

Regional and Land Use Considerations

High Desert Corridor

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1. EXECUTIVE SUMMARY

The High Desert Corridor (HDC) is a proposed 63-mile transitway, green energy corridor, and potential Public Private Partnership (P3) beginning at SR-14 in Los Angeles County, extending across U.S.-395 and I-15, and terminating six miles east of I-15 in San Bernardino County. It is the only urban-adjacent greenfield project of its nature in the country. The route will directly impact the mostly arid cities of Palmdale and Lancaster, in Los Angeles County, and the cities of Adelanto, Victorville, and Apple Valley in San Bernardino County.

The HDC presently has eight notable characteristics that relate to land use:

1. Completed California Environmental Quality Act (CEQA) filing for a green energy corridor with high-speed rail (HSR), highway/tollway, bike and pedestrian paths.
2. A one of a kind urban-adjacent greenfield project-type, which allows a unique capacity for innovation and incorporation of new technologies.
3. Regional energy substations located at each HDC terminus, which create opportunities for green energy generation and transmission.
4. Proximity to the expanding Inland Port at Southern California Logistics Airport (SCLA), as well as high-growth population centers.
5. A range of options for financing and executing the project, including green energy grants and investments, Enhanced Infrastructure Finance District (EIFD), usage fees, and various P3 opportunities.
6. Direct alignment with state policy, current and future interests of Los Angeles and San Bernardino Counties, and identified priorities of local cities and unincorporated communities.
7. Engagement with local municipalities to encourage energy and environmentally conscious development of transit and energy-related planning; especially as it relates to emerging trends in renewable energy, Community Choice Aggregation (CCA), and Distributed Energy Resources (DER).
8. Complementing nearby infrastructure plans to create a mega-regional rail option for passenger travel from northern, central, and southern California to Las Vegas.

The CEQA compliant plan for the HDC includes a green energy corridor with a HSR system, a highway or tollway, pedestrian walkways, and bicycle paths. This transitway will also include special considerations for commercial freight. Upon completion, the HDC will become a globally innovative model for taking a multifaceted approach to environmental responsibility, green energy generation and transmission, traffic alleviation, improved goods movement, recreational opportunities, equitable job creation, locally targeted economic stimulus, regional collaboration, and inclusion of innovative technologies.

The unique urban-adjacent greenfield nature of the HDC creates opportunities for innovation and new technology that will provide a model for multi-faceted green energy transit corridors around the world. Further research and outreach to interested parties will determine which novel approaches to reducing environmental impacts while generating and transmitting green energy will be incorporated into the HDC as a key regional transportation asset.

The environmental impact of the HDC advances the intention of California State legislation AB 32, and SB 32, which promote the statewide decrease in greenhouse gas emission levels and encourage the goal of emissions 40% below 1990 levels by 2030.¹ HDC infrastructure also provides valuable renewable energy resources with the expansion of cap-and-trade from 2020 to 2030 under the July 2017 passage of AB 398.

In parallel, both Los Angeles and San Bernardino County's general plans highlight the importance of improving infrastructure without doing damage to the environment. Los Angeles County seeks a multimodal solution to reduce the number of single occupancy vehicles by encouraging use of transit as well as pedestrian and bicycle options. San Bernardino County seeks to provide a safe, functional, and convenient transportation system that reduces traffic while addressing concerns of appropriate and intentional land use. The HDC will provide driving, walking, cycling, and rail options that directly address the desires and concerns of both Los Angeles and San Bernardino County's general plans, as well as myriad city, local, and regional plans. Consistent population and economic growth in both Los Angeles and San Bernardino counties justifies, if not demands, investment in the HDC as a central component to improving regional transportation and energy infrastructure.

¹ California Climate Change Legislation, <http://www.climatechange.ca.gov/state/legislation.html>

Because Los Angeles Department of Water and Power (LADWP) and Southern California Edison (SCE) substations are located near each terminus of a project with abundant solar energy, the HDC is well suited to provide transmission line infrastructure as well as generate green energy along the corridor. This will enable current and future renewable energy developers to connect into the grid and promote responsible green energy development along the right of way. Such energy infrastructure may prove increasingly valuable to the security and stability of the regional grid as distributed energy generation continues to expand throughout the high desert.

By improving east-west freight mobility in southern California, the HDC will play a crucial role in the future development of the Inland Port. Near the eastern terminus of the HDC, Victorville's SCLA is an international logistics hub with multimodal capabilities. An existing P3, comprised of the SCLA, Southern California Logistics Center (SCLC), and Southern California Rail Complex (SCRC) is working on redevelopment of the SCLA with an 8,500-acre multimodal freight transportation hub by combining ground, air, and rail connections which will serve as an Inland Port.² As shipping volumes continue to grow and transportation technology improves, the SCLA will help disperse the movement of goods and in turn alleviate the bottleneck issues in and around the Port of Los Angeles, Port of Long Beach, and Los Angeles International Airport (LAX). Such redirections of commercial freight will also demonstrate cost savings, reduced environmental impacts, and improved economic efficiency. The projected growth associated with the Inland Port, alongside the projected population growth of the region, make the HDC a critical multimodal solution for the movement of both goods and people.

The HDC Joint Power Authority (HDC JPA) is currently exploring various financing opportunities to contribute to building the project, which faces a significant funding gap. Creating a full green energy corridor can help to attract funds by offsetting energy consumed by the roadway and HSR transitway, while simultaneously generating revenue through the sale of excess energy. This approach can include solar paneling, energy transmission, rainwater capture systems, solar electric vehicle charging, and hydrogen/fuel cell refilling stations adjacent to off-ramps and at rail stations.

² High Desert Corridor Final Environmental Report, http://www.dot.ca.gov/d7/env-docs/docs/hdc/HDC%20FED--Vol%201--062016_FINAL.pdf

In addition to attracting grants and investments unique to the green energy corridor approach, another land use tool that can be used for funding is an EIFD. Pursuit of an EIFD will further strategic collaboration in the interests of long-run financial management and operational agreements. If approved and implemented, an EIFD will provide tax increment financing (TIF) based on future economic growth in a designated area. Considerations of future development will be critical, as an EIFD may require anticipated density not currently expected along the majority of the HDC's right of way.

The HDC JPA's pursuit of one or more P3s, accompanied by some form of revenue generation, could provide access to more flexible capital while simultaneously improving the overall efficiency of the project from design to build to finance to operation to maintenance. The exploration of a P3 that includes future maintenance could further reduce costs while shifting operational risk away from local government and transit agencies to a private party.

This report also highlights specific ways in which land use requirements, planning, and related programs can facilitate the optimal development of areas adjacent to the HDC. Green energy components bring significant opportunities to collaborate with local municipalities, particularly given increased regional interest and investment in DER and CCA in the high desert. One such recommendation is that all the cities along the HDC encourage rooftop solar panels and rainwater capture systems on any structure built within a given distance of the right of way. Additionally, transit structures built along the HDC could be required and/or incentivized to provide hydrogen/fuel cell refilling stations and electric vehicle charging stations. Such charging stations could utilize power from rooftop solar paneling. These measures could make the HDC, as well as surrounding areas, energy self-sufficient while mitigating the environmental impact of the project toward net-zero over time.

While the primary impacts of HDC infrastructure will be within the high desert, the project has potential to play an important mega-regional role in connecting California High Speed Rail Authority (CHSRA)'s north-south HSR from the San Francisco Bay Area to Los Angeles with XpressWest's east-west HSR to Las Vegas. In conjunction with the CHSRA and XpressWest lines, the HSR component of the HDC would provide a critical connector for high-speed public transit between Las Vegas and northern, central, and southern California.

2. DESCRIPTION OF ALTERNATIVES

2.1 No Build Alternative

Under the No Build Alternative, there will be no ground broken for the highway connecting Palmdale and Apple Valley. The route that would have seen construction will remain uninterrupted desert, with no development of alternative energy solutions. This may lead to the following detrimental impacts:

1. Traffic congestion on I-210, I-10, SR-60, and SR-138 will remain at its current level, and likely worsen in coming years as the area experiences increases in population and commercial freight.
2. Economic development in the region will face insufficient energy and transportation infrastructure.
3. Expansion of goods movement, particularly related to the Inland Port at SCLA, will require less proactive, less environmentally conscious, and more expensive alternative solutions for commercial freight in the future.
4. Revenue and financial management opportunities from the green energy corridor, as well as from an Enhanced Infrastructure Financing District (EIFD), may become unavailable.
5. Improved efficiencies from currently available regional collaboration and private-public partnerships will be forgone.
6. The State of California will miss out on a critical urban-adjacent greenfield opportunity for innovation and new technology.
7. Future build-options are unlikely to comprehensively include the current model's dynamic considerations of environmental interests, goods movement, economic development, population growth, local community dynamics, regional priorities, long-term financial health, collaborative sustainability and cross-sector investment.
8. Northern, central, and southern California will continue to lack a passenger rail option for travel to and from Las Vegas.

9. Future changes to policy and regulations may cause additional costs and impacts that could be detrimental to components of the project and/or one of the many external benefits of the project.
10. Future need for re-establishment of key relationships, loss of partnership with related projects, CEQA re-filing, seeking new institutional buy-in, re-alignment with local, state and federal policies, and restarting planning to address the inevitable need for improved transit in the high desert will become increasingly expensive with the passage of time.

2.2 Construction of the HDC - Build Alternatives

The four build alternatives are freeway with HSR, freeway without HSR, tollway with HSR, and tollway without HSR. Every build alternative includes considerations for green energy production and transmission as well as pedestrian and bike paths. The four options can be easily represented as follows:

	Freeway	Tollway
with High-Speed Rail	FWY w/HSR	TWY w/HSR
without High-Speed Rail	FWY w/o HSR	TWY w/o HSR

As it relates to vehicular traffic, all four build alternatives of the HDC would connect SR-14 and SR-18. This project would facilitate the movement of goods and people throughout southern California, creating more direct shipping and traveling lanes. In consideration of current traffic concerns and the potential for future growth, this multi-modal project would also help relieve congestion on several existing roadways, including I-210, I-10, SR-60, and SR-138.

The High Desert Corridor Traffic Study, published in 2014 based on data collected by Parsons Transportation Group between 2008 and 2011, concluded that the HDC build alternatives are crucial for avoiding severe traffic congestion in the region. Level of Service (LOS) is used to determine the performance of an intersection or roadway. It measures traffic conditions by considering factors such as speed and travel time. There are six alphabetized levels of LOS ranging from A (traffic with very little or no delay) to F (traffic flow exceeds freeway capacity).

The study revealed that the road network of SR-18, SR-138, I-15, U.S. Route 395, and SR-14 allowed for traffic conditions between 2009 to 2011 mostly at a LOS of D or better during peak hours. However, over half of the 89 intersections studied were at a LOS of C or worse during evening peak hours. Given the rapid population and employment growth in the region, traffic conditions were expected to worsen significantly between 2010 and 2020. As of the writing of this report, most of that decade has passed by without material progress on the HDC. The HDC Traffic Study's projections for traffic in 2020, along with a pattern of public concerns regarding traffic in recent public outreach, suggest that worsening traffic conditions have already begun to emerge in 2017.

Under the No Build Alternative, it is anticipated that 19 percent of the intersections studied will operate at LOS E or F by year 2020. Given that the present year of 2017 is closer to 2020 than the actual data from 2008-2011, there is reason to be concerned that many intersections are approaching LOS E or F. By the year 2040, 38 percent of the intersections studied will operate at LOS E or F. The study also used a screenline analysis to determine that an approximate average of 66,000 vehicles per day crossed the County line between Los Angeles and San Bernardino in 2010. This number is expected to double to 133,500 by the year 2040, with each of the current roadways accommodating between 16,000-45,000 vehicles per day.³ The HDC roadway component will directly accommodate a significant portion of growth in vehicle volume and in turn reduce traffic on the other road networks. In addition, the HDC's commercial freight conscious design and non-roadway build components can be expected to further alleviate traffic both from regional roads as well as from east-west transitways further south in Los Angeles County. Consideration of commercial freight and emerging related technologies into the HDC design is intended to increase overall transit efficiency and thus prevent roadway congestion locally and regionally. Further delays to constructing the HDC will lead to further traffic concerns for both passenger travel and commercial freight.

In parallel to the roadway, HSR options could reduce traffic significantly by offering passengers an effective non-vehicular option. Additionally, the HDC pedestrian and bike pathways may further encourage use of public transit and other forms of non-vehicular travel, and thus have a positive impact on future traffic conditions.

³ High Desert Corridor Traffic Study, http://www.dot.ca.gov/d7/env-docs/docs/hdc/The%20Human%20Environment/HDC%20Traffic%20Study%20Rpt_Vol1_FINAL_2of2-June%202014.pdf

The comparison of tollway and freeway build-options is critical to the HDC's financial model. This debate between a freeway and tollway is often represented through either a short-term political or a long-run economic lens. Politically, the public may prefer a freeway for reasons of perceived self-interest and/or addressing social disparities. Economically, a tollway can provide a revenue stream that would allow the HDC to attract private investment to facilitate overall funding, consider private management, and create an ongoing revenue stream for infrastructure maintenance.

Caltrans District 7 worked with Parsons Transportation Group to produce a 2016 Community Impact Report, which mentions the perceived negative impact of tollways on low-income individuals. However, it goes on to describe the lack of any demonstrated understanding of the impact of tolling on transportation equity.⁴

“Studies conducted on tolling in California showed that economically disadvantaged drivers use toll lanes, voluntarily and are not necessarily excluded, although more frequent use is often exhibited by higher-income drivers. The studies revealed that low-income drivers approved of the express toll concepts, similar to opinions of higher-income households. Case studies on two toll facilities – I-680 in the San Francisco Bay Area and SR-91 in southern California – revealed no substantive differences of opinion on tolling among members of the public based on their ethnic or income breakdown, nor was equity a critical issue identified by stakeholder focus groups or in surveys conducted for either tolling project.”

This same Caltrans report also highlights the value of such tollways to local jobs and businesses. According to a 2006 study by Law and Economics Consulting Group,

“Simply the savings in travel time for the on-the-clock employees (e.g., sales people, truck drivers, delivery people, etc.) along with the decreased use of expensive fuel clearly provide bottom-line benefits for businesses, particularly small businesses.”

Additionally, the development of an HDC tollway is additive in nature, and thus would reduce the traffic on existing non-tolled alternative routes between Palmdale and Victorville.

⁴ High Desert Corridor Community Impact Report, <http://www.dot.ca.gov/d7/env-docs/docs/hdc/The%20Human%20Environment/HDC%20Community%20Impact%20Assessment-March%202016.pdf>

Business plan considerations by LA Metro's Planning and Programming Committee highlight the financial feasibility of the HDC by including a toll concession with upfront public funding. However, the 2012 Interim Business Plan only allows for toll concessions along the 50 miles between Palmdale and Victorville. Leaving these east and west portions untolled contributes to an estimated funding gap of \$1.5 to \$2.3 billion in capital costs. (See section 8.3 for further exploration of how this funding gap may be addressed through EIFD strategies.)

It is notable that the White House's 2018 budget includes federal infrastructure priorities to incentivize use of congestion pricing, liberalize tolling, allow increased private investment in transitway-adjacent development projects, reduce redundant governmental approval, and allow governmental entities increased flexibility in asset management and operational maintenance. Planning the HDC to incorporate tollway options alongside freeway options, through a High Occupancy Toll (HOT) Lane system, may provide a way to balance political and economic realities. Further research and discussion are required to determine the best model for the vehicular right of way, given both political and financial considerations. Under all build-options, an Equity Assessment Analysis is intended by Caltrans during the design phase of the project.

The two alternatives that include HSR as a key component are preferable for a range of environmental, social, economic, and transit reasons. The environmental impacts and efficiency of HSR are particularly salient when a Life-Cycle Inventory (LCI) is considered. (See High Desert Corridor Green Energy Report conducted by Infra Associates for further detail on the application of Life-Cycle Analysis to the HDC.) Each HDC build alternative with HSR would provide material benefits to passenger travel, commercial freight, environmental sustainability, economic development, employment, regional collaboration, and cross-sector investment. For the purposes of this report, the discussion will focus on the build alternatives that include HSR regardless of whether the vehicle portion is designated as freeway, tollway, or some combination thereof.

Inclusion of HSR adds value on several fronts, one of which is the completion of a passenger rail pathway from Los Angeles to Las Vegas. Establishing this corridor could significantly reduce airplane ridership and traffic between the two cities while creating a more efficient pathway for trucking, passenger cars and renewably powered vehicles. These impacts combine to significantly reduce the carbon footprint of the popular Los Angeles to Las Vegas travel route, while simultaneously generating a long-term revenue stream for the HDC.

Alternative energy fueling stations would make it possible for renewably powered commercial and passenger vehicles to travel the entire Los Angeles to Las Vegas distance by providing access to electric, hydrogen cell and/or compressed natural gas refueling options. This may prove to be of particular value to regional bus systems and clean-powered trucking routes. Further research and outreach may reveal a deeper understanding of such impacts.

Accompanying bike and pedestrian paths would reduce car usage by providing would-be motorists a convenient and direct route between and within the five neighboring cities. Cyclists could carry their bicycles onto buses, then use these paths to commute from on-ramps to their final destinations, thus increasing public transit ridership and contributing to a healthier society. This is an explicit goal of several of the region's cities as well as both Los Angeles and San Bernardino Counties.

The undertaking of the HDC will have considerable positive regional impacts on collaboration, long-run financial management, economic development, and job creation. Each of the build alternatives, particularly when accompanied by a P3, offers a transformative benefit to the region from households to cities to county levels. In addition, completion of the HDC advances California's statewide environmental and transit objectives. If pursued in a timely and strategic fashion, the HDC can be further bolstered by federal priorities for infrastructure development.

High Desert Corridor Region



Figure 1: High Desert Corridor Region Map (source: https://media.metro.net/projects_studies/hdc/images/map_corridor_hidesert.pdf)

2.3 Mitigation Suggestions

The HDC aims to have a net-zero energy impact through the offsetting of all energy consumed along the right of way. Inversion of energy produced on-site for direct on-site use was explored, but is unlikely due to prohibitive costs. (See HDC Green Energy Report for more detail on energy offset vs. on site use.)

The combination of proposed alternative energy solutions would allow for all ongoing energy-dependent operations (such as HSR and streetlights) to be offset via production of an equivalent or greater amount of renewable energy. Such a model will make the green energy corridor one of the most environmentally responsible infrastructure projects of its kind.

To provide comprehensive mitigation of environmental hazards, the HDC will seek to use sustainable construction and implementation practices to ensure that all components of the project meet or exceed all industry standards for such infrastructure.

3. ENVIRONMENT, ZONING, AND SPECIAL DISTRICTS

3.1 Description of Area Biomes and Climate

The region being considered for construction is exceptionally dry, receiving an average of seven inches of precipitation per year according to U.S. Climate Data.⁵ The proposed route comprises a portion of the western edge of the Mojave Desert, shielded from sea-forming weather formations by its leeward position north of the San Gabriel Mountains. For this reason, water-conscious design, construction, operation and maintenance will be incorporated throughout the HDC. Such needs are clearly and consistently highlighted in local and regional planning documents.

The tract of land between Palmdale and Apple Valley is normally sunny and warm, making it an ideal location for solar energy development. According to data provided by the National Renewable Energy Laboratory (NREL), the average daily total solar resource in San Bernardino County is among the highest in California with an annual average of 5.63 kWh/m²/day.⁶ When harnessed to an appropriate degree, this solar power can become the principal source of offsetting the entirety of the HDC's energy footprint.

⁵ U.S. Climate Data, <http://www.usclimatedata.com/climate/palmdale/california/united-states/usca0829>

⁶ Solar Energy Local, <https://solarenergylocal.com/states/california/san-bernardino/>

3.2 Regional Land Use and Zoning

The current proposed path of the HDC is primarily unoccupied desert within LA and San Bernardino Counties. Because it is one of the nation's only urban-adjacent greenfield plans for such a transitway, the project can serve as a testing ground for a multitude of technologies and innovations aimed at reducing environmental impacts, generating and transmitting clean energy, improving transit, and more efficiently moving commercial freight. In addition, the dearth of brownfield sites along the potential transitway means that acquiring the necessary right of way to plan and construct the HDC will be simpler than if the project sought to pass mostly through previously developed areas.

