskin School of Public Affairs
- Dr. Brian D. Taylor, Director of the Institute of Transportation Studies at UCLA and Professor of Urban Planning and Public Policy in the Luskin School of Public Affairs
- Juan Matute, Deputy Director of the Institute of Transportation Studies and Lecturer in Urban Planning

Each of our meetings gave us valuable insights into the current state of transportation within

LA County, as well as the numerous factors and issues that persist in complex relationships. Some of the highlights included the socioeconomic effect on personal travel, the effect of high-traffic areas on public health, and the possible shifts in travel behavior and micromobility.

Next, we plan to identify data sets at the county level. Several examples include those from CalEnviroScreen, the Los Angeles Department of Transportation (LADOT), the Environmental Protection Agency (EPA), the Los Angeles Metro (LA Metro), the Los Angeles County Department of Public Health (LADPH), the American Community Survey, and the Los Angeles County Metropolitan Transportation Authority (LACMTA), as suggested by some of the experts we met with. We plan to assemble a spreadsheet with possible data sources, and then analyze these data sources to verify whether they contain information relevant to our selected indicators. Finding and determining the relevancy of the data may bring about challenges, as noted in our meeting with Dr. Taylor, due to incomplete data sets and non-reported information. However, we believe that more information may be available compared to the 2017 Report Card, as the commercialization of phone data and availability of the data for researchers and government agencies could increase accessible data sources. We expect our data analysis process to follow a methodology similar to that of the 2017 Report Card, leveraging various data sources and being mindful of potential challenges like incomplete datasets and non-reported information from 2017. As of the first week of February, we will confer with a contact from the Luskin Center for Innovation to further advise how to approach the data analysis process.

Once the data analysis is finished, building and writing the 2024 SLAGC URSP LA County Energy Report Card will be the next step. This will once again likely follow a similar structure to the 2017 Report Card with an introduction, data description, findings, and data limitations sections. The 2017 Report Card also included a “highlight” piece at the end of each subject; the transportation section highlighted transport affordability and AllTransit Performance scores. In the 2024 SLAGC URSP LA County Energy Report Card, we aim to also include a highlight piece but instead feature multiple topics based on policy, health outcomes, and transport equity. Dr. Taylor mentioned that these topics may arise after compiling and analyzing data, so this step will likely come toward the end of the overall process. While our current methodology is somewhat generalized at this time, compiling data in our spreadsheet will drive the rest of the project, and the team will build upon the continuous information we collect, along with the guidance of experts, to solidify and structure our plan for the 2024 SLAGC URSP LA County Energy Report Card.

Budget Sheet

[SLAGC Budget Spreadsheet](#)

Dataset Acquisition:

- January, April, May 2024: \$0 - Using publicly accessible transportation statistics for initial analysis from sources including, but not limited to [SLAGC Group Project Data Sources Spreadsheet](#). Continued use of annual specialized dataset subscriptions from February and March.
- February 2024: \$100 - One-time purchase of specialized transportation datasets for in-depth analyses of traffic patterns, gridlock, or transportation infrastructure from suppliers such as TomTom ([Pricing per 1000 requests](#)).
- March 2024: \$200 - Purchase of subscription-based datasets for in-depth analysis of public transportation usage or mobility trends from companies specializing in the sector, such as Statista (free, up to \$200 annually) or Transit API (free with developer

consent).

Data Analysis Software Tools:

- January, April, May 2024: \$0 - Data processing and analysis using R or QGIS, or other open-source programs. Continued use of annual licensing software from February and March.
- February 2024: \$100 - Purchase licenses for proprietary software tools for advanced spatial analysis or transportation network modeling, such as ArcGIS (free through UCLA) and MATLAB (free through UCLA).
- March 2024: \$200 - Renewing a membership to a cloud-based analytics platform, like Microsoft Azure or Google Cloud Platform, in order to access computationally costly machine learning algorithms and scalable data processing.

Miscellaneous Expenses:

- January, April, and May 2024: \$0 - No specific miscellaneous expenses were identified for this period.
- February 2024: \$0 - Free Google Scholar, JSTOR, and other academic journal subscriptions for access to transportation research literature or payment for publication fees.
- March 2024: \$50 - Printing and dissemination costs for research posters or presentation materials.

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