Key ordinances and planning in Los Angeles County and San Bernardino County provide the HDC with a valuable, albeit nuanced, opportunity for development of combined energy and transit infrastructure.

The 2016 Renewable Energy Ordinance (REO) from Los Angeles County set goals of fostering small-scale and structure-mounted alternative energy projects to reduce the reliance on more intrusive ground-mounted and utility-scale projects. REO also seeks to regulate ground-mounted alternative energy solutions to address growing community concerns about their environmental impacts.⁷ The REO provides a streamlined permitting process for structure-mounted projects, such as rooftop solar paneling. The goal is to encourage small-scale projects for on-site energy usage. This legislation places new requirements upon utility-scale projects, including placing transmission lines underground and taking measures to reduce fugitive dust. Additionally, all ground-mounted utility-scale solar structures are now prohibited under the REO in Significant Ecological Areas (SEAs) and Economic Opportunity Areas (EOAs). Using the scope outlined in the completed CEQA filing, it will be important for the HDC to work closely with REO to ensure that the green energy corridor is in alignment with the policy directives as well as the underlying intentions of REO and Los Angeles County's General Plan. By doing so, the HDC can play a critical role in responsibly developing renewable energy generation and transmission in the high desert.

⁷ Los Angeles County Renewable Energy Ordinance, <http://file.lacounty.gov/SDSInter/bos/supdocs/109934.pdf>



According to a 2013 San Bernardino County Ordinance amending Chapters 84.29 and 810.01 of the County Development Code, new solar facilities will only be sought in areas that are not desirable for the development of communities. New projects must not infringe upon scenic desert locations that make San Bernardino a destination for tourists, or must be near enough to pre-existing disturbances (such as power plants and dams) that they do not further detract from the natural landscape. Any proposed facility must not be built upon areas slated for future infrastructure development, and must not drain groundwater supplies from residential areas. Projects should also be built as close as possible to existing electrical infrastructure, to utilize the existing right of way, power poles, and utility corridors, while minimizing ground disturbance.⁸ The completed CEQA filing and greenfield nature of the right of way provide a robust starting point with San Bernardino County on how and where to develop clean energy generation and/or transmission infrastructure as a component of the HDC.

Specific land use designation of parcels along the route, particularly at off-ramps, will need to be identified in the future to allow for appropriate service development and potential industrial and renewable energy development. Zoning along the route will need to be researched and addressed at a more detailed level to advise specific policy and planning.

⁸ San Bernardino County Development Code,
<http://cms.sbcounty.gov/lus/planning/developmentcode.aspx>

High Desert Corridor



Figure 2: High Desert Corridor Variations and Approximate Locations (source: https://media.metro.net/projects_studies/hdc/images/map_corridor_hidesert_eng.pdf)

3.3 Future Zoning and Special District Considerations

Given the number of communities and municipalities, as well as the pace of economic and population growth, collaboration between regional zoning efforts and special districts may prove critical both to the HDC and to the future of land use throughout the region.

Concentration of population ranges greatly between urban, suburban, and rural areas in the high desert. Through concurrent planning with zoning agencies and special districts, the HDC could provide a backbone for development that would prevent sprawl. Zoning can demarcate and reserve the requisite right of way, thus saving the project considerable local costs. In the absence of such concurrent planning, unforeseen housing development could take place within the right of way, the future removal of which would have negative economic and political impacts. Special districts such as water, fire, and lighting can assist in providing infrastructure to plan and supply development along the right of way.

Expensive consequences can easily arise from a lack of concurrent planning. In some scenarios, housing can become so dense that congestion suffocates mobility, which leads to a scenario where the only feasible right of way requires the purchase and demolition of housing. Similarly, efforts to build out HSR between major urban areas can be significantly impacted by housing, retail, and light manufacturing that is within the right of way. If the HDC can work intentionally with local zoning and special districts, then costly problems such as these would be mitigated considerably.

Specifically within the HDC, changes to zoning and special districts can have a significant impact on financing and economic development. If a tollway build-option is utilized, zoning will have a significant impact on traffic generators, which determine toll revenue. If an EIFD is formed, zoning would interact considerably with special districts in determining the planning, economic and financial models. Since future high density is generally critical to the formation of an EIFD, zoning can play a considerable role in facilitating such a development plan.

Zoning can have a notable impact on how the HDC's energy and transit infrastructure is utilized. Ordinances tied to zoning can require use and/or sale of excess renewable energy along the HDC, proceeds of which could finance the project, provide an ongoing revenue stream, and help offset energy impacts of the HDC's infrastructure. The efficiency of vehicle miles traveled can be impacted significantly by zoning that promotes jobs within the high desert. In this scenario, individuals who currently commute to distant jobs would be able to seek and find employment more proximate to their residence. In the past, logistics and manufacturing have been large economic drivers in the region. However, due to automation, many of those jobs are shifting to more service-oriented roles. Further study is required to determine what types of jobs, and corresponding zoning, would best support local hiring.

4. RELEVANT PLANS, POLICIES, AND LEGISLATION

4.1 Federal

Due to the current federal administration and California's comparatively more stringent environmental laws, any federal legislation governing emissions levels or environmental protection within this region would be met by adhering to California's regulations.

As it relates to infrastructure development, the 2018 budget put forth by the White House established key principles for making targeted federal investments, encouraging self-help, aligning infrastructure investment with entities best suited to provide sustained and efficient investment, and leveraging the private sector. The current HDC plan has potential to align with federal initiatives in each one of these areas. As specific policies, material resources, and changes to administration of these policies and resources become available from the federal administration over time, the HDC is well-positioned to benefit from national efforts to invest in infrastructure through improved cross-sector collaboration, sustainable asset management, and increased efficiency and effectiveness. Further discussion of these opportunities, particularly through expansion of Transportation Infrastructure Finance and Innovation Act (TIFIA) and Private Activity Bond (PAB) options, along with use of Railroad Rehabilitation and Improvement Financing (RRIF), can be found below in this report's discussion of Financing Options in Section 8.

4.2 California State Legislation

California state-level policy is highly aligned with the construction of the HDC's green energy producing, regionally valuable, and responsibly built infrastructure. The following is an overview of relevant policies, based largely on information from California Environmental Protection Agency's Climate Change Unit.

AB 32 - September 27, 2006 - The California Global Warming Solutions Act of 2006 dictates that, by 2020, the statewide greenhouse gases emissions levels must be equivalent to or lower than the statewide emissions levels in 1990.⁹

SB X1-2 - April 12, 2011 - This legislation mandates that 33% of the total electricity sold to retail customers in California per year be generated via specified renewable energy means by December 31, 2020. This goal applies to all retailers of electricity in California, including community choice aggregators, publicly owned utilities, investor-owned utilities, and electricity service providers.¹⁰

SB 350 - October 7, 2015 - This legislation aims to increase the retail sale of renewable electricity to 50% of all electricity sold within the state by 2030, and to double the energy efficiency savings for natural gas and electricity end users by 2030.¹¹

⁹ Assembly Bill 32, http://www.leginfo.ca.gov/pub/05-06/bill/asm/ab_0001-0050/ab_32_bill_20060927_chaptered.pdf

¹⁰ Senate Bill X1-2, http://www.leginfo.ca.gov/pub/11-12/bill/sen/sb_0001-0050/sbx1_2_bill_20110412_chaptered.html

¹¹ Senate Bill 350, https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350

SB 32 - September 8, 2016 - The California Global Warming Solutions Act of 2016 continues the mission of its predecessor, extending the goal to emissions 40% below 1990 levels, achievable by 2030.¹²

AB 398 - July 17, 2017 - Extended current cap-and-trade program expiration date from 2020 to 2030, including some detailed policy modifications and a potential constitutional amendment in 2018 that may require a two-thirds vote in 2024 to continue spending cap-and-trade revenues.¹³

SB 354 (Introduced February, 2017) – If approved, this bill would mandate that utilities produce 100% of their electricity from renewable energy sources by 2045.¹⁴

4.3 Los Angeles County

Los Angeles County published its current general plan in 2015, highlighting a variety of transit and economic objectives that would be furthered by the construction of the HDC. It has placed a priority on infrastructure development by aiming to utilize capital improvement plans, P3s, and funds from various state and federal agencies to help finance projects.

According to the general plan, 74% of residents in the unincorporated parts of Los Angeles County drive to work alone, while only 6% utilize public transit.¹⁵ The County seeks a multimodal and creative solution to reduce the number of solo drivers and encourage use of its transit and bike/walkway options, thereby also supporting the connection of regional and community-level transportation systems via new roadway networks.

A broad range of financing systems would be considered to complete projects that facilitate these goals, including congestion pricing, bonding, increasing parking costs, and fair share programs. The HDC would provide driving, walking, cycling, bus and rail options that would promote the use of public transit while improving the movement and security of trade in the region. It is beneficial that the Los Angeles general plan previously designated most of the HDC as a vehicular road right of way. The HDC project's scope has since built upon this to include highway, rail, bike, pedestrian, and green energy. By planning a multimodal transit and green energy corridor along the existing right of way, the land procurement process will be simplified for design and construction for both the HDC as well as on adjacent land.

¹² Senate Bill 32, https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB32

¹³ Assembly Bill 398, https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB398

¹⁴ 100% by 2045 renewable energy bill introduced in California, <https://www.pv-magazine.com/2017/02/21/100-by-2045-renewable-energy-bill-introduced-in-california/>

¹⁵ Los Angeles County General Plan, <http://planning.lacounty.gov/generalplan/generalplan>

Los Angeles County's intention to only undertake sustainable ventures is also relevant. Under this intention, projects that utilize solar and other energy-efficient and environmentally friendly mechanisms will be more highly regarded than those that do not. The general plan encourages investment in environmentally sensitive transportation design, including hydrogen gas stations, Intelligent Transportation Systems (ITS), and electric car plug-in ports. The HDC is committed to the development of a green energy corridor that would allow for the installation of some combination of these features along the right of way. Los Angeles County would therefore receive the benefit of augmenting its transportation infrastructure, improving its public transit viability, and furthering connectivity with other transportation systems; all while advancing toward its goals for environmental protection, green energy, and sustainability.

Within Los Angeles County, the Antelope Valley Area Plan further describes the local intentions of the town and country areas outside the more urban cities of Palmdale and Lancaster.¹⁶ Much of this plan reaffirms the general planning principles of the countywide plan, with a focus on preserving the Antelope Valley's rural character, protecting agricultural assets, and enhancing resident quality of life.

4.4 San Bernardino County

San Bernardino County is currently in the process of updating their general plan. The current version, adopted in 2007 and revised multiple times since then, largely focuses upon improving infrastructure without damaging the environment. By and large, the plan seeks to promote projects that encourage cooperation among, and benefit to all, jurisdictional entities operating within the County. These entities include incorporated cities, regional associations (e.g. SCAG and SANBAG) and various local, state, and federal organizations.¹⁷

Transit-related projects are viewed as a primary means by which the county can support economic development and encourage new businesses of all sizes, thus resulting in consistent population growth, employment opportunities, and improved quality of life. The county government is putting heavy emphasis on improving its capacity to provide transportation for all its residents.

¹⁶ Antelope Valley Area Plan, <http://planning.lacounty.gov/tnc/documents/>

¹⁷ San Bernardino County General Plan, <http://www.sbcounty.gov/Uploads/lus/GeneralPlan/FINALGP.pdf>

As the county within the fastest growing region of California, San Bernardino's population growth rate requires that the county anticipate and accommodate forthcoming economic development by investing in infrastructure and creating long-run capital management plans.¹⁸ The HDC could play an important role toward addressing financial, transportation, environmental, energy, and economic goals.

A public outreach process allowed San Bernardino residents to identify their concerns related to growth and development. Information was gathered from residents at several community meetings held within the county.¹⁹ The concerns highlighted by public participation were central to the formation of San Bernardino County's General Plan. Many San Bernardino residents felt that traffic was one of the most pressing issues facing the county, with many believing that improved rail and bus services would help to alleviate this congestion. Many residents expressed concerns about the growing population density in the region and emphasized the need for additional roads in the county. Additionally, access to jobs was a concern of the residents, including both job availability and infrastructure improvements for mobility. As such, the county is committed to providing a safe, functional, and convenient transportation system that will be coordinated with land use to reduce traffic and make sure that all areas have sufficient transportation.

In order to address both commercial and residential needs, development must be multi-modal and operate at regional, county-wide, community, and neighborhood levels. By providing a full array of transit options, the HDC would amplify San Bernardino's business reputation as a "Transcontinental Hub." This would be of particular value to attracting and expanding businesses by improving distribution corridors and attracting users with multi-modal needs, such as trucking, warehouse, and distribution opportunities.

The HDC would reduce the county's environmental impact by reducing vehicular dependency, improving public transit options, offering bike and pedestrian paths, offsetting power consumption through green energy generation and transmission, providing fueling stations for renewably powered vehicles, and improving regional collaboration. The county's general plan discusses at length its desire to conserve natural resources, comply with environmental expectations, promote safe energy extraction, and develop alternative energy opportunities; all of which will be achieved with the HDC's proposed approach.

¹⁸ Population: Inland Area Still Among State's Fastest-Growing, <http://www.pe.com/2016/05/03/population-inland-area-still-among-states-fastest-growing/>

¹⁹ San Bernardino County General Plan, <http://www.sbcounty.gov/Uploads/lus/GeneralPlan/FINALGP.pdf>

San Bernardino County is currently in the process of revising and updating their County General Plan. Initial review of draft documents, particularly the Renewable Energy and Conservation Element, reveals an ongoing commitment to balancing economic development with environmental stewardship. There appears to be an increasing interest in DER, especially household solar and community-facing renewable energy. If the environmental interests of the public and the responsibilities of regional utility companies can be synthesized into the design of the HDC, they can play a critical role in supporting the security, safety, cost, and reliability dynamics of such a distributed energy system

4.5 Palmdale

The City of Palmdale released its current general plan in 1993, citing primarily its desire to promote transportation accessibility and reduce vehicle miles travelled.²⁰ Palmdale's goal of adopting land use and development that encourages economic diversity and growth will be supported by the array of transportation opportunities that the HDC provides. The proposed corridor will travel near the city's downtown area, making Palmdale more of a hub for movement in the southern California region by increasing its connectivity with other locations near Los Angeles. Palmdale's plan includes cooperating with Caltrans, as well as other regional, state, and federal organizations and jurisdictions, to upgrade the network of roads within the region and establish standards for regional highways. The city is open to exploring a variety of grant and financing alternatives to support development of these thoroughfares. The bike and walking paths of the HDC proposal will also help to satisfy Palmdale's adherence to local and statewide air quality standards by encouraging non-vehicular transportation, while the green energy corridor will further reduce the environmental footprint of the project within the city boundaries.

4.6 Lancaster

Adopted in 2009, Lancaster's general plan directly describes its intention to promote a transportation corridor in the high desert that will directly connect Interstates 5 and 15 to the city.²¹ Under the current HDC proposal, Lancaster would be more directly connected to I-15 by the new highway, and I-5 would remain easily accessible via SR-138. Additionally, Lancaster notes its desire to utilize its unique desert climate to develop and integrate green energy technologies and conservation efforts into its planning.

²⁰ City of Palmdale General Plan, <http://www.cityofpalmdale.org/Portals/0/Documents/Business/Planning/General%20Plan/03-LandUse.pdf>

²¹ City of Lancaster General Plan, <http://www.cityoflancasterca.org/home/showdocument?id=9323>

The City of Lancaster has been instrumental in paving the way for a green energy community. The city's goal of becoming the nation's first "Net-Zero Energy" community is well underway. What began with a requirement for new homes to have solar paneling on rooftops has since expanded to require all new home construction to include two watts of rooftop solar for every square foot of the home. The recently passed city ordinance promotes a net-zero environmental impact as well as energy cost savings for its residents. The price of these solar energy systems will be included in the sales price of newly constructed homes, which allows builders to leverage technical expertise and economies of scale for solar installation. This movement is in line with discussion in California legislation which extends the goal to emissions 40% below 1990 levels, achievable by 2030.²²

Additionally, power purchase agreements are in place, allowing private companies to build solar arrays and sell the energy produced to a CCA. The city has created a not-for-profit CCA, called Lancaster Choice Energy (LCE), to further efforts toward becoming a major hub for solar energy generation and distribution. LCE is the first CCA of its kind in California, which allows local control over the type, source, and pricing of the energy it provides to residents and businesses.²³ Currently, LCE contracts with private companies to procure energy but plans on incorporating locally generated power in the future.

Transmission, distribution, and delivery of energy within Lancaster is handled by SCE. Within this agreement, LCE not only helps the environment but also creates jobs and provides an additional revenue stream for the city. Lancaster residents can now choose their own source of energy. ClearChoice is the most cost effective option with 35% renewable energy. SmartChoice offers its residents 100% renewable energy at a competitive rate. Finally, PersonalChoice allows residents who produce their own energy to sell any excess energy back to LCE. Participants in this program can earn credits for power that is provided back to the grid. If residents provide more energy to the grid than they consume in a given billing period, LCE will issue a credit to the customer. Residents can also choose to opt out of the program and remain fully with SCE for their energy needs.²⁴ Development of a green energy transmission line within the HDC right of way, particularly with direct involvement of SCE, could provide a valuable resource for advancement of LCE's objectives as well as expansion of similar CCA programs across the high desert.

²² Case Study: Lancaster Zero Net Energy Goal, <https://energycenter.org/case-study-lancasters-zne-goal>

²³ Lancaster Community Choice Aggregation, <http://www.cityoflancastrerca.org/about-us/sustainability/alternative-energy/lancaster-choice-energy>

²⁴ Lancaster Choice Energy, <http://www.lancasterchoiceenergy.com/>

In 2013 BYD joined forces with the City of Lancaster to open two manufacturing facilities for production of large scale batteries and electric city buses. Per the Antelope Valley Transit Authority (AVTA), a fully electric fleet is underway. The AVTA is doing away with diesel powered buses and anticipates being 100% green by end of 2018, making them the first of its kind in the nation. These buses will have both hard wired and wireless charging capabilities, allowing these zero-emission buses to operate with routes and logistics like the previous fleet of diesel buses.²⁵ The greenfield nature of the HDC right of way, as well as immediately adjacent areas, provides miles of opportunity for accessible electric bus and charging infrastructure.

For its visionary work in the field of renewable power, Lancaster was awarded Wolfgang Neumann's Energy World Globe Award in 2012, winning first place in the "Fire" category.²⁶ The HDC's green energy corridor approach, replete with solar paneling to take advantage of the copious sunlight, transmission infrastructure, alternative energy vehicle charging stations to reduce emissions, and water management systems to salvage the sparse precipitation, could complement Lancaster's already outstanding green energy efforts, helping get the city closer to its goal of being one of the world's first "Net-Zero Cities." The complementary presence of pedestrian and bike trails along the corridor would help the city achieve its goals of emphasizing healthy living while reducing vehicular traffic.

4.7 Adelanto

The City of Adelanto adopted its most recent general plan in 1994, focusing on environmental mitigation techniques and inter-jurisdictional participation as a means to foster growth. Adelanto would like to promote the use of alternative forms of transportation to lessen the frequency of single-passenger car trips for local and regional travel, while expanding the existing network of running and bike trails. Adelanto is ready to work with San Bernardino County, Caltrans, and other jurisdictional organizations to orchestrate and find creative financing for infrastructure projects.²⁷ The HDC could supplement each of these goals, enhancing Adelanto's accessibility and reducing harmful local emissions.

²⁵ BYD and the City of Lancaster Announce Lancaster's Energy Module and Electric Bus Manufacturing Facilities, <http://www.byd.com/usa/news-posts/byd-and-the-city-of-lancaster-announce-lancaster-energy-module-and-electric-bus-manufacturing-facilities/>

²⁶ City of Lancaster Wins Prestigious World Energy Globe Award – First in Category, Third in World, <http://www.cityoflancasterca.org/Home/Components/News/News/3020/1952?arch=1&npage=>

²⁷ City of Adelanto General Plan, <http://www.ci.adelanto.ca.us/DocumentCenter/Home/View/221>

Although there is no immediate impact to the HDC, it is notable that Adelanto has pioneered local zoning policy for production of medical marijuana. City Ordinance 545, passed by Adelanto's City Council in May 2016, allows for hundreds of underutilized acres of land to be utilized to produce marijuana.²⁸ This so-called "Green Zone" is projected to produce sufficient tax revenue to balance the city's severely troubled budget in as few as one or two years. In addition, this land use policy intends to generate economic stimulus and create local jobs.

4.8 Victorville

Victorville released its current general plan in 2008 with a focus on economic concerns for land use and circulation policies. The city stressed creating improved vehicular and multi-modal access to satisfy the transportation infrastructure needs of current and future passenger travel as well as movement of goods.²⁹ The HDC would facilitate and increase the mobility of both passengers and goods through the city, in a convenient and cost-effective manner. The HDC corridor would allow Victorville to connect effectively with other regional roadways, and the green energy components would limit the environmental effects of the increased through-traffic.

The SCLA is a critical regional asset located within Victorville. The SCLA is a designated Foreign Trade Zone, meaning it can operate outside of many of the regulations and tariffs imposed by the federal government. Thus, many large companies that are involved in international trade have chosen to move operations to SCLA to take advantage of the unique economic advantages provided by the airport. The HDC will further attract private business to the area by facilitating trade routes and making SCLA more accessible for all entities that operate on the west coast.³⁰ Since Victorville actively seeks multi-faceted financing options, the HDC's financial model, including EIFDs, usage fees, and a variety of green energy production facilities, will provide the local government with a diverse portfolio of revenue generation into the future.

²⁸ City of Adelanto Ordinance No. 545, <http://www.ci.adelanto.ca.us/DocumentCenter/Home/View/544>

²⁹ City of Victorville General Plan, <http://www.victorvilleca.gov/uploadedFiles/CityDepartments/Development/GeneralPlan.pdf>

³⁰ Southern California Logistics Airport, <http://victorvillecity.com/airport/>

4.9 Apple Valley

According to its 2009 general plan, Apple Valley has already set about reserving right of way in the future area of the HDC. The town notes that the presence of walking paths, bike lanes, and off-street trails is especially important along major roadways in the community. Apple Valley also set out a series of objectives that it believes to be important for operating a sustainable transportation system. These include: network connectivity, operational balance, emissions reduction/energy efficiency, pedestrian accommodations, transit readiness, and quality public space.³¹ Upon completion, the HDC will offer considerable progress toward each of these local objectives.

5. REGIONAL PROFILES AND IMPACTS

A study by London's Centre for Economics and Business Research, along with INRIX, found that the average household in Los Angeles loses \$6,000 per year to traffic, for a total of approximately \$23 billion in losses annually. By creating jobs and reducing traffic, the economic impact of the HDC could profoundly change the lives of companies and households throughout the high desert region.

The following is an overview of local profiles and impacts within the high desert region. Demographic information below, when not indicated otherwise, is sourced from the 2010 U.S. Census.

³¹ Apple Valley General Plan, <http://www.applevalley.org/home/showdocument?id=13926>

5.1 Palmdale³²

Population - 157,356

Demographics - 24.5% white, 14.8% African-American, 4.3% Asian, 54.4% Hispanic or Latino (note: this distinction is not mutually exclusive)

26.2% foreign born persons

14.8% college educated

58.9% labor force participation

Mean travel time to work: 40.7 minutes

Median household income: \$52,392

Per capita income: \$19,217

Persons in poverty: 21.3%

12,676 firms

The HDC could allow Palmdale to reduce its commuters' mean time to work, which is well above both the national average of 25 minutes and the California average of 28 minutes. Increased mobility could also provide increased career opportunities, which will in turn decrease the poverty rate.

Intentions:

Build ramps 1, 2, and 3 at 20th St. E., 30th St. E., and 50th St. E. respectively. Build HSR, roadway, pedestrian path, bike path, and energy transmission line along Palmdale Blvd. running east-west from SR-14 through most of the City of Palmdale. Further discussion of tollway along the entirety of the HDC's right of way, including within Palmdale's western section of the project.

Consequences:

Environmental impact of build and operation/maintenance.

Impacts:

Residential job creation, traffic reduction, lowered commute times, improved recreational options, economic stimulus, and increased land values; increased tourism to destinations such as Blackbird Airpark and DryTown Water Park; improved energy access for city of Palmdale, SCE and LADWP; improved commercial freight access for Palmdale Regional Airport and U.S. Air Force Base Plant 42.

³² U.S. Census Quickfacts, City of Palmdale, <https://www.census.gov/quickfacts/table/RH1125215/0655156,00>

5.2 Lancaster³³

Population - 160,106

Demographics - 34.2% white, 20.5% African-American, 4.3% Asian, 38.0% Hispanic or Latino (note: this distinction is not mutually exclusive)

13.3% foreign born persons

15.1% college educated

52% labor force participation

Mean travel time to work: 31.1 minutes

Median household income: \$47,225

Per capita income: \$18,898

Persons in poverty: 23.5%

12,627 firms

The enhanced mobility offered by the HDC could help to boost Lancaster's per capita income, which currently rests more than \$11,000 less than the average for California.

Intentions:

While the HDC has no immediate land use impacts within the City of Lancaster, the development of the project on nearby land will have considerable consequences and impacts on Lancaster.

Consequences:

Environmental impact of build and operation/maintenance.

Impacts:

Residential job creation, traffic reduction, lowered commute times, improved recreational options, economic stimulus, and increased land values; increased tourism traffic to places such as the Aerospace Walk of Honor, The Hangar sports stadium, and the California Poppy Festival at Lancaster City Park; integration with Lancaster's Master Plan of Trails and Bikeways; improved commercial freight access for nearby Palmdale Regional Airport and U.S. Air Force Base Plant 42; improved energy access for city of Lancaster and SCE. This may be of particular value to the LCE plan, in seeking to make Lancaster a net-zero energy producer/consumer.

³³ U.S. Census Quickfacts, City of Lancaster,
<https://www.census.gov/quickfacts/table/RH1125215/0640130,31109,0655156,00>

5.3 Adelanto³⁴

Population - 33,391

Demographics - 17.0% white, 20.5% African-American, 1.9% Asian, 58.3%

Hispanic or Latino (note: this distinction is not mutually exclusive)

20.9% foreign born persons

6.4% college educated

46.1% labor force participation

Mean travel time to work: 39.1 minutes

Median household income: \$33,298

Per capita income: \$10,538

Persons in poverty: 40.3%

2,426 firms

Adelanto is the most economically disadvantaged of the four cities through which the HDC would pass. It would stand to benefit directly from the increased connectivity and job opportunities created by the project, helping to lower its 40.3% poverty rate and increase its per capita income.

Intentions:

Build ramps 12 and 13 at Koala Rd. and U.S. 395 respectively. Build HSR, roadway, pedestrian path, bike path, and energy transmission line running east-west from western Edge of Adelanto, approximately along Rancho Road, to the eastern edge of Adelanto along the southern edge of the SCLA.

Consequences:

Environmental impact of build and operation/maintenance.

Impacts:

Residential job creation, traffic reduction, lowered commute times, improved recreational options, economic stimulus, and increased land values; increased tourism access for local destinations such as Adelanto Stadium; improved energy access for City of Adelanto, SCE and LADWP; improved commercial freight access to the SCLA.

³⁴ U.S. Census Quickfacts, City of Adelanto,
<https://www.census.gov/quickfacts/table/RHI125215/0600296,0640130,31109,0655156,00>

5.4 Victorville³⁵

Population - 122,265

Demographics - 28.3% white, 16.8% African-American, 4.0% Asian, 47.8% Hispanic or Latino (note: this distinction is not mutually exclusive)

18.2% foreign born persons

11.0% college educated

53.3% labor force participation

Mean travel time to work: 33.7 minutes

Median household income: \$45,894

Per capita income: \$15,826

Persons in poverty: 26.0%

9,621 firms

Victorville's per capita income is almost half of the California average. The HDC could provide an economic boon to the area and encourage outside investment, thus boosting wages and increasing incomes across the city.

Intentions:

Build ramps 14, 15, and 16 at Phantom W. St., Phantom E. St., and National Trail Highway respectively. Build HSR, roadway, pedestrian path, bike path, and energy transmission line running east-west from western edge of Victorville, approximately along the southern edge of the SCLA, to the eastern end of Victorville, north of Mojave Narrows Regional Park. Further discussion of tollway along the entirety of the HDC's right of way, including within Victorville's eastern section of the project.

Consequences:

Environmental impact of build and operation/maintenance.

Impacts:

Residential job creation, traffic reduction, lowered commute times, improved recreational options, economic stimulus, and increased land values; increased tourism for California Route 66 Museum, Mojave Narrows Park, Old Town Victorville, and the Mojave Rock Faces; improved energy access for City of Victorville and SCE; improved commercial freight access to SCLA.

³⁵ U.S. Census Quickfacts, City of Victorville,
<https://www.census.gov/quickfacts/table/RH1125215/0682590,0600296,0640130,31109,0655156,00>

5.5 Apple Valley³⁶

Population - 72,553

Demographics - 55.5% white, 9.1% African-American, 2.9% Asian, 29.2% Hispanic or Latino (note: this distinction is not mutually exclusive)

8.1% foreign born persons

17.0% college educated

50.5% labor force participation

Mean travel time to work: 29.8 minutes

Median household income: \$47,938

Per capita income: \$23,399

Persons in poverty: 20.6%

5,626 firms

Apple Valley is the most economically stable and least diverse of the five cities within the scope of the HDC. In addition to improving its accessibility to the rest of the southern California region, the HDC would benefit Apple Valley by augmenting development in its neighbors, which could spur cross-regional private investment and raise the standard of living even further.

Intentions:

Build ramps 17 and 18 at Choco Rd. and Dale Evans Pkwy respectively. Build HSR, roadway, pedestrian path, bike path, and energy transmission line running east-west from western edge of Apple Valley, just north of Mojave Narrows Regional Park, to the eastern Edge of Apple Valley near Apple Valley Airport.

Consequences:

Environmental impact of build and operation/maintenance.

Impacts:

Residential job creation, traffic reduction, lowered commute times, improved recreational options, economic stimulus, and increased land values; improved energy access for city of Apple Valley and SCE; improved commercial freight access for Apple Valley Airport and nearby SCLA.

³⁶ U.S. Census Quickfacts, Town of Apple Valley,
<https://www.census.gov/quickfacts/table/RHI125215/0602364,00>

5.6 Hesperia³⁷

Population - 93,724

Demographics - 41.1% White, 5.8% African-American, 2.1% Asian, 48.9% Hispanic or Latino (note: this distinction is not mutually exclusive)

15.2% foreign born persons

9.6% college educated

55.5% labor force participation

Mean travel time to work: 37.3 minutes

Median household income: \$44,874

Per capita income: \$16,369

Persons in poverty: 24.8%

6,561 firms

Located south of Victorville along I-15, Hesperia is the second largest city in Victor Valley. Hesperia has experienced rapid residential, commercial, and industrial growth over the last several years. According to the Southern California Association of Governments (SCAG), Hesperia is among the fastest growing areas in the region. A 30% increase in population occurred between the years 2000 and 2010, and the population is expected to exceed 211,000 by the year 2035. Improved east-west transit will be crucial in supporting this growing population and economy.

Intentions:

The HDC would improve use and access to a park-and-ride lot located in the City of Hesperia. The 186 parking-space lot is located 12 miles south of the HDC.

Consequences:

Environmental impact of build and operation/maintenance.

Impacts:

Residential job creation, traffic reduction, lowered commute times, improved recreational options, economic stimulus, and increased land values.

³⁷ U.S. Census Quickfacts, City of Hesperia,
<https://www.census.gov/quickfacts/fact/table/hesperiacitycalifornia,US/RH1125216>

5.7 Lake Los Angeles³⁸

Population - 12,328

Demographics - 31.9% white, 11.3% African-American, 0.9% Asian, 53.6% Hispanic or Latino (note: this distinction is not mutually exclusive)

16.2% foreign born persons

5.9% college educated

49.0% labor force participation

Mean travel time to work: 44.3 minutes

Median household income: \$40,240

Per capita income: \$14,896

Persons in poverty: 30.1%

784 firms

Lake Los Angeles is located in the eastern portion of the Antelope Valley, is one of two unincorporated areas within Los Angeles County that are within the HDC project area. Lake Los Angeles is a low-density rural community; however, it has the highest population among the unincorporated communities in the Antelope Valley. Lake Los Angeles has the highest unemployment rate in the Antelope Valley area, with a poverty level that is more than double that of California. The per capita income in this region is less than half of the California average. Additionally, the Lake Los Angeles community is located within an EOA in Antelope Valley. The HDC can provide residents of this area with better mobility and job access.

Intentions:

The HDC proposed path is in very close proximity to Lake Los Angeles, which is situated slightly north of the HDC right of way. A bikeway connecting Palmdale and Lake Los Angeles is also anticipated.

Consequences:

Environmental impact of build, operation, and maintenance. Residents of Lake Los Angeles would like to maintain the low-density, rural nature of the community. The HDC may impact the quality of life of the residents of this area.

Impact:

Residential job creation, lowered commute times, improved recreational options, economic stimulus, and increased land values.

³⁸ U.S. Census Quickfacts, Lake Los Angeles, <https://www.census.gov/quickfacts/fact/table/lakelosangelescdpcalifornia,US/RHI125216>

5.8 Sun Village³⁹

Population - 11,565

Demographics - 27.5% white, 7.0% African-American, 1.4% Asian, 63.2% Hispanic or Latino (note: this distinction is not mutually exclusive)

21.3% foreign born persons

9.9% college educated

53.8% labor force participation

Mean travel time to work: 42.2 minutes

Median household income: \$52,554

Per capita income: \$16,918

Persons in poverty: 18.6%

992 firms

Sun Village is located east of Palmdale in the southeastern Antelope Valley. It is one of two unincorporated areas within Los Angeles County that are within the HDC project area. This rural community lacks infrastructure outside its developed areas and is located within an EOA in Antelope Valley. The HDC can provide access to otherwise hard to reach rural areas and provide residents with better access to additional employment opportunities.

Intentions:

Sun Village is located just south of the HDC. The HDC will not run through any part of Sun Village, but effects can be anticipated as the HDC is expected to be built within close proximity.

Consequences:

Environmental impact of build and operation/maintenance. Much of the undeveloped land in Sun Village is considered rural preserve areas. Land use designations are in place to promote rural living conditions and avoid land divisions.

Impact:

Residential job creation, lowered commute times, improved recreational options, economic stimulus, increased land values and access to local natural beauty.

³⁹ U.S. Census Quickfacts, Sun Village,
<https://www.census.gov/quickfacts/fact/table/sunvillagecdpcalifornia,US/RHI125216>

5.9 Littlerock⁴⁰

Population - 1,377

Demographics –31% white, 6% African-American, 3.8% Asian, 57.6% Hispanic or Latino (note: this distinction is not mutually exclusive)

28.7% foreign born persons

50.4% labor force participation

Median household income: \$39,000

Per capita income: \$15,557

Persons in poverty: 23.7%

Littlerock is located south of the HDC project zone in Los Angeles County. The community is also located within an EOA. SR-138 runs through the area and widens from two lanes to four lanes. The HDC will provide improved traffic conditions for the area by rerouting much of the current traffic on SR-138 to the HDC.

Intentions:

The HDC would impact a total of 96 acres of grazing land from Littlerock Wash to 95th Street. However, no farming operations will be impacted. Fire Station Number 92 located in Littlerock at 8905 East Avenue U will be one of many serving the project area.

Consequences:

Environmental impact of build and operation/maintenance.

Impacts:

Residential job creation, traffic reduction, lowered commute times, improved recreational options, economic stimulus, and increased land values.

⁴⁰ U.S. Census Quickfacts, Littlerock,
<https://www.census.gov/2010census/popmap/ipmtext.php?fl=06:0641880>

5.10 Phelan⁴¹

Population - 14,304

Demographics - 63.3% white, 1.9% African-American, 3.1% Asian, 28.9% Hispanic or Latino

10.3% foreign born persons (note: this distinction is not mutually exclusive)

7.3% college educated

51.8% labor force participation

Mean travel time to work: 43.7 minutes

Median household income: \$52,064

Per capita income: \$21,107

Persons in poverty: 17.0%

Phelan is an unincorporated community in the Victor Valley. It is located south of the HDC. With over 14,000 residents, Phelan is one of the largest of the unincorporated communities in the Victor Valley. The low-density region has limited employment opportunities. The HDC project can increase jobs opportunities, as well as provide better access to jobs that are further away.

Intentions:

The HDC route will not run through Phelan. Sheep Creek Road, one of the longest roadways in the region, runs north-south from SR-138 in Phelan to El Mirage. This roadway does intersect directly with the east-west route of the HDC, but may see impacts from construction of the project.

Consequences:

Environmental impact of build and operation/maintenance.

Impacts:

Residential job creation, traffic reduction, lowered commute times, improved recreational options, economic stimulus, and increased land values.

⁴¹ U.S. Census Quickfacts, Phelan,
<https://www.census.gov/quickfacts/fact/table/phelancdpcalifornia,US/RHI125216>

5.11 Helendale⁴²

Population - 5,623

Demographics - 71.8% white, 5.6% African-American, 3.5% Asian, 16.1% Hispanic or Latino (note: this distinction is not mutually exclusive)

6.1% foreign born persons

25.1% college educated

51.4% labor force participation

Mean travel time to work: 36.8 minutes

Median household income: \$69,157

Per capita income: \$26,196

Persons in poverty: 11.5%

29 firms

The mean travel time to work in Helendale is higher than that of California. residents of this area will benefit from the improved mobility provided by the HDC.

Intentions:

The HDC has no immediate land impacts within the Helendale area. The Victor Valley Transit Authority (VVTA) provides bus service to the Victor Valley region. Helendale's Route 22, is expected to have improved service with the addition of the HDC.

Consequences:

Environmental impact of build and operation/maintenance.

Impacts:

Residential job creation, traffic reduction, lowered commute times, improved recreational options, economic stimulus, and increased land values.

⁴² U.S. Census Quickfacts, Helendale,
<https://www.census.gov/quickfacts/fact/table/silverlakescdpcalifornia,US/RHI125216>

5.12 Lucerne Valley⁴³

Population - 5,811

Demographics - 66.8% white, 2.9% African-American, 1.5% Asian, 24.9% Hispanic or Latino (note: this distinction is not mutually exclusive)

6.5% foreign born persons

8.8% college educated

42% labor force participation

Mean travel time to work: 41.7 minutes

Median household income: \$26,429

Per capita income: \$17,728

Persons in poverty: 22.9%

326 firms

The median household income and per capita income in Lucerne Valley is significantly lower than that of California and San Bernardino County. The poverty rate is also higher in this region compared to that of the County. The HDC can assist in stimulating local job growth while simultaneously providing better options for local and non-local transit for work purposes.

Intentions:

No Immediate land impacts will occur in the Lucerne Valley area. However, the proximity of the HDC project on nearby land will have consequences and impacts on Lucerne Valley.

Consequences:

Environmental impact of build and operation/maintenance.

Impacts:

Residential job creation, traffic reduction, lowered commute times, improved recreational options, economic stimulus, and increased land values.

⁴³ U.S. Census Quickfacts, Lucerne Valley,
<https://www.census.gov/quickfacts/fact/table/lucernevalleycdpcalifornia,US/RHI125216>

5.13 Mountain View Acres⁴⁴

Population – 3,130

Demographics - 34.6% white, 6.9% African-American, 3.1% Asian, 52.6% Hispanic or Latino (note: this distinction is not mutually exclusive)

Mean travel time to work: 34 minutes

Median household income: \$56,318

Per capita income: \$ 17,549

Persons in poverty: 20.5%

Mountain View Acres is located south of the HDC, and southwest of SCLA. It has historically had the lowest unemployment rates in the Victor Valley area.

Intentions:

No immediate land impacts will occur in the Mountain View Acres area. This region is located south of SCLA and Victorville. However, the proximity of the HDC project on nearby land will have consequences and impacts on Mountain View Acres.

Consequences:

Environmental impact of build and operation/maintenance.

Impacts:

Residential job creation, traffic reduction, lowered commute times, improved recreational options, economic stimulus, and increased land values.

⁴⁴ U.S. Census Quickfacts, Mountain View Acres,
<https://www.census.gov/2010census/popmap/ipmtext.php?fl=06:0649684>

5.14 Non Census-Designated Places⁴⁵

The unincorporated areas of Crystalaire, Oro Grande, Juniper Hills, Pearblossom, and Llano are non-census-designated places, however they still have regional significance. Crystalaire, Juniper Hills, Pearblossom, and Llano are all located south of the HDC. Oro Grande is north of the HDC, and just east of SCLA. Although these regions are not within the project area, they will experience regional impacts as they are located nearby. The communities of Crystalaire, Pearblossom, and Llano are located within an EOA region. Residential job creation, traffic reduction, and lowered commute times are among some of the possible benefits. In most of these areas, rural community character is highly valued and new commercial or industrial uses are strongly discouraged. Rural preserves as well as residential areas are designated with limitations on density levels to maintain low density living in these communities. All such local preferences, policies, and planning will be taken into consideration in the design, build, and operation of all the HDC components.

5.15 Los Angeles County⁴⁶



Figure 3: Los Angeles County (source: <https://www.google.com/maps/place/Los+Angeles+County,+CA/@33.7815461,-119.41986,8z/data=!3m1!4b1!4m5!3m4!1s0x80dd2ad30164cd31:0x837d28d6cfbd392a!8m2!3d34.0522265!4d-118.2436596>)

⁴⁵ High Desert Corridor Community Impact Report, <http://www.dot.ca.gov/d7/env-docs/docs/hdc/The%20Human%20Environment/HDC%20Community%20Impact%20Assessment-March%202016.pdf>

⁴⁶ U.S. Census Quickfacts, Los Angeles County, <https://www.census.gov/quickfacts/table/RH125215/06037,0602364,00>

Population - 10,137,915
Demographics - 71% white, 9% African American, 15% Asian, 48% Hispanic or Latino (note: this distinction is not mutually exclusive)
35% foreign born persons
30% college educated
64% labor force participation
Mean travel time to work: 30 minutes
Median household income: \$56,196
Per capita income: \$28,337
Persons in poverty: 17%
1,146,701 firms

Los Angeles county will benefit from the reduced traffic in Santa Clarita, San Fernando, Crescent and San Gabriel Valleys. The HDC will minimize the vehicles traveling on congested Los Angeles highways, as well as reduce pollution and increase travel and freight distribution speeds.

Intentions:

Build ramps 4, 5, 6, 7, and 8 at 90th St. E., 140th St. E., 170th St. E., 210th St. E./Largo Vista Rd., and 240th St. E. respectively.
Build HSR, roadway, pedestrian path, bike path, and energy transmission line along Palmdale Blvd. running east-west from the eastern edge of the City of Palmdale to the eastern edge of Los Angeles County.

Consequences:

Environmental impact of build and operation/maintenance.

Impacts:

Residential job creation, traffic reduction, lowered commute times, improved recreational options, economic stimulus, and increased land values; improved energy access for Los Angeles County, SCE and LADWP; improved commercial freight and goods movement through Los Angeles County due to redirection of freight to SCLA and increased east-west mobility in the high desert.

5.16 San Bernardino County⁴⁷

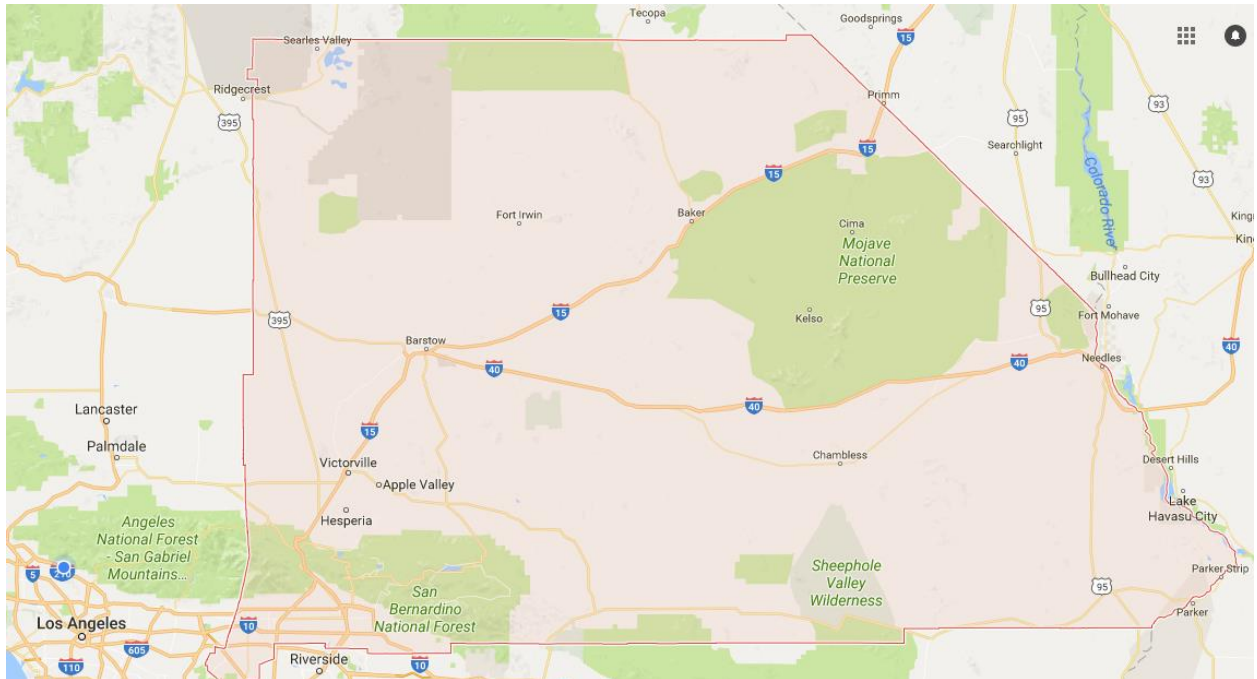


Figure 4: San Bernardino County (source: <https://www.google.com/maps/place/San+Bernardino+County,+CA/@34.8371439,-117.088425,8z/data=!3m1!4b1!4m5!3m4!1s0x80c52a8ae8311be5:0xa438bdbc918edca!8m2!3d34.9592083!4d-116.419389>)

Population - 2,140,096
Demographics - 77% white, 10% African American, 7% Asian, 52% Hispanic or Latino (note: this distinction is not mutually exclusive)
21% foreign born persons
19% college educated
60% labor force participation
Mean travel time to work: 30 minutes
Median household income: \$53,433
Per capita income: \$21,352
Persons in poverty: 19%
160,500 firms

⁴⁷ U.S. Census Quickfacts, San Bernardino County, <https://www.census.gov/quickfacts/table/RHI125215/06071,06037,0602364,00>

The HDC will improve east-west accessibility and assist in the development of the Inland Port. The HDC will connect the airports in Palmdale and Victorville to the Port of Los Angeles, Port of Long Beach, and LAX, which will improve the movement of goods across southern California. This improvement to the flow of commercial freight will generate significant economic growth for the high desert region.

Intentions:

Build ramps 9, 10, and 11 at Oasis Rd., Old Phelan Rd./Sheep Creek Rd., and Caughlin Rd. respectively. Build HSR, roadway, pedestrian path, bike path, and energy transmission line along and beyond the trajectory of Palmdale Blvd. running east-west from the western edge of the county to the City of Adelanto; exploration of solar farm installation in one or more unincorporated areas of the county that are not visually relevant to tourism, environmentally sensitive, or intended to be an area of population or economic growth.

Consequences:

Environmental impact of build and operation/maintenance.

Impacts:

Residential job creation, traffic reduction, lowered commute times, improved recreational options, economic stimulus, and increased land values; improved energy access for Los Angeles County, SCE and LADWP; improved commercial freight access to SCLA.

6. GOODS MOVEMENT CONSIDERATIONS

6.1 Intermodal Transfer Facilities

The Palmdale Regional Airport, Air Force Plant 42, and SCLA are regional intermodal and economic assets located near the HDC that are emerging as massive centers for economic growth.

The Palmdale Regional Airport was managed by Los Angeles World Airports until taken over by the City of Palmdale in 2013 and designated for management under the Palmdale Airport Authority. The airport is immediately adjacent to the Federal Aviation Administration's Los Angeles Air Route Traffic Control Center and shares a runway with Air Force Plant 42. While the Palmdale Regional Airport does not have any scheduled passenger airline services, there is great potential for such services to return. As recently as 2007, the airport served over 10,000 passengers per year. Additionally, Palmdale Regional Airport's location has potential to serve high-density populations such as Sherman Oaks more effectively than LAX, and has the general support of Palmdale residents for reopening and expansion. The HDC's improved transit options, particularly an HSR station in Palmdale, would be a transformational asset in re-establishing passenger airline services at Palmdale Regional Airport.

Air Force Plant 42 is a classified United States Government aircraft manufacturing plant used by the U.S. Air Force as well as NASA. Located approximately 60 miles from downtown Los Angeles, Air Force Plant 42 has seen a massive increase in department of defense spending in the past few years. While the specifics of such plans are confidential, there is public documentation of Northrup Grumman receiving funding for a \$24.8-million multi-story, steel-framed office complex in Palmdale to be completed by 2018 and funding for a \$35.8-million 45,900 square foot facility to be completed by 2019. These structures are likely components of a much larger government contract to build a new fleet of long-range bombers, which could eventually cost over \$80 billion.⁴⁸ The economic implications of such a large endeavor for the region reach both far and wide in terms of job creation, housing, educational advancement, investment, local businesses, power consumption, regional planning, and expanded needs for commercial and residential transit options.

Directly across the HDC right of way from Air Force Plant 42 and Palmdale Regional Airport, approximately 50 miles across the high desert, is the SCLA. SCLA is located on land that used to be the George Air Force Base. The potential for the federal government to begin reinvesting in a region that lost 7,500 jobs to the closing of this base in 1992 has huge ramifications for the region.

⁴⁸ Northrop Grumman's \$35-million contract may point to work on new stealth bomber, <http://www.latimes.com/business/la-fi-northrop-contract-20170201-story.html>

SCLA's expansion is capturing attention from important decision makers, such as State Senator Wilik, who suggested that the region "should be doubling down on aerospace" to maximize on regional workforce and institutional assets while capturing the rising investment of aerospace entrepreneurship such as Space X and Virgin Galactic.

Recent growth at SCLA has been dominated by air cargo. The SCLA, also known as Victorville Airport, is an international logistics hub with multimodal capabilities. The SCLA provides air cargo services and can accept any type of commercial or military aircraft. The site includes a direct fuel line with over two million gallons of storage, which could be of considerable strategic value in developing a nearby green energy corridor. In addition to growing private sector activity, San Bernardino County is planning two business expansion projects at SCLA within the next five years to expand aircraft repair capabilities.⁴⁹

The SCLA provides a 24-hour, seven-days-a-week customs office and is designated as a U.S. Customs Port of Entry. The SCLA was granted a Foreign Trade Zone and a Local Agency Military Base Recovery Act Zone by the federal government. Importers and exporters can reduce, defer, or eliminate duties while storing or transporting eligible products. This feature alone will continue to draw large businesses to the SCLA. Federal Express, Atlas Air, Cargolux, ASB Air, and the U.S. Armed Services are among some of the carriers that have utilized the SCLA for timely and cost-effective goods movement. Two intercontinental runways at the SCLA are utilized to allow the heaviest aircrafts direct access to and from anywhere in the world.

The high desert's surplus of undeveloped industrial land coupled with the growing workforce provides an attractive condition for production and distribution firms within southern California. Boeing, Dr. Pepper Snapple, Victorville Aerospace, General Electric, and Pratt & Whitney have already established themselves or are expecting to expand at SCLA.⁵⁰ Further relationship with these companies may reveal potential alignment of interests for private sector investment and/or involvement with the HDC.

⁴⁹ Economic Development Agency, Air Service, <http://www.sbcountyadvantage.com/For-Site-Selectors/Transportation-Infrastructure/Highway-Systems.aspx>

⁵⁰ Inland Port Feasibility Study, http://tiogagroup.com/docs/Tioga_Grp_SCAGInlandPortReport.pdf

Global Access, a P3 comprised of the SCLA, SCLC, and SCRC, is working on redevelopment of the SCLA with an 8,500-acre multimodal freight transportation hub by combining ground, air, and rail connections.⁵¹ The SCLA hub will serve not only goods traveling through Victorville, but all of southern California. It is currently estimated that 60% of goods traveling in and out of southern California move through Victorville. The HDC will provide a more effective method of transportation, while also connecting the SCLA more directly to the Port of Long Beach and Port of Los Angeles. By linking Interstate 15, Interstate 5, and SR14 the HDC will alleviate a significant amount of traffic volume by diverting traffic from the Los Angeles Basin.

The SCLA is under consideration to become southern California's first ever Inland Port, which would connect to the Port of Los Angeles and Port of Long Beach via major rail networks. Victor Valley is situated along the main lines for BNSF Railway Company and Union Pacific Railroad (UPRR). In January 2007, BNSF and the City of Victorville signed an exclusive memorandum of understanding (MOU) to develop a major intermodal logistics center at the SCRC. This will alleviate the congestion that exists at these ports. Currently, the two ports of Los Angeles and Long Beach receive more than 40% of the nation's imports. As shipping volumes continue to grow, demand for such an Inland Port continues to rise. The SCLA and SCRC will help spread out the movement of goods and in turn alleviate the bottleneck issues in and around the Port of Los Angeles, Port of Long Beach, and LAX. The HDC would complement these developments with a critical east-west transitway for commercial freight along with increasingly needed regional transportation and green energy infrastructure.

The intention to design the HDC with commercial freight in mind will dramatically enhance the region's trucking, rail, and air routes. Such robust infrastructure will attract further growth in commercial freight, related businesses, investment and overall economic stimulus in the region. Incorporation of commercial freight may lead to use of innovative technologies such as autonomous vehicles (AVs) and commercial drone usage.

Per Caltrans, increasing passenger volume and ground access restrictions near LAX are leading to development of air cargo operations in the Inland Empire. The current east-west transportation facilities in the Inland Empire are not sufficient, resulting in problems with connectivity and congestion. The growing market and activity at the Palmdale Regional Airport and SCLA make these airports vital transportation hubs. By improving east-west accessibility, the HDC will play a crucial role in the future development of these emerging hubs of aerospace, cargo, and enterprise.

⁵¹ Global Access, <http://www.logisticsairport.com/page.aspx?pgid=3>

A study conducted by Tioga Group, reported by Stirling Capital Investments as a part of their ongoing interests in Global Access, found that the SCLA and the HDC will have a positive impact on the major trade corridors and reduce future congestion and vehicle miles traveled.⁵² Tioga group analyzed the SCLA's logistics expansion coupled with the HDC and found significant benefits. The study found that rather than using the Los Angeles Basin, trucks will shorten their routes by crossing the HDC.

The study also found that the planned SCRC will be extremely beneficial. The next closest intermodal rail facility is at capacity and has restraints that make it inefficient. The SCRC would be particularly attractive because it would be the first stop into southern California from the east and the last stop out to the east from southern California. Many long-haul trips may convert to rail-truck intermodal, which would have significant emission benefits. By building the HDC close to the SCLA, the HDC will cater to the expected increase of vehicles and trucks accessing the SCLA. Additionally, the HDC will prevent what would otherwise be costly wear and tear on existing roads and avoid costly and uncoordinated improvements to accommodate such a significant rise in regional commercial freight.

According to SCAG, the SCLA will improve the transport of goods throughout southern California, as well as create jobs, which will in turn drive the economy. With 2,073 people, the SCLA is the largest single employer in Victor Valley. This number is expected to reach 28,646 by 2080 with the envisioned build-outs of the SCLA. The increase in jobs in the region may also result in additional housing development within the County. These projected growth estimates make the HDC a critical multimodal alternative for the movement of goods and people. Without the HDC, growth of SCLA and surrounding communities will be stunted by already over-crowded north-south railways to and from the Port of Los Angeles, Port of Long Beach, and LAX. The HDC would create an east-west route that would shift goods movement traffic away from urban population centers, mitigate congestion, improve route efficiency, and reduce environmental impact.

⁵² Connections, http://www.victorvilleca.gov/uploadedFiles/NewsEvents/NewsStories/08_Stories/GA%20CONNECTIONS%2012.pdf

6.2 Freight Logistics

Governor Brown's Sustainable Freight Action Plan recommends establishing potential freight pilot projects. By developing a "laboratory" in a corridor it enables state agencies, local jurisdictions, and private sector supply chain players to test different options and compare the emission reduction and economic impacts of those options. The HDC is an ideal corridor for a Sustainable Freight Action Plan freight pilot project program. A "Green Freight Corridor Laboratory" could facilitate zero-emission technologies for trucks and logistics equipment, carbon sequestration strategies to capture and store emissions, and improvements to the grid in the high desert to ensure adequate supply of sustainable electricity. Additionally, it could provide truck lanes to enhance freight mobility, throughput, environmental sustainability, and efficiency. Participation in the Sustainable Freight Action Plan could also contribute to land use policies that encourage LEED Platinum logistics facilities in the corridor along with infill warehousing and distribution facilities.

The urban-adjacent greenfield opportunity combines with the HDC's proximity to SCLA's Inland Port to make a compelling case for selection as one of the California Freight Advisory Committee's (CFAC) pilot sites. As a CFAC pilot site, the HDC would be supported toward integrating advanced technologies, alternative fuels, freight and fuel infrastructure, and local economic development opportunities. As outlined in Governor Brown's Executive Order B-32-15, CFAC pilot sites are intended to establish "...clear targets to improve freight efficiency, transition to zero-emission technologies, and increase[d] competitiveness of California's freight system." This opportunity warrants further research, consideration, and discussion. Beyond the exploration of establishing a CFAC pilot site, additional outreach to alternative-energy trucking and commercial-freight interests may reveal additional opportunities to collaborate on relevant renewable energy and design considerations.

6.3 Drone (UAV) Technology

Given the urban adjacent greenfield nature of the HDC, there is a unique capacity for innovation along the right of way. One emerging high growth industry with potential applications is drone, also known as Unmanned Aerial Vehicle (UAV), technology.

It should be noted that governmental regulation and oversight of UAVs is at a nascent stage. Currently the Federal Aviation Administration is building policy with the input of an emerging industry. At times, local jurisdictions, such as counties or cities, are acting to restrict or prevent drone use. Coupled with the pace of technology change, the uncertain policy environment makes it hard to predict the specific future use-cases within the drone industry. In order to address the uncertainty of governmental oversight, the HDC could coordinate with local municipalities to provide space for varied UAV uses by providing some assurance that the right of way would be locally “drone-friendly”.

Since the beginning of the century, UAV technology has developed rapidly and emerged in a wide range of markets. Recent technological advances are accelerating the pace at which drones are likely to become an integral part of day-to-day life. The military has been using large drones for many years for tactical and data-collection purposes. In the consumer market, smaller drones have recently become accessible and affordable. Some of these small drones are used by individuals for recreational purposes. A growing number of similarly small and increasingly capable UAVs are utilized by the private sector for numerous applications related to goods movement, infrastructure planning, environmental stewardship, and data-collection.

Given the HDC’s intersectional interests in all the aforementioned UAV use-cases, research was conducted to determine if there might be an opportunity to engage with private sector drone companies on the planning of the HDC. Initial research revealed one of the biggest uses of drone technology will likely be deliveries. This includes consumer products, medicine, groceries, and more. The clear majority of commercial drone discussions focus on ‘first mile last mile’ uses and the fact that drones do not require road infrastructure to reach remote rural areas. It is unlikely the HDC would relate to either of these advantages of small UAVs.

While a small individual drone is unlikely to become a goods-movement use-case along the HDC, large drones may provide a more fitting opportunity. Large drones, more similar to existing military models than most consumer models, may eventually play a key role in long-range goods movement. Nautilus, a San Jose startup, is working to reduce global air freight costs by 50% through the use of large solar-powered drones.⁵³ While such technology is in an early phase, there could be interest in the future to allow for such large cargo drones to utilize the HDC’s infrastructure on their way to SCLA’s Inland Port.

⁵³ Nautilus, <http://www.natilus.co/>

Another potential use-case for UAVs along the HDC would be “swarms” of small drones. In January 2017, the U.S. Military conducted a test in California, launching 103 miniature swarming drones from the body of a fighter jet.⁵⁴ These drones operated autonomously and shared a distributed intelligence system. As UAV technology advances, it becomes more and more likely that goods movement may take place in large groupings of drones. In this scenario, each UAV would have a specific delivery, but all the UAVs would travel in a swarm for much of their route. Doing so along a designated aerial right of way would allow the practice to comply with federal and local regulations while improving the flow of traffic.

Creating space for UAVs in some form within the HDC may eventually lead to goods-movement drones, but this is unlikely to be the most immediate use-case for drones in the high desert. In the near future, the HDC would most likely benefit from drones in the context of construction, surveying, public safety, and infrastructure monitoring. The HDC could act as a test site for various utility and energy pilots for data collection, infrastructure monitoring, and technology exploration.

The mostly empty and arid nature of the land surrounding the HDC provides many related opportunities for testing of new drone technologies. Current advancements and potential opportunities include the following:

- Monitoring of green energy transmission, distribution, and production. This is especially relevant along the HDC where infrastructure will exist at remote sites and/or near protected land. Drones are already used for such purposes within the more well-established oil and gas industry.⁵⁵
- Wi-Fi and/or mobile network coverage could be provided along the HDC with drone technology. Facebook’s “Internet.org” initiative is exploring such efforts overseas, which could eventually lead to similar domestic initiatives.⁵⁶
- In emergency scenarios, drones may complement human response efforts, especially with regards to restoring power in the case of an outage.

⁵⁴ BBC News, <http://www.bbc.com/news/technology-38569027>

⁵⁵ Energy API, <http://www.api.org/news-policy-and-issues/news/2016/07/13/congress-approves-use-of-drones-to-enhance>

⁵⁶ Express Wi-Fi, <https://info.internet.org/en/story/expresswifi/>

- Environmental and conservation research across a diverse range of activities, including monitoring forest fires, counting bird species, and analyzing greenhouse gases from point source emissions. Such UAV use would likely include some of the many applications of Light Detection and Ranging (LiDAR).⁵⁷
- Similarly, UAV monitoring could provide enhanced data and response for traffic accidents and related issues.
- The HDC could also provide a general testing environment for the advancement of UAV technology at large. This would include goods movement drones as discussed above. It would also include efforts such as Qualcomm's exploration of how well drones can fly on cellular networks. Such projects would benefit from having a drone-friendly 63-mile right of way for applied research.

Although there are several avenues that can be explored in terms of drone technology along the HDC, very little is possible without interest from a specific public-sector partner such as the California Commercial Freight Advisory Committee, and an engaged private-sector partner involved in drone technology. An initial attempt at cold-call outreach to private-sector partners did not generate substantial interest in a partnership, but the CFAC may be able to provide further insight on how to develop a pilot project along the HDC.

6.4 Autonomous Vehicle (AV) Technology

Due to the pace of innovation and the levels of private sector investment, AV Technology is worthy of consideration in the design and construction of the HDC. The introduction and expansion of such technology will have material impacts on the future of transit infrastructure. Within the HDC, an AV-friendly design might incorporate Intelligent Transit Systems (ITS), alternative fueling stations, pick-up/drop-off points, digital construction notifications, differentiated traffic signals, emphasized lane demarcation, and safety precautions. If pursued in earnest, such design considerations could be established through a partnership between auto makers, tech companies, and public agencies.⁵⁸ If this partnership is pursued early in the national adoption cycle of AV technology into public roads, additional opportunities for investment and public engagement may be available.

⁵⁷ 50 LIDAR Application, <http://grindgis.com/data/lidar-data-50-applications>

⁵⁸ Self Driving Cars, <https://www.wired.com/2016/03/self-driving-cars-wont-work-change-roads-attitudes/>

While efficiency of ITS and AVs will provide improved utilization of time, energy, and money, it is likely that the largest societal benefits of AV technology will come from improved road safety. With over 3,000 people injured each day by human-operated vehicles, there is a strong case to be made for automation to reduce human error and save lives.

Any consideration of AV technology will benefit from a basic understanding of the tiers of self-driving vehicles. Adoption of AV technology will take place through these levels sequentially, and thus accommodation for such stages of change can be made incrementally. Per SAE International's industry standard, there are six numerical levels of AV technology numbered 0-5.⁵⁹ Level 0 is no automation, with the driver in full control. These cars are still on the road, but are less common than most realize. Level 1 incorporates function-specific automation, which is common in many vehicles on the road today. Familiar examples include traction control and cruise control. Level 2 combines two or more functions, which are currently found in many luxury vehicles. An example of this would be adaptive cruise control with lane centering. Level 3 allows for limited self-driving automation. Under this level, the entire vehicle can drive itself in specific driving scenarios. Current examples include the Tesla's relatively limited highway-only AV mode and the Google cars seen on the street in Silicon Valley. Level 4 is fully self-driving. This level would allow a driver to enter the vehicle, input a known destination, and do nothing at all until they arrive safely. Level 5, which some industry experts do not believe will ever be reached, would allow fully self-driving vehicles in every driving scenario. This would include off-road and extreme environments with nearly infinite complexity.

Initial cold-call outreach was conducted via phone to Government Affairs contacts at GM, Ford, Daimler, BMW, Renault-Nissan, Waymo, Tesla, Honda, and Uber. The intention of this outreach was to assess the enthusiasm with which those involved with AV might respond to an invitation to provide input and intelligence to the pre-design phase of the HDC. No substantive affirmative or negative response was received from a single round of outreach. More substantive and targeted outreach in the future may prove successful once the HDC has an established time-table for design and construction.

⁵⁹ Automated Driving, https://www.sae.org/misc/pdfs/automated_driving.pdf

7. COMPONENT OBSTACLES AND OPPORTUNITIES

By approving the HDC as a transitway and green energy corridor, multiple stakeholder groups can see benefits from the full project. These positive impacts include environmental, civic, social, economic, financial, and community-health outcomes. Within these categories of positive impacts, there are specific obstacles and opportunities associated with each of the build components. The following exploration of each build component is intended to provide insight into how to construct the full corridor.

7.1 Pedestrian and Bikeway

The pedestrian and bikeway components of the HDC provide health and recreation opportunities, which are especially valuable in areas of the high desert that are lacking in park space. Local interests, as reflected in planning documents and general plans, indicate that opportunities to encourage both commuting and recreation along a pedestrian and bikeway are valuable to community well-being and environmental stewardship. Integration of the HDC with existing planning, such as Lancaster's Master Plan for Trails and Bikeways, will make the HDC more connected to and accessible for residents and travelers alike.

Development of a bikeway across the HDC will serve to connect existing bike path systems and cycling enthusiasts from across the high desert. In addition to the benefits of pedestrian and bikeway for residents, there is also a tourism factor to consider. Options for enjoying the natural beauty of the high desert on bicycle and by foot would likely attract tourism to areas that would benefit greatly from the economic stimulus.

In alignment with the values reflected by the HDC plan, pedestrian and bikeway paths will be constructed up to industry leading sustainable standards. Careful consideration would be made to plan around wildlife, natural environment, historical or cultural assets, and otherwise protected areas. The path would consistently provide an option for people to reduce reliance on fueled transport. Public transit will become more accessible when individuals can ride their bicycles and walk comfortably to and along the HDC. Such an approach would make use of the natural beauty in the region while maintaining an overall net-zero environmental footprint.

As a consideration within pedestrian and bikeway planning, equestrian uses may be particularly beneficial in lower density rural areas.

Opposition to pedestrian and bikeway will likely be minimal. Some local land use and zoning issues may emerge, but such obstacles can likely be addressed in the design phase. However, this build component is not being considered in isolation. Therefore, the most likely outcome will be that the inclusion of a pedestrian and bikeway path will increase the overall appeal of a multi-component build-option.

7.2 Roadway

A vehicular right of way is a central component of the HDC plan to address both passenger travel and regional goods movement. Regional population growth and economic development are expected to continue to increase the demand for roadway well into the future.

The primary benefit of a roadway, regardless of whether it is a freeway or tollway, will be to improve circulation of freight and people throughout the high desert. Given the plans for interrelated green energy components, particularly renewable refueling stations, the HDC's roadway can provide a much-needed east-west path for alternative energy vehicles.

A traffic study is currently underway by Los Angeles County Metropolitan Transportation Authority, the results of which will further inform this particular build component. Further consideration for the tollway option is provided in this report under Sections 2.2 and 9.4.

In alignment with the underlying values of the HDC project, any roadway components would be built to industry-leading sustainability standards while carefully considering wildlife, natural environment, and otherwise protected areas.

There are potential sources of opposition to construction of a roadway. Local land use concerns regarding environmental, historical, and/or cultural sites may require adaptation in the design phase of this project. While the overall regional case for a road may be strong, hyperlocal "Not-In-My-Backyard" (NIMBY) opposition to construction may arise.

Local feedback has been taken into consideration at multiple times in the pre-design planning process. Through the incorporation of such information, alternative routes have been considered and included in the HDC plan. This ongoing inclusion of local insight will continue to advise the HDC project throughout.

While the HDC seeks to offer alternative-energy friendly infrastructure, most vehicles in the immediate future will continue to be internal combustion engines. This may lead to concerns regarding environmental impact, air quality, and/or noise of roadway infrastructure.

7.3 High-Speed Rail

When the HDC is analyzed from a LCI perspective, the benefits of HSR stand out among transit options. In other words, when the entire design-bid-build-operate-maintain life-cycle is considered over time, the environmental impact of HSR is relatively less per mile traveled than other forms of transportation. This is primarily dependent on the energy efficiency per passenger, which is bolstered by the green energy components of the HDC and requires a certain threshold of passengers over time.

In addition to overall efficiency, HSR has multiple benefits in aligning with regional interests. Connecting XpressWest with CHSRA would create a robust set of railway paths throughout northern, central, and southern California, and heading east to Las Vegas. The economic impacts of HSR would be considerable, from immediate job creation to long-term mobility and an increase in tourism.

HSR may contribute specifically to increased land values and high-density development around rail stations. Such economic advancement bears considerable benefit to the immediately-proximate urban area and may be the basis for funding through a mechanism such as EIFD.

Opposition to HSR is most likely to come from cost concerns. While the life-cycle impact of HSR is comparatively low, the upfront costs are comparatively high. Given that the financing is primarily public, some citizens fear that their money is not being used properly. Critics are quick to point out that such a long-run projection for a new piece of technology is a dangerous gamble.

Given the initial costs and long run benefits, HSR is a good fit for a P3 financial arrangement. Such an agreement would allow for private capital to be used for construction and paid back over time. While this cross-sector approach carries many benefits, there are some who are reluctant to see private interests engaged with public projects. These concerns can be ameliorated through transparent and thorough prioritization of the public interest while forming any P3 agreement.

Like other build components, the HDC's HSR would be constructed up to industry-leading sustainability standards with careful consideration for local environmental, wildlife, and other protected land. NIMBY-type obstacles may still arise, and would require attention in the design phase of the process.

7.4 Energy Production

While the initial impetus for the HDC was transit, energy production has emerged as a vital parallel component. The high availability of solar energy, along with the existing energy sector innovation in the high desert, contributes to the strategic value of the HDC's energy production. In addition, the potential for renewable energy produced along the HDC to completely offset the multimodal transitway's energy footprint is as innovative as it is environmentally responsible.

While the high desert region is growing rapidly, jobs have continued to be in high demand. Green energy production would serve as a creator of both immediate and long-term jobs in construction, operations, and maintenance. In 2016, the National Solar Job Census reported that solar jobs increased by 25% since 2015, surpassing the total number of those working in coal and natural gas power generation.⁶⁰

Given the increasing preference for locally produced non-utility scale energy production in both Los Angeles and San Bernardino County, the creation of a series of community-facing green energy production sites of 9 MW or less may be in order. Solar would be the most likely renewable source, followed by wind. If a regionally acceptable build-option can be put forth, then the green energy production will go to immediate use across the region. Working with regulated utilities, such as SCE, to plan for such energy resources can reduce consumer prices, which are a rising concern as communities move away from more centralized and traditional energy resources.

⁶⁰ Fortune- Energy, <http://fortune.com/2017/02/07/us-solar-jobs-2016/>

Plans for energy production would adhere to industry leading sustainability standards for all construction, while carefully siting around wildlife, environmental, and other land use concerns.

Some may oppose green energy production along the HDC due to a desire to rely upon household solar. However, household solar has yet to prove sufficiently productive and reliable to provide for the needs of the region. Renewable energy production along the HDC would provide stabilizing resources to control consumer costs and assure more safe and reliable availability of energy.

7.5 Energy Transmission

Energy transmission in the high desert is a critical area of infrastructure need. With the growing community-facing energy sector, utilities must adapt to a changing landscape. Transmission line infrastructure along the HDC can provide an opportunity to do so proactively and strategically.

With the increase in DERs comes reduced grid stability, energy storage, oversight, and safety. The HDC's right of way could play a critical role in supporting utilities, such as SCE, to find ways to build transmission and distribution infrastructure that supports community-facing energy production in balance with needs for reliability and security.

Some residents will undoubtedly find the idea of a new transmission line to be questionable due to construction cost, redundancy, and an overall desire to move away from established energy systems. However, a carefully designed transmission and distribution system along the HDC could provide a means for utility companies, like SCE, to support the transition to distribute energy resources while avoiding cost spikes, disruption of service, safety issues, and instability of energy availability.

As with all other components of the HDC, any energy transmission infrastructure would be designed and built to industry leading sustainability standards. Siting for transmission infrastructure will carefully consider the local wildlife, environmental impact, cultural/historical dynamics, proximity to populations, and other land use factors.

Further transmission line exploration and research will be required to better understand the needs and wants of the local energy market, especially as it relates to reliability, stability and security. The overall goal, to which transmission line infrastructure along the HDC can significantly contribute, is to ensure that the self-determination of DER expands in strategic relationship to the investment and expertise of utilities such as SCE.

7.6 All-Component Approach

Given the complementary nature of components described above, the optimal build-option will include pedestrian and bikeway, roadway, HSR, green energy production, and energy transmission. By building out these components, the HDC will address regional transit and energy needs in strategic balance with environmental, community health, economic, and civic considerations. In addition, the project will have optimal opportunities for funding and financing throughout the lifespan of all infrastructure components.

A full component build-option allows for coordinated and strategic utilization of financial and environmental assets. Resources such as funding, energy, and water would all be handled across build-components to ensure that the regional infrastructure improvements are built in a fully responsible and publicly informed manner. Full efficiencies of scale can be pursued through multiple local, state, federal, and P3 funding streams.

The all-component build-option provides critical economic stimulus and job creation to communities eager for self-reliance. The restoration of a region damaged by closing military bases through the construction of innovative infrastructure adds a compelling social dimension to the work at hand. Project-labor agreements, and other tactics supporting the higher-need local segments of the population, can be explored accordingly.

Providing an ongoing option for residents and tourists to select and/or alternate between pedestrian, bikeway, roadway, and HSR would make the high desert an enjoyable place for commuting, travel, and visitation. Natural beauty would become accessible for millions of southern Californians by reducing both costs to travelers and impacts on the environment. The plan for such a transitway to be offset by regional green energy production and transmission is what brings the vision of sustainability into full focus.

While the local impacts are most immediate and relevant, the all-component build-option would also carry considerable positive state and federal benefits. For the State of California, the HDC would reduce fossil fuel dependency, bolster green energy production/transmission, ensure environmental protection in a vulnerable region, stimulate the economy, and contribute to long-term financial stability. Moreover, the HSR component alongside other transit and energy infrastructure, would play a key role in complementing the CHSRA. Federally, the innovative nature of the project and the pursuit of P3 funding models would provide a model use-case for what intelligent infrastructure development can look like in 2017 and beyond.

The all-component build-option is not without obstacles. Significant resources and study will be required to properly understand and address the local needs for environmental conservation, protecting historical/cultural sites, and wildlife preservation. Consideration for such land use dynamics must continue to be pursued through the complexity of local community and municipal leadership.

Overall, many of the benefits from an environmental and economic perspective are based on models that assume a highly complementary relationship between some form of centralized infrastructure development and regional well-being. Most immediately, the project must overcome considerable funding gaps in order to break ground. If such funding is secured and utilized successfully, then the all-component build-option will play a central role in the future advancement of the high desert.

8. FINANCING OPTIONS

8.1 Tax Increment Financing Background

TIF is a public financing method in which municipalities normally redirect future increases in property tax revenue from a predetermined area toward a community development or infrastructure project. The tax increment essentially captures any increase in the value of the development as a result of new public and private investment. TIFs borrow against these incremental property-tax increases for 20-25 years or longer to fund immediate improvements in underdeveloped or impoverished areas in which government investment would have been otherwise limited. A TIF area can be drawn around a discretionary region near the project area to provide sufficient borrowing capacity to finance the operation.

The history of TIF is a long and fascinating intersection of economics, politics, and governance. TIFs are generally utilized through the designation of an IFD. TIF originated in California in 1952 and by 2004 some form of TIF and IFD could be found in all 50 states. Continuing to stay ahead of the curve, California recently revised laws regarding TIF and IFDs to require the formation of an EIFD in order to use TIF for a project. See Section 8.2 for more information.

When seeking to capture TIF through an EIFD, it is vital to incorporate awareness of local interests and politics. A TIF district, such as an EIFD, can quickly become controversial when it is perceived to overextend eminent domain, be too large, have a negative impact on local budgets, or lead to population displacement. Some TIF districts have been accused of using the “blight” designation to develop areas that were not perceived by the public to be actual blight. Others have included properties too far away from the financed project to benefit significantly from its construction.

Although TIF subsidies through EIFD are not appropriated directly from a city's general fund, there is still a potential loss associated with the opportunity cost of the tax increment. Poor municipal asset management, unexpected shifts in budget, and/or inaccurate financial projections may lead to a perception that EIFD funding takes resources away from other municipal services. Also, economic development associated with a TIF district may become a public concern if quickly escalating real estate prices contribute to displacement of existing residents and businesses.

A well-structured TIF, through a carefully formed EIFD, can allow for overall positive economic impact on all parties, from local governments to the local economy, by only capturing tax increment value specifically attributable to the project(s) funded by the EIFD. Furthermore, the strategic planning process required for the formation of an EIFD will assist all parties involved in collaborating effectively and efficiently, and thus incorporate awareness of local interests, concerns and politics. Such an influx of capital has the potential to increase surrounding real estate values, thus enticing settlement in the area, and in turn leading to both increased tax revenue and job creation to meet the demand of new investment. This virtuous cycle is at the core of TIF and EIFD logic.

However, the residential density required for TIF financing infrastructure may be difficult to achieve along most of the HDC. High-rise type projects with a high urban density are often critical to EIFD financing, as the number of residents in a given area determines the needed geographic size of the financing district. Lack of density and/or potential slower economic growth carries substantial risk to any EIFD considerations.

8.2 Enhanced Infrastructure Finance District (EIFD) -Policy and Implementation

California was the birthplace of TIF districts and has often been the pioneer in updating and modifying TIF and IFD policies. In the wake of the recent abolishment of California Redevelopment Agencies (RDAs), a new system of public funding arose as a replacement. California State Senate Bill 628, passed in fall 2014, created EIFDs to fill the gap left behind by the dissolution of RDAs and to upgrade past IFD policies. Much like their predecessors, EIFD's utilize TIFs to carry out infrastructure-related projects in carefully designated districts within a city or county. The "Enhanced" IFDs, however, were created in the wake of a specific problem: since the introduction of the TIF, most of California's infrastructure and economic stimulus projects had been completed via the RDAs (not through the formation of IFDs).

This RDA-dependent process proved to become fiscally problematic over time. So much so that many RDAs received financing from California's General Fund, often with the school system's share of property taxes. As a result, Governor Jerry Brown's administration sought to create a broader form of financing that did not drain the General Fund as heavily as the RDAs, and subsequently created EIFDs to spur intergovernmental spending. To prevent future fiscal management problems, EIFD policies only allow for 20% of the tax increment income that TIFs could garner from RDAs, which insulates general funds and corresponding governmental services from the fiscal impact of an EIFD's tax increment income.⁶¹

The strategic and governance components of EIFDs are notably robust. Unlike traditional IFDs which are controlled by an RDA, EIFDs are governed by a Public Financing Authority (PFA). PFAs are five-member units, generally containing three members of the taxing authority participating in the EIFD, and two members of the public. If more than one city/county are involved in the EIFD, then three members of the PFA must be representative of the taxing legislatures, and the remaining two positions will be comprised of members of the public.

⁶¹ Enhanced Infrastructure Finance District, <http://cceda.com/wp-content/uploads/EIFD-Resource-Guide-Feb-20161.pdf>

According to the League of California Cities, state legislation dictates that a municipality that formerly contained a RDA may not create an EIFD or join in a PFA until the following have occurred (in conjunction with SB-628):

1. "The successor agency receives a finding of completion from DOF [California State Department of Finance]
2. The City /County certifies to DOF that no former RDA assets are the subject of litigation involving the State, where the City, successor agency or designated local authority are a named plaintiff, have been or will be used to benefit any efforts on an EIFD until the legal process has concluded
3. The State Controller has completed its review of agency-city/county asset transfers after January 1, 2011, pursuant to section 34167.5; and the successor agency has complied with the findings and orders of the State Controller stemming from those reviews".

After it has been shown that the City/County has met the RDA dissolution requirements of SB 628, it may begin the establishment of one or more districts by resolution. The City/County must have created the corresponding PFA prior to adopting any resolution or forming any districts. Once this is completed, the City/County prepares a financing plan that describes the infrastructure development that will take place within the district and includes a plan for funding the project. Per SB-628, the primary source of funding will be the incremental increases in property taxes within the district governed by the PFA. Those preparing the financial plan must coordinate with other taxing entities within the EIFD area to establish if they are willing to assign a portion of their share of future property tax growth to the project. The legislation allows flexibility over time for the amount and percentage of property tax increases transferred to the PFA by the various other taxing authorities.⁶²

According to the California Community Economic Development Association, before the approval of any EIFD by the City/County legislature, a public hearing will be held with ample prior notice in which taxing agencies, private property-owners within the district, and members of the general public are given the opportunity to voice their comments. Voter approval, therefore, is not required for the creation of an EIFD. However, 55% voter approval is necessary for the EIFDs issuance of bonds. As a result, EIFDs are most likely to succeed in projects with strong support from its taxing authorities as well as the general public.

⁶² SB 628, <http://www.cacities.org/CMSPages/GetFile.aspx?nodeguid=d8e42eca-7647-4f12-98d4-e93383abc48c&lang=en-US>

Economically, a high-density development plan is critical to the success of an EIFD. Without high density property construction, the EIFD is at risk of financial strain and the relevant project is unlikely to attract vital private capital. If land is to be re-designated from a lower to a higher density use, there may be an opportunity for a public agency to capture a portion of this real estate value add. A public agency may be able to buy privately held land that is zoned for low density near a planned transportation hub, and then increase the designated use density. It could then theoretically sell the land back on the open market, capturing the capital gain resulting from both the increase in designated use density and the development of the transportation hub. All relevant policies, such as those that create special rights for affordable housing and restrict the range of such actions by certain types of public agencies, must be taken into consideration.

8.3 HDC and EIFD

Undertaking EIFD formation could act as the central mechanism of strategic alignment for all parties with interests in the HDC. With sufficient buy-in from the cities, counties, agencies, and stakeholders along the HDC, an EIFD (or multiple EIFDs) could provide an effective, efficient, and fiscally responsible means of financing the HDC from design to construction. The shared governance, planning, engagement and outreach required to form an EIFD would generate regional awareness of the HDC's multi-faceted benefits as well as the resources required for funding all aspects of the project.⁶³

Density of development plays a critical factor in feasibility of forming an EIFD, as future tax revenue is driven largely by the presence of tax payers. Generally, EIFDs require high unit density in order to generate sufficient revenue to pay off the infrastructure over time. The overall population distribution among census blocks in the high desert does not have the density generally desired for the formation of an EIFD. According to the 2010 census, Victorville had 1,571.8 people per square mile. Palmdale was similar with 1,438.1 people per square mile. As a reference point, New York City's population density is 27,016.3 per square mile and West Hollywood's is 18,297.3; Los Angeles County's is 2,405 and San Bernardino County's is 100.

While existing density is not generally present in the high desert, economic and population trends tend to suggest that urban density will continue to rise. This trend may prove to be especially true in parts of Palmdale and Victorville, particularly if local land use strategy can boost density immediately adjacent to the HDC's transit hubs and HSR stations. By starting at the current lower density, there is the potential for an EIFD to contribute to a stimulus and capture of significant growth through related land use strategies.

⁶³ Q&A on Enhanced Infrastructure Financing Districts, <http://www.caeconomy.org/reporting/entry/qa-on-enhanced-infrastructure-financing-districts>

Caltrans District 7's March 2016 Community Impact Assessment highlights the impact of HSR stations on density in Palmdale and Victorville. Specifically, the construction of an HSR element would likely shift lower density development patterns to higher density and mixed use within areas immediately adjacent to rail stations in Victorville and Palmdale.⁶⁴ Ultimately such development must be in alignment with local zoning and planning, which can act as a critical factor in increasing density around HSR stations.

Within Palmdale, the existing zoning and plans around each of the potential locations for an HSR station offers opportunities for increasing density of development. Existing planning documents such as *Palmdale Trade and Commerce Center Specific Plan* and the *Palmdale Transit Village Specific Plan* offer a strong starting point for discussion with the City of Palmdale on forming an EIFD to further their stated development objectives in parallel to the construction of the HDC's infrastructure. See the following tables from Caltrans District 7's March 2016 Community Impact Assessment for further detail on potential HSR station locations and existing zoning.

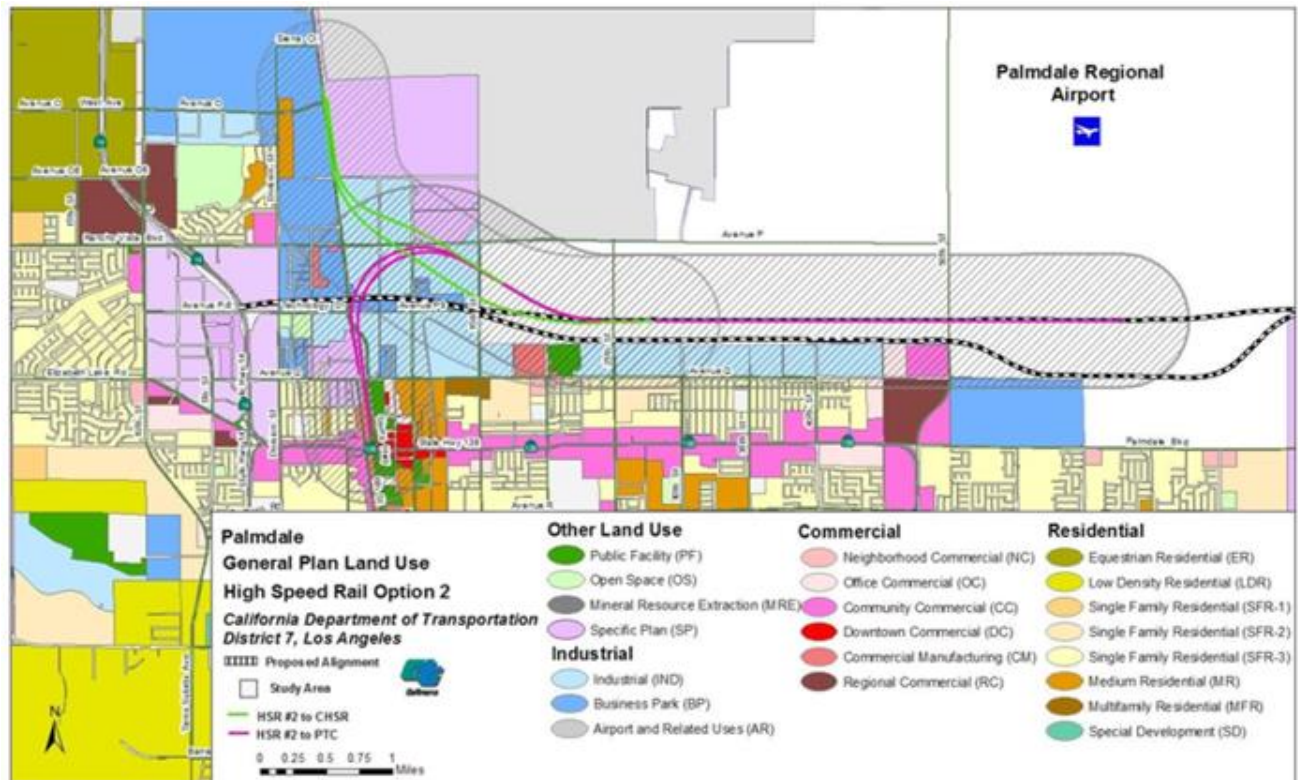


Figure 5: Palmdale Land Use High Speed Rail Option 1 Map (source: <http://www.dot.ca.gov/d7/env-docs/docs/hdc/The%20Human%20Environment/HDC%20Community%20Impact%20Assessment-March%202016.pdf>)

⁶⁴ High Desert Corridor Community Impact Report, <http://www.dot.ca.gov/d7/env-docs/docs/hdc/The%20Human%20Environment/HDC%20Community%20Impact%20Assessment-March%202016.pdf>

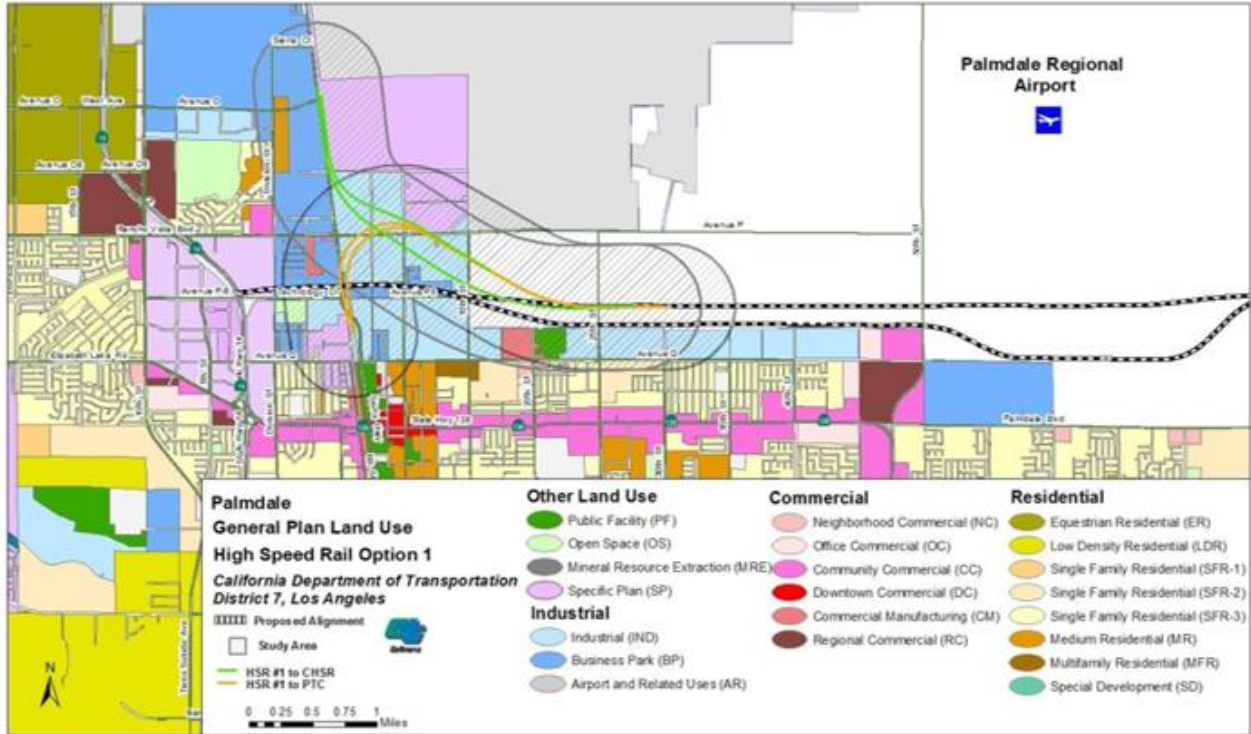


Figure 6: Palmdale Land Use High Speed Rail Option 2 Map (source: <http://www.dot.ca.gov/d7/env-docs/docs/hdc/The%20Human%20Environment/HDC%20Community%20Impact%20Assessment-March%202016.pdf>)

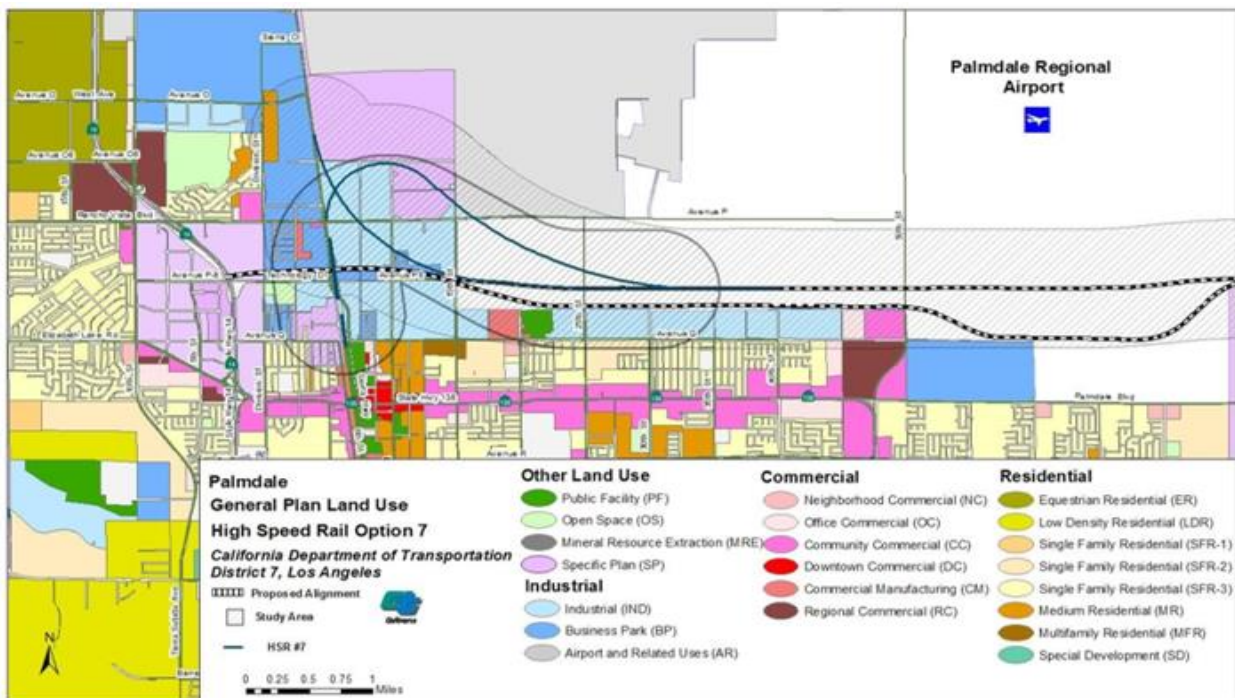


Figure 7: Palmdale Land Use High Speed Rail Option 3 Map (source: <http://www.dot.ca.gov/d7/env-docs/docs/hdc/The%20Human%20Environment/HDC%20Community%20Impact%20Assessment-March%202016.pdf>)

The addition of an HSR station in Victorville would align significantly with existing plans for increasing development around what could be a future HDC HSR station. *The Desert Gateway Specific Plan* describes a new urbanism vision for development of a transit-oriented community near the intersection of the HDC and I-15. This plan includes the designation of 10,203 acres for high density residential, commercial, industrial, and mixed use centered around transportation-related projects. An EIFD may be a useful tool with which to fund the construction of the HDC's infrastructure while furthering the local planning intentions within Victorville.

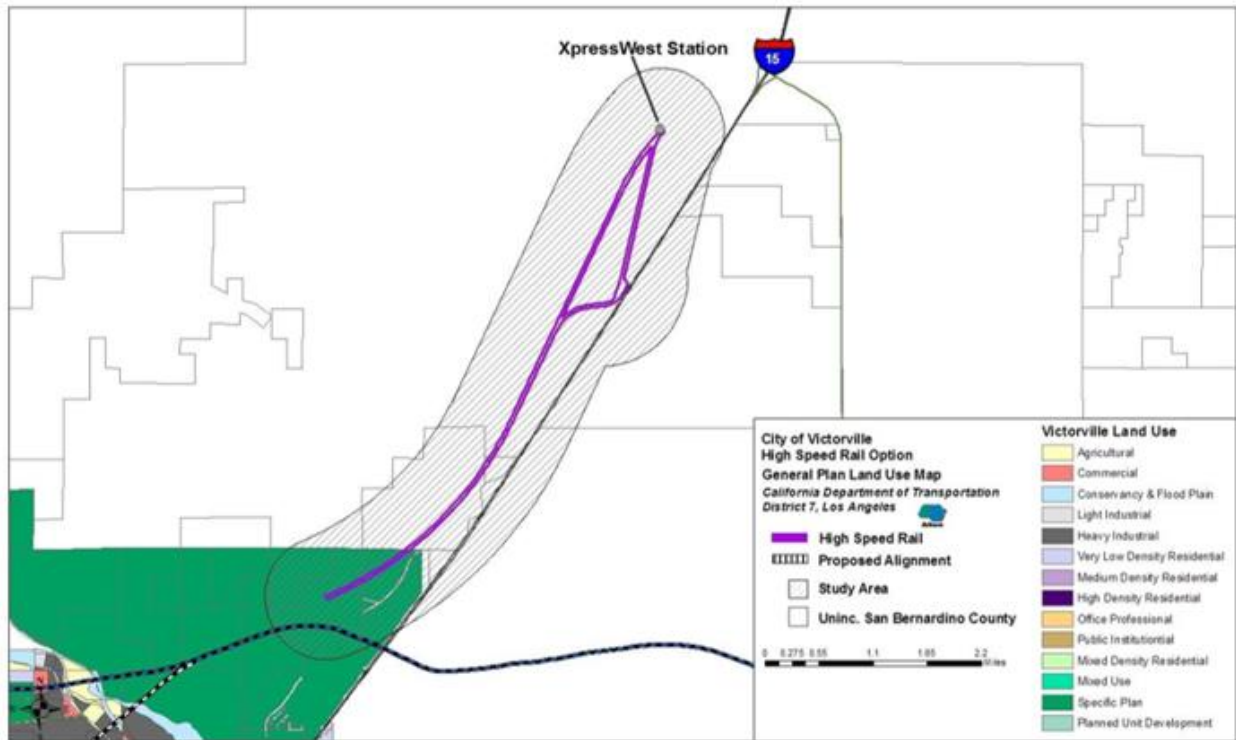


Figure 8: Victorville Land Use High Speed Rail Map (source: <http://www.dot.ca.gov/d7/env-docs/docs/hdc/The%20Human%20Environment/HDC%20Community%20Impact%20Assessment-March%202016.pdf>)

Immediate research is required to establish the appropriate geographic and governance scope for formation of one or more EIFDs. Given that governance of an EIFD includes a wide range of taxing entities such as city, county, and special districts, the size and corresponding governance model will be a vital consideration prior to EIFD formation.

It may be beneficial to consider multiple EIFDs along the HDC. If usage fees and tolls continue to be restricted to the central component of the roadway, then one potential model might be to utilize EIFDs in Palmdale and Victorville to fund the \$1.5 to \$2.3 billion funding gap for construction of east and west segments. Such EIFDs would work in parallel with P3 tolling agreement for the middle 50 miles of infrastructure. Further research is required to determine which opportunities are both financially beneficial and politically viable.

The planning process for an EIFD requires the identification of a clear goal and a corresponding funding strategy. In the context of the HDC, this will require bringing multiple investment streams together from across multiple jurisdictions. The large range of benefits that are generated by the HDC correspond to many accessible revenue streams. However, with size comes complexity, evidenced by the formation and ongoing governance of the HDC JPA. While the authority of an EIFD may provide the multiple financing authorities and flexibility necessary for the HDC's local funding and financing capacity, an EIFD will also require a considerable undertaking of regional collaboration and intergovernmental alignment. The size and scale of the HDC would likely strain a single EIFD authority's ability to provide an organizational structure that functions across jurisdictions to access all available financing tools. Exploration of creating multiple EIFDs may be beneficial to the advancement of the project's governance.

Formation of one or more EIFDs will allow the integration of a wide range of financial options since the HDC includes both transit and energy infrastructure. Options for financing are furthered by inclusion of water-related projects, resource conservation projects, affordable housing, and any other components that provide community-wide benefit along the right of way.

Under EIFD protocols, demonstrating a link between 'payer' and 'beneficiary' is a complex task that has caused local governments to historically turn to sales tax measures and state bonds instead of using tools such as an EIFD to support infrastructure projects. But recent innovations in the planning profession are making the measurement of benefit much more feasible. In the "Blueprint" growth-visioning process used by the Southern California Association of Governments, planners relied on geographic informational systems analysis and modeling to identify when specific land parcels experienced a "tipping point" in value as a result of public infrastructure and land use investments.

A modification of this “tipping point” analysis is under development that will allow the same approach to be used for water infrastructure, which will give planners a way to determine how geomorphology within an EIFD determines how water runoff impacts individual land parcels. By using such tools, the proportionality analysis needed to satisfy Proposition 218 and Proposition 26 can be established, thus allowing the EIFD to successfully tap into a wealth of new revenue streams directly linking infrastructure beneficiaries with taxpayers.⁶⁵

By using such a “tipping point” analysis, the EIFD authority could calculate the HDC’s impact on property values through improved regional recreational, passenger, industrial and commercial transit options; green energy production and transmission; improvements to water-related infrastructure; economic multipliers; and environmental impact mitigation. In addition, investments in parking districts, circulation systems, railways, tollways, and energy production could generate revenue that could be captured using the fee authority of an EIFD.

Once formed, an EIFD can utilize growth from existing revenues, all existing assessment law authority granted by the state, and fee and partnership authority granted by the Infrastructure Financing and Investment Act. The EIFD statute is essentially a basket of financing tools which includes capturing growth in property taxes, benefit assessment, fees, and other related authorities. To the extent a nexus exists between the assessment and the benefit to property, any given assessment is not considered a tax under Prop. 218. To leverage funds, an EIFD can create availability payment schedules using the resources of participating taxing entities. In addition, an EIFD can issue tax increment bonds with a vote threshold of 55%, which require an independent audit every two years.

While EIFD funds are restricted from being used for operations and maintenance, a procurement agreement with a private party can encourage private funding of operations and management as a means of preserving the value of revenue-generating assets along the HDC. Revenue from these assets would correspondingly be allocated to the private party, thus becoming available for use in operations and management of the HDC’s infrastructure. See Section 9.5 below for further discussion on P3 considerations.

The process of establishing an EIFD, creating an investment program, crafting a financial package, and combining it all into a strategic plan may prove to be both a massive and a highly valuable undertaking. In order to complement such a comprehensive pursuit of local funding mechanisms, the HDC will certainly benefit from leveraging state and federal grants and/or financing to unlock further resources.

⁶⁵ Funding Sustainable Communities: Enhanced Infrastructure Financing District, <https://cafwd.app.box.com/s/p8re0h7s6vkhm1st2uwq>

8.4 HDC and Transportation Infrastructure Finance and Innovation Act (TIFIA)

TIFIA is a federal program of the United States Department of Transportation that provides credit assistance to projects of regional and national significance.⁶⁶ Recently released federal priorities further bolster the importance of TIFIA in leveraging limited federal resources and stimulating capital market investment. The HDC could benefit from TIFIA by securing credit assistance in the form of a direct loan, loan guarantee, and/or standby line of credit.

The HDC has multiple attributes that make it a strong potential fit for TIFIA. First, the project components demonstrate significant public benefits through enhanced transit options, commercial freight considerations, environmental sustainability, green energy production, energy transmission, economic stimulus, job creation, and incorporation of innovative technology. Secondly, the HDC's P3 approach would encourage new revenue streams and private participation that would balance strategically with the flexible long-horizon interests of federal investment.

If secured, TIFIA could provide credit assistance up to 33% of reasonably anticipated eligible project costs. This percentage can be increased to 49% if the sponsoring agency provides compelling justification. The HDC would have no problem meeting the minimum anticipated project cost of \$50 million for Surface Transportation Projects. Components of the HDC may also meet the \$10 million and \$15 million minimum for transit-oriented and ITS projects respectively.

Since the total anticipated cost of all HDC build-components is estimated at \$6 billion, well over the TIFIA threshold of \$75 million, all senior debt and TIFIA loans would be required to receive investment grade ratings from at least two nationally recognized credit rating agencies. Options for the required dedicated revenue source include energy generation, usage fees, and other P3 considerations.

Consideration must be given to TIFIA's intention to reduce a given project's reliance on federal grant assistance. If the HDC were to pursue TIFIA support, the project would be subject to applicable federal requirements such as civil rights requirements, The National Environmental Policy Act (NEPA), Uniform Relocation, Buy America, and Titles 23 and 49.

⁶⁶ TIFIA Credit Program Overview, <https://www.transportation.gov/tifiatifia-credit-program-overview>

In order to proceed, the JPA must submit a detailed letter of interest once the HDC can provide sufficient information to satisfy statutory eligibility requirements, such as credit worthiness, and readiness to proceed with contracting process no more than 90 days from execution of TIFIA credit instrument. Once the TIFIA Joint Program Office processes that letter, an invitation to formally apply may follow.

8.5 HDC and Railroad Rehabilitation and Improvement Financing (RRIF)

If the HDC's HSR component is deemed eligible, RRIF may provide similar reduced-rate financing as TIFIA but in a larger amount. Within RRIF's \$35 billion for rail infrastructure development and improvements, the HDC may prove particularly compelling given its promotion of economic development in the high desert, impact on international competitiveness through Global Access and SCLA, and enhancement of rail infrastructure in rural areas. Initial research indicates that direct RRIF loans can fund up to \$3.5 billion over 35 years with interest rates equal to government borrowing cost. RRIF does require a credit risk premium, which is not required under TIFIA.⁶⁷

It is notable that XpressWest applied for RRIF in 2010 and was denied due to the project's failure to meet Buy America standards. Concerns were also expressed regarding the risk of financing private passenger-rail projects, for which RRIF has never been used.⁶⁸ Further research is suggested to better understand the HDC's suitability for RRIF, especially given the potential scale of funds available.

8.6 HDC and Private Activity Bonds (PABs)

California Debt Limit Allocation Committee (CDLAC) administers the tax-exempt PAB program available annually for California. Such bonds are purchased by the private sector and repayment is not an obligation of the state or the federal government.⁶⁹

⁶⁷ Railroad Rehabilitation & Improvement Financing RRIF, <https://www.transportation.gov/buildamerica/programs-services/rrif>

⁶⁸ The Railroad Rehabilitation and Improvement Financing (RRIF) Program, <https://fas.org/sgp/crs/misc/R44028.pdf>

⁶⁹ California Debt Limit Allocation Committee, <http://www.treasurer.ca.gov/cdlac/current.asp>

Current allocation of PAB through CDLAC is limited to specific program areas, one of which is designed for Industrial Development Bond Projects. Given the considerable manufacturing interests along the HDC, it may be possible to pursue such resources based on immediate and long-term needs for industrial and commercial freight, the aerospace industry, and the region's goods movement. Manufacturing at Air Force Base 42 as well as industrial/commercial activity at SCLA constitute a considerable amount of economic activity by private corporations. Further exploration into how to utilize PAB under existing California practices would require support and insight from relevant private corporations.

There may also be ways to access PAB through CDLAC on behalf of water treatment and recycling aspects of the HDC, but these opportunities are relatively limited compared to the potential impact of using PAB on a larger portion of the HDC.

There may soon be mechanisms for the HDC to access PAB outside of the CDLAC's annual \$3.9 billion issuance and the program restrictions thereof. The U.S. government has indicated a strong desire, included in an addendum to the White House's 2018 budget, to expand the existing \$15 billion cap on PAB and the usability of PAB to more directly support transportation infrastructure.

PABs outside of California are currently used to issue tax-exempt bonds on behalf of private entities constructing highway and freight transfer facilities.⁷⁰ They are particularly valuable when used along with TIFIA and/or RRIF (described above in Sections 8.4 and 8.5) to finance P3s. If the federal government moves forward with expansion of PABs, along with various other policies to incentivize P3s, the HDC could be in a strong position to utilize such resources.⁷¹

⁷⁰ The Safe, Accountable, Flexible, Efficient, Transportation Equity Act <https://www.irs.gov/tax-exempt-bonds/the-safe-accountable-flexible-efficient-transportation-equity-act-a-legacy-for-users-safetea-lu-pl-109-59>

⁷¹ 2018 Budget: Infrastructure Initiative, https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/budget/fy2018/fact_sheets/2018%20Budget%20Fact%20Sheet_Infrastructure%20Initiative.pdf

9. REVENUE-GENERATING ASSETS

9.1 Renewable Energy Generation

A proposed concentrated photovoltaic system of 20 MW is estimated to produce enough energy to offset the entire power usage of the HDC project, carrying with it a considerable financial and environmental advantage. Due to prohibitive costs of on-site energy inversion, offsetting all infrastructure components to net-zero would require the HDC to produce energy on-site for off-site use while consuming energy produced off-site for on-site use. In order to facilitate this offset strategy, pursuit of a clear agreement with regional utility interests, such as SCE and/or LADWP, as well as California Independent System Operator (CAISO), will be required.

As previously outlined, solar energy is abundantly available along the HDC. Such technology generally requires large land areas to optimize production, which can be a hindrance to some projects, but is favorable to the HDC due to the greenfield nature and low real estate costs along the current proposed right of way. Considerations will be made to accommodate local planning preferences, wildlife migration, historical and cultural sites, environmental impact, proximity to related infrastructure, and regional power needs. Specific designations such as EOAs and SEAs shall be considered alongside Los Angeles County's REO and San Bernardino County's Renewable Energy and Conservation Element (RECE) for siting of any power-generation infrastructure.

Green energy sources other than solar have been investigated, but none provides the same combined benefit of financial and energy benefits. Options for wind, geothermal, hydropower, and biomass renewables are described in depth within the HDC's Green Energy Report by Infra Associates. Among non-solar options, wind energy is the most viable. Land use, zoning, and aesthetic considerations would have to be more fully assessed before continuing to explore wind energy in the high desert.

The formation of an EIFD may provide resources and mechanisms to secure land adjacent to the right of way. These mechanisms could potentially include the ability to secure land through eminent domain. However, given the real estate values and availability of underutilized and unusable land along the right of way, it would be of benefit to explore purchase of any additional land through market-based acquisition.

9.2 Regional Trend toward Distributed Energy Resources

As mentioned earlier in the report, the high desert region has some of the highest solar power availability in the country. County and local planning processes are aligning more and more with existing municipal efforts to capture and utilize the potential for renewable energy through varied forms of DER. DER planning seeks to decentralize power generation with the intention of aligning on-site production with on-site consumption. Many see DER as a means to eliminate cost, complexity, dependency, and inefficiency of established mechanisms of transmission and distribution. However, these intentions to move away from traditional energy infrastructure come with considerable increased risks, reduced stability, and potential user-cost fluctuation.

The HDC may provide SCE an opportunity for demonstration and deployment projects related to DER as outlined in SCE's Distribution Resources Plan.⁷² Given that most DER-related exploration has taken place in Orange County, it may be of value to SCE to expand demonstration and deployment projects to the high desert. A microgrid project might of be particularly high strategic value given the recent history of LCE and the increasing interest of neighboring municipalities to pursue similar DER efforts. Such an endeavor could demonstrate how utility companies and semi-centralized energy infrastructure can play a critical role in providing stability and safety to the local power supply while simultaneously lowering and stabilizing user costs.

Such an arrangement with one or more utilities for transmission or distribution infrastructure could be structured to produce positive revenue for the HDC over time.

9.3 Off-ramp and Adjacent Development

Off-ramp development in and adjacent to the right of way of the HDC may provide additional revenue opportunities. Such development can lead to sustainable charging/fueling stations, additional green energy production, water-conscious construction, and bolstered collaboration with and among regional communities.

⁷² SCE Application and Distribution Resources Plan, [http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/BF42F886AA3F6EF088257E750069F7B7/\\$FILE/A.15-07-XXX_DRP%20Application-%20SCE%20Application%20and%20Distribution%20Resources%20Plan%20.pdf](http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/BF42F886AA3F6EF088257E750069F7B7/$FILE/A.15-07-XXX_DRP%20Application-%20SCE%20Application%20and%20Distribution%20Resources%20Plan%20.pdf)

In keeping with its identity as a green energy corridor, the HDC roadway can promote use of a combination of electric vehicle charging stations and hydrogen fueling stations, each supplementing its power supply with photovoltaic rooftop solar arrays. These structures would allow increased mobility for drivers of electric and hydrogen fuel cell vehicles, allowing them to travel the length of the corridor and potentially facilitating movement of green vehicles between Los Angeles and Las Vegas. Without such fueling infrastructure, this distance is inaccessible for EV and fuel cell vehicles with limited ranges. These stations could also feature rainwater capture systems, allowing them a higher level of self-sufficiency with respect to utilities and preventing strain on the local watershed. The presence of charging and refueling stations could attract environmentally friendly motorists from around the greater central and southern California region, boosting business to other commercial centers on the right of way and increasing the property values for the state.

In addition to renewables, a clean energy approach inclusive of compressed natural gas refueling stations may contribute to the environmental and financial sustainability of the project. Options for vehicle charging and fueling stations are further explored in the HDC's Green Energy Report by Infra Associates. Such development along the right of way may provide additional opportunity for EIFD formation.

As mentioned under Renewable Energy Generation in Section 9.1, use of land within and adjacent to the right of way can provide solar energy generation. In addition to green energy generation within the purview of the HDC, the construction of a DER-friendly transmission line within the right of way would create opportunities throughout the high desert for renewable energy projects. By utilizing the HDC's right of way for a transmission line, which would run over 50 miles from a western LADWP substation in Los Angeles County to an eastern SCE substation in San Bernardino County, solar farms and other sources of green energy could plug into the grid. Such developments would have the potential to provide revenue to the HDC, further improve environmental sustainability, create local jobs, and generate economic growth, all while strengthening the region's DER and the state's portfolio of renewable energy. Portions of this renewable energy generation may be monetized either in the form of direct revenue, P3 agreement, and/or EIFDs.

Although the most recent severe drought has come to an end in 2017, southern California will always be a region where water is a valuable resource.⁷³ The high desert is no exception. Incorporating water-conscious infrastructure both into the HDC as well as into off-ramp and adjacent developments would have considerable benefit to both the project and the region. The HDC would see immediate benefits from access to grant funding and special financing options. Local water districts, municipalities, and residents would benefit from improved water quality, water storage, flood control, and regional self-reliance.

Any coordination of off-ramp and right of way adjacent land use will be made possible through collaboration with cities and districts along the HDC. In order for the project and the region to make the most of opportunities described herein, a comprehensive strategy for engagement across municipalities must be carefully planned and executed. A significant portion of these efforts will go toward establishing clear and strategic land use designations at the local level.

9.4 Usage Fees, Tollway, and High Occupancy Toll (HOT) Lanes

As discussed in the build alternatives (Section 2.2), the HDC has the option of pursuing roadway construction with or without tolls. In some form, usage fees are likely to play a critical role in creating a revenue stream for the HDC while providing choice-based efficiency for passenger travel and commercial freight. Including a tollway would generate future revenue, which can act as a basis for attracting both upfront capital funding and long-term efficiencies of a P3 arrangement. The inclusion of tolls within as much of the HDC roadway as possible is of material benefit to the financial health to the project.

By aligning costs with behavior, a usage fee or toll will help to ensure that costs to operate and maintain infrastructure are covered by those who use the transitway. Such an approach could allow for HOT lanes to be separated to allow for fee-based transit of opt-in passenger vehicles as well as commercial freight. Given the cost per mile of a large commercial truck compared to a small single passenger vehicle, allowing for price and path differentiation to be available leads to great gains in transitway efficiency.

⁷³ California Drought, <https://ca.water.usgs.gov/data/drought/>

The freeway model, without usage fees or tolls, raises concerns on efficiency as well as equity. Not only does a freeway provide no incentive for those who wish to travel faster in a separate lane, but the lack of regard for behavior causes a detrimental impact on economic equity. Like the regressive nature of mandated car insurance, such one-size-fits-all freeway approach disproportionately benefits higher-income individuals who tend to drive more miles in a given period.⁷⁴

The right of way is a particularly good fit for tolling across the high desert, where vehicles would continue to have options for east-west routes. Along the more developed eastern and western edges of the HDC, in Palmdale and Lancaster, tolling may prove beneficial to those who wish to avoid local traffic.

Under a build-option where tolling is restricted to the area between Lancaster and Palmdale, a P3 arrangement for the middle section of the HDC could act as an anchor for funding the project. Further research into additional financial options, such as EIFDs, to meet the \$1.5 to \$2.3 billion gap for funding the eastern and western edges of the HDC is recommended. See Section 8.3 for further discussion on the use of EIFDs within Palmdale and Lancaster.

Without some form of usage fees and/or tolls, the HDC will struggle to secure financing and the HDC's roadways will encounter future challenges from rising passenger travel and commercial freight. A partial toll or restricted toll portion, as outlined in the existing CEQA document, will reduce availability of revenue for a P3 partner to be involved in the HDC project. See Section 2.2 in this report for further discussion on tollway as a build-option.

9.5 Public Private Partnership (P3) Considerations

Revenue-generating assets discussed above create a valuable range of P3 opportunities for the HDC. The economic value of green energy production, vehicle charging/fueling stations, energy transmission, tolls and usage fees can become the financial basis on which a P3 is formed. Financing for the construction of the project can be secured primarily through assessing the net present value of these future revenue streams. Further considerations may be made for inclusion of mechanisms such as TIF, availability payments, fees, bonding, and other related tools.

⁷⁴ Metro Investment Report, <http://www.planningreport.com/2004/07/29/sanbags-norm-king-challenges-meeting-san-bernardinis-transportation-needs>

By linking with a P3 through one or more revenue-generating assets, the financial burden and risks associated with operations and management of the HDC could become the ongoing responsibility of a private party.

Given the opportunity for revenue-generating assets, regional growth, TIF, regional collaboration, state and federal support; the HDC will likely attract considerable private investment. This opportunity would be further advanced by pursuit of specific federal support through grants, TIFIA, RRIF, PAB, and other resources. Such support will likely become more accessible in the coming years through the growing recognition of the importance of P3s to rebuilding the nation's infrastructure.

In addition to opportunities along the HDC's right of way, the HSR stations in Palmdale and Victorville may provide additional P3 investment mechanisms. Given the regional connector role that the HDC's HSR will play between northern, central, and southern California, as well as Las Vegas, there is likely to be a strong demand for high-density residential and mixed-use development within the immediate vicinity of HSR stations. By strategically forming EIFDs in partnership with P3 investment, the HDC JPA can improve availability of funding for construction by capturing a portion of future high-density tax increment for financing the growth-inducing transit and energy infrastructure.

10. SUMMARY OF OPPORTUNITIES

Each of the HDC's eight unique land use characteristics help make this project a potential win across the board for residents, businesses, passenger travel, commercial freight, goods movement, green energy infrastructure, economic development, local governance, environmental sustainability, and regional advancement.

1. CEQA filing for a green energy corridor with HSR, highway/tollway, bike and pedestrian paths.
2. A one of a kind urban-adjacent greenfield project-type, which allows a unique capacity for innovation and incorporation of new technologies.
3. Regional energy substations located at each HDC terminus, which create opportunities for green energy generation and transmission.
4. Proximity to the expanding Inland Port at SCLA as well as high-growth population centers.
5. A range of options for financing and executing the project, including green energy grants and investments, EIFD, usage fees, and various P3 opportunities.

6. Direct alignment with state policy, current and future interests of Los Angeles and San Bernardino Counties, and identified priorities of local cities and unincorporated communities.
7. Engagement with local municipalities to encourage energy and environmentally conscious development of transit and energy-related planning; especially as it relates to emerging trends in renewable energy, CCAs, and DER.
8. Complementing nearby infrastructure plans to create a mega-regional rail option for passenger travel from northern, central, and southern California to Las Vegas.

As discussed in this report, as well as the CEQA filing, the HDC goal of offsetting to a net-zero energy emission supports not only statewide goals but also local interests. The HDC will serve as much more than a green energy corridor; it will provide an international model for future green energy transit projects. A host of environmentally minded solutions, including DER-based production, distribution, and transmission provide opportunities for both revenue generation and upfront capital costs while mitigating many pollution and ecological concerns.

Electric vehicle charging and hydrogen fueling stations, complete with their own solar panels and water conservation technologies, can be constructed in the off-ramp right of way of the project to provide better mobility and accessibility to owners of these kinds of vehicles. Particular consideration can be made for commercial freight fueling infrastructure. Ancillary revenue and financing opportunities can be captured as ongoing revenue or structured for use as upfront capital costs. The presence of these stations could make the HDC an instrumental link between California and Las Vegas for travelers with alternative energy vehicles, as well as those riding the newly complete passenger railway through the high desert. The increased traffic from both passenger vehicles, goods movement, and HSR riders will have a considerable impact on regional economic advancement.

The HDC directly supports goals within the general plans set forth by both Los Angeles and San Bernardino counties. Improving infrastructure, lowering traffic congestion, and having a minimal environmental impact are among the highlights of the HDC project. Alignment with related local trends toward CCAs and DERs further bolsters the regional value of the project.

The HDC will have the added benefit of supporting future development in and around the Inland Port. The SCLA currently employs thousands of people. This number is expected to grow significantly as production and distribution firms expand to the SCLA. Complementary manufacturing growth is anticipated on the other side of the HDC around Palmdale Regional Airport and Air Force Base 42. The HDC will support the projected population growth in the high desert area by providing much-needed energy and transit infrastructure. Additionally, the HDC will provide a less-congested alternative for connecting Global Access and the Inland Port to the Port of Los Angeles, Port of Long Beach, and LAX. This will in turn greatly improve the efficiency and effectiveness of goods movement across southern California, and correspondingly throughout the United States.

A wide range of financing and funding opportunities can be explored for the HDC project. The most compelling land use tool discussed in this report is the EIFD. This financing mechanism allows local municipalities to borrow against future property tax increases in a defined area to fund infrastructure development, with a five-person PFA attending to the project rather than the past RDA or IFD models. The scope and magnitude of the HDC could justify the creation of an extensive EIFD, possibly across city and county lines. This process would involve close inter-jurisdictional cooperation, and the payoff of completing the green energy corridor would reap excellent returns on such an investment. Such a regional effort to improve transit and energy, including the private sector through P3 agreements, would be a rare opportunity to meet local needs while furthering both the State of California and the current federal administration's vision for the future of infrastructure.

11. NEXT STEPS

The high desert region is currently challenged by over-reliance on passenger vehicles and fossil fuels, lack of predictable funding streams for cities and counties, insufficient green energy production and transmission, unmet opportunities for collaboration across city and county boundaries, insufficient public transit options, and a dearth of job and economic opportunity. Given the anticipated economic and population growth in the region, these issues will become increasingly problematic and urgent in the near future.

If funding gaps can be addressed, and the HDC can be built in concert with local land use preferences, then the high desert would see movement on all the challenge areas outlined above. Improved public transit options would lead to a reduction in passenger vehicles and fossil fuel. Strategically developed P3 agreements would increase predictable funding streams for cities and counties. Coordination with SCE and increasingly DERs could make the HDC a regional backbone for ongoing green energy production and distribution. Not least of all, the economic activity produced by the construction and ongoing operation would generate a considerable amount of jobs, as well as secondary and tertiary economic benefits. Given that such progress can be made with environmental sustainability and net-zero energy offsets, the HDC is well-positioned to act as a backbone for the future development of the high desert as well as a model for similar infrastructure across the U.S.

11.1 Navigating State and Federal Dynamics

While local expertise remains the most critical source of information for the land use components of the HDC, state and federal factors remain relevant. The two main mechanisms around which to further develop a plan are regulation/oversight and funding/resources. Going forward, the HDC will benefit from an approach that exceeds all regulatory or oversight requirements while optimizing the funding and resources it can secure from state and federal entities.

Most recently, President Trump's stated infrastructure plan aims to allocate \$200 billion over 10 years in financial incentives to states, rural formula programs, and transformational projects. A more detailed plan has been scheduled for release in Fall 2017. Incentives are expected to encourage the private sector to finance public infrastructure projects. The intention will be to utilize \$200 billion in public funds to attract \$800 billion in private sector funding to meet a total expenditure of \$1 trillion. The Administration's goal is to engage the private sector to finance and potentially take over public infrastructure projects. A portion of the total funding is specifically intended for projects in rural areas with 50,000 people or less, which may require comparatively higher levels of public funding. An additional portion is intended for use on high risk transformational and innovative infrastructure. Initial funding is expected to flow to projects that already have secured financing through private and local sources.

Although the HDC planning process started long before President Trump took office, there is a great deal of alignment between the HDC and the infrastructure plan proposed by the White House. The HDC serves rural areas, has access to local funding, and carries strong regional relevance. The visionary nature of a transformational net-zero hybrid transit-energy corridor approach, structured through a P3 agreement for design, build, financing, operation, and maintenance, aligns directly with the White House's stated intentions. It is recommended that the HDC make known such alignments so that federal funding, and corresponding private sector agreements, may become more readily and fully available for use. Once the HDC plan for funding and next steps is approved and ready to proceed, the Federal Rail Administration will be contacted for a Record of Decision (ROD). Upon completion of this step, the project will gain considerable momentum toward completion. At that stage, initial conversations with a range of interested parties will convert into more substantive discussions.

11.2 Collaboration with Interested Parties

At the present, there are a variety of interested parties that have been involved with the HDC over the course of the past decade. These include residents, environmental stewards, property owners, local cities (Palmdale, Lancaster, Adelanto, Victorville, and Apple Valley), local counties (Los Angeles and San Bernardino), regional transit actors (SANBAG, SCAG, LA Metro, SBCTA, AVTA, and Caltrans Districts 7 and 8,), HSR interests (CHSRA, XpressWest), regulated utility companies (SCE and LADWP), commercial and freight interests (SCLA, Palmdale Airport, Air Force Base 42), and perhaps drone (UAV) and self-driving (AV) car and technology companies.

The intention of the HDC is to provide a transitway and energy corridor that provides improved efficiency, equity and acceptability, and sustainability. By doing so, the financial and economic health of the region, the quality of life for its residents, and considerations for environmental impact will all be advanced. Cooperation and collaboration between all the aforementioned interested parties will be critical to the design, build, financing, operation, and management of the HDC.

For the purposes of the HDC's planning process, it may be beneficial to consider local cities and counties as the source of understanding concerns and desires of residents, environmental stewards, and property owners. Extensive community outreach was done on behalf of the HDC in the past, much of which can be found in Caltrans' March 2016 Community Impact Plan.⁷⁵ Outcomes of such public outreach largely aligns with what can be found in local planning documents. It is notable that public voice tends to emphasize potential negative environmental and social impacts, while the general public may still benefit from increased economic activity, rising real estate values, and overall improvements to transit and energy infrastructure. Given the public participation in land use planning, and particularly the opportunity to observe public input on plans currently under review, these processes act as a clearinghouse for local information and insights. While specific external conversations may become strategic in the future, in the immediate present, a review of local planning processes will be considered sufficient to have a beginner's understanding of the voices of residents, environmental stewards, and property owners.

While the cities and counties of Lancaster, Palmdale, Adelanto, Victorville, Apple Valley, Los Angeles and San Bernardino all have their own distinguished attributes, to a large degree they share interests in the HDC. As described in detail above, the general plans for each of these cities outlines some level of desire for all of the following; traffic reduction, increased public transit options, improvements to commercial freight, recreation opportunities, environmental stewardship, and economic development. On a more specific level, planning alignment with the HDC is explicitly represented in the Antelope Valley Area Plan, Victorville General Plan, Apple Valley General Plan, and the Los Angeles County General Plan.

Further discussion with each city and county may reveal more nuanced and immediate interests. Recent conversations with city staff at Victorville provided insight as to the political history of and current interest level in construction of the HDC. Review of a draft document by San Bernardino staff helped to direct the HDC planning process to incorporate critical and ongoing environmental planning by the county.

⁷⁵ High Desert Corridor Community Impact Report, <http://www.dot.ca.gov/d7/env-docs/docs/hdc/The%20Human%20Environment/HDC%20Community%20Impact%20Assessment-March%202016.pdf>

Regional transit agencies and associations of governments are highly relevant to and impacted by the HDC. LA Metro, SBCTA, SCAG, SANBAG, AVTA, and CalTrans Districts 7 and 8 have all been involved with the HDC project from the beginning and will continue to play vital roles from both resource and regional planning perspectives.

HSR development adjacent to the HDC is another source of closely tied interests. CHSRA and XpressWest are the primary entities seeking to build HSR infrastructure that would interact directly with the HDC's HSR component. While CHSRA is a state-wide public endeavor, and XpressWest is a local private project, they both share similar concerns in terms of ridership, environmental impact, regional economic growth, public and private HSR investment.

A transmission line consultant will begin work in September 2017 to better understand specific opportunities to collaborate with SCE and LADWP. Once this research and outreach is completed, a more specific path forward can be planned to engage with regional utility interests.

Given the potential impact of the HDC on commercial freight in the high desert, efforts to establish the Inland Port at the SCLA are of critical importance. Private sector actors, in the form of investors and regional corporate interests, stand to benefit considerably from the construction of the HDC's significant transit infrastructure. Impacts will include economic development, new international and domestic trade routes, improved east-west mobility, and an increased capacity to integrate newer technologies, such as UAVs and AVs, into the region's goods movement.

By approving the HDC as a transitway and green energy corridor, stakeholder groups can see multiple positive impacts over time. These benefits cover a wide range, from environmental to civic to social to economic to financial to community-health. By working closely with each of these aforementioned stakeholder groups, the HDC can design, build, finance, operate, and maintain infrastructure that serves the region with the local intelligence and guidance of those who know best.

11.3 Funding Options

In order to establish clear funding options, projections of costs and revenue are critical at this stage. Once costs and revenues are specifically known, taking into consideration the varied revenue paths of different P3 models, then a comprehensive funding strategy can be developed and implemented.

Due to the near certain inclusion of a P3 agreement, the following overview seeks to describe, as simply as possible, the difference between various forms of funding such as revenue, upfront capital costs, and financing.

The HDC may produce revenue from various sources, such as renewable energy sales, leasing of right of way for a transmission line, usage and tollway fees, and future tax increment through an EIFD. Such revenue over time may either be captured by the HDC JPA for direct use, or it may be directed to a private partner through a P3. Depending on the arrangement, future revenues may be used to operate and maintain infrastructure and/or to pay back debt related to upfront capital costs. In each case, a net present value calculation can be performed to essentially convert future revenue into upfront costs. All such agreements must be in place in advance of the project's construction.

Upfront capital is critical to the actual construction of the project. It can be secured through grants and various forms of loans. Grants are generally from the government and are intended to specifically provide a public benefit through a specific form or impact of infrastructure. Loans may be either from a private actor or the government, and include private equity, TIFIA, and RRIF. Another form of loan is a bond, which is essentially a loan taken from the public. A bond can provide upfront capital, potentially through PABs, that is repaid over time.

Within financing strategy, P3s can be utilized to capture tax benefits that are otherwise unavailable to public entities. Simultaneously, public entities can access grants and loans that are otherwise unavailable to private actors. By strategically considering risk tolerance alongside complementary capabilities, a P3 agreement can facilitate the HDC to the benefit of all parties involved - most notably the general public.

11.4 Land Use Next Steps for Implementation

1. Deepen regional collaboration with cities and counties, and utilize intelligence from land use plans therein to advise the strategy of the HDC.
2. Finish the planning for the design, construction, and operation scheduling components of the project.
3. Establish clear cost and revenue models, including P3 considerations.
4. Identify funding gaps and create a plan to explore a range of funding options including EIFD, PAB, TIFIA, RRIF, and various grants.
5. Identify specific land use designations throughout project.
6. Secure permits from the necessary municipal governments.
7. Schedule a final review of the project, and plan construction of the HDC for a time when it will not interfere with normal operations of existing transit and energy infrastructure.
8. Begin construction, keeping all municipalities and stakeholders updated on the project's ongoing developments.
9. Once construction is complete, have all municipal government inspect the work to ensure it meets all governmental standards.
10. After the project is officially opened, maintain continual performance monitoring operations to ensure efficiency and update stakeholders.

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13. APPENDICES

Appendix A: List of Acronyms

AV	Autonomous Vehicle
AVTA	Antelope Valley Transit Authority
CCA	Community Choice Aggregation
CDLAC	California Debt Limit Allocation Committee
CEQA	Completed California Environmental Quality Act
CHSRA	California High Speed Rail Authority
DER	Distributed Energy Resources
EIFD	Enhanced Infrastructure Finance District
EOA	Economic Opportunity Areas
HDC	High Desert Corridor
HDCJPA	High Desert Corridor Joint Power Authority
HOT	High Occupancy Toll
HSR	High-Speed Rail
IFD	Infrastructure Finance District
ITS	Intelligent Transit Systems
LADWP	Los Angeles Department of Water and Power
LAX	Los Angeles International Airport
LCE	Lancaster Choice Energy
LCI	Life-Cycle Inventory
LiDAR	Light Detection and Ranging

LOS	Level of Service
MOU	Memorandum of Understanding
NIMBY	Not-In-My-Backyard
NREL	National Renewable Energy Laboratory
P3	Public Private Partnership
PAB	Private Activity Bond
PFA	Public Financing Authority
RDA	Redevelopment Agency
REO	Renewable Energy Ordinance
ROD	Record of Decision
RRIF	Railroad Rehabilitation and Improvement Financing
SCAG	Southern California Association of Governments
SCE	Southern California Edison
SCLA	Southern California Logistics Airport
SCLC	Southern California Logistics Center
SCRC	Southern California Rail Complex
SEA	Significant Ecological Area
TIF	Tax Increment Financing
TIFIA	Transportation Infrastructure Finance and Innovation Act
UAV	Unmanned Aerial Vehicle
UPRR	Union Pacific Railroad
VVTA	Victor Valley Transit Authority

Appendix B: Glossary of Technical Terms

Autonomous Vehicle (AV): A vehicle capable of operating without a human driver.

Biomass: Organic matter gathered from living organisms that can be used as a source of renewable energy when combusted or converted to other biofuel forms via thermal and biochemical methods.

Brownfield sites: A project site that contains existing infrastructure.

California Environmental Quality Act (CEQA): Established in 1970, requires public agencies to regulate projects that may have an environmental impact.

California High Speed Rail Authority (CHSRA): A state agency run by a board of governors, established to begin formal planning in preparation of California High Speed Rail.

Community Choice Aggregation (CCA): A program designed to allow cities and counties to buy and/or generate electricity for residents and businesses.

California Debt Limit Allocation Committee (CDLAC): Administers the tax-exempt Private Activity Bond (PAB) program.

Congestion pricing: A method of reducing traffic congestion by charging a fee to use the transitway under certain conditions.

Distributed Energy Resources (DER): Small-scale power generation sources that provide community-facing energy.

Enhanced Infrastructure Finance District (EIFD): Allows for infrastructure development to be funded by a variety of financial mechanisms, including future tax increment.

Economic Opportunity Areas (EOA): Areas that have significant opportunities for growth and economic development.

Foreign Trade Zone: An entry port that can operate outside of many of the regulations and tariffs imposed by the government.

Geothermal: A source of renewable energy generated from heat in the Earth.

Green Freight Corridor Laboratory: A Sustainable Freight Action Plan freight pilot project program through the office of California Governor Jerry Brown.

Greenfield project: A project on unused land, with no existing infrastructure.

Ground-mounted: Alternative energy method where system is not connected to an existing structure.

High Occupancy Travel (HOT) lane: A toll-based roadway/lane for high occupancy travel, often accompanied by lanes without tolls.

Hydropower: Power generated from the energy of falling or fast running water.

Inland port: An inland extension of a seaport, typically connected by rail.

Intelligent Transportation Systems (ITS): An application which aims to provide advanced services relating to different modes of transport and traffic.

Internal combustion engines: Vehicle engine system relying on fossil fuel.

League of California Cities: An association of California city officials aimed at influencing policy decisions that affect cities.

LiDAR Light Detection and Ranging: A remote sensing method that uses light to generate detailed maps over large areas.

Life-Cycle Inventory (LCI): Analysis that creates an inventory of flows from and to nature for a system over the duration of its anticipated use.

Level of Service (LOS): Used to determine the performance of an intersection or roadway. It measures traffic conditions by considering factors such as speed and travel time.

Memorandum of Understanding (MOU): A formal contract between two or more parties engaging in a partnership.

Multimodal: A project consisting of multiple forms of transportation.

National Renewable Energy Lab (NREL): A federal government-owned facility dedicated to renewable energy and energy efficiency research and development.

Net-Zero Energy: Infrastructure with zero net energy consumptions. Energy consumed is offset by the same or more energy produced using renewable resources.

No Build Alternative: The scenario in which a given project will not be built.

Private Activity Bond (PAB): Tax-exempt bonds issued by local or state governments for the purpose of providing special financing.

Park-and-ride: Parking lots connecting to public transport facilities.

Public Financing Authority (PFA): Provides local governments and projects access to low-cost, tax-exempt financing for projects that promote economic development and provide public benefit.

Photovoltaic: Solar cells that convert sunlight directly into electricity.

Public Private Partnership (P3): A cooperative arrangement between two or more public and private sectors.

Redevelopment Agency (RDA): Governmental body dedicated to urban renewal, typically at the municipal level. All 400 RDAs in California were dissolved in 2012.

Renewable Energy Ordinance (REO): A type of planning and zoning code update for the review and permitting of solar and wind energy projects.

Record of Decision (ROD): Document issued by the Federal Transit Administration to explain the project decision, mitigation measures, impacts, public outreach and approval.

Significant Ecological Area (SEA): Biodiverse areas with irreplaceable resources.

Structure-mounted: Alternative energy method where system is connected to an existing structure.

Tax increment financing (TIF): Public financing method that utilizes a portion of future tax revenue to finance up front capital funding costs.

Transportation Infrastructure Finance and Innovation (TIFIA): Provides credit assistance in the form of direct loans, loan guarantees, and standby lines of credit (rather than grants) to projects of national or regional significance.

Tollway: A roadway/lane that charges a fee for drivers.

Transmission line: Infrastructure that moves electricity from production facilities to distribution systems.

Unmanned Aerial Vehicle (UAV): Aircraft without a human pilot, often referred to as a drone.

Unincorporated Areas: Land that is not governed by a local municipal corporation, therefore generally falling under governance of the county.

XpressWest: A privately-led proposed high-speed passenger rail connecting Victorville, California to Las Vegas, Nevada.

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