A stylized illustration of a skyscraper, resembling the Transamerica Pyramid, rendered in shades of blue. The building's facade is composed of a grid of white squares, and its structure is overlaid with intricate white circuit board patterns. The base of the building is wider and also features these circuit patterns. The entire graphic is set against a solid light blue background.

# DTLA 2040

## TECHNOLOGY INTEGRATION PLAN

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**Prepared by  
Jason King**



# DTLA 2040 TECHNOLOGY INTEGRATION PLAN

# DTLA

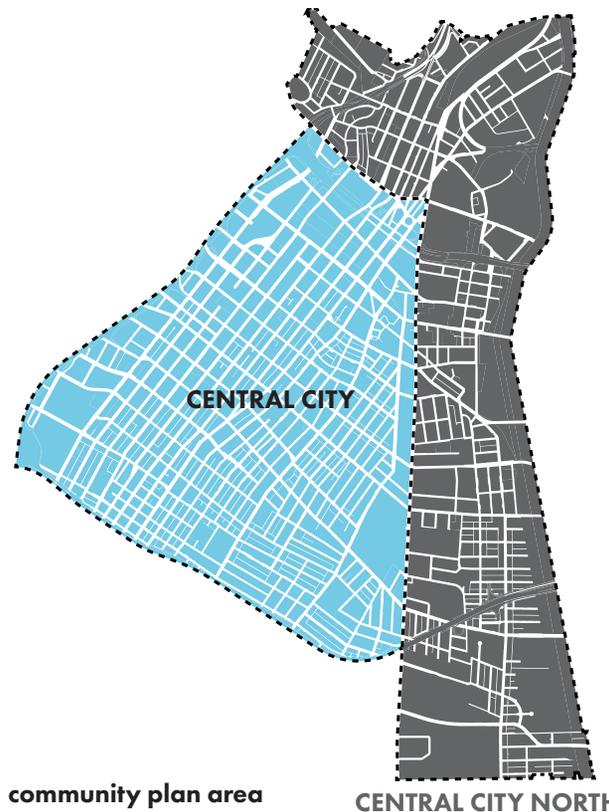
#diverse #historic #destination  
#transithub #walkable #bikeable

Downtown Los Angeles (DTLA) is a little over a decade into a major urban revitalization. Even ten years ago, one would have found themselves in nearly empty streets once the daytime working population left. Today, the 60,000+ residents find themselves surrounded by culture, dining, and nightlife; riding their Metro Bikes to the red, purple, gold and expo lines.

With this revitalization, DTLA has seen a large growth in population with no slowing foreseen well into the future. Dozens of old banks and warehouses have been adapted into apartments and lofts, but many more are needed to accommodate the current and future populations of DTLA.

Externalities tied to re-population include traffic congestion, lack of affordable housing, strain on natural resources and aging infrastructure, lack of park space, long permitting times and increased backlog, and a government slow to adapt to changing technologies.

This plan aims to address these problems and offer technological solutions. Acknowledging that every problem cannot be solved by technology, this plan shall work in concert with existing plans such as the Mobility Plan and the Plan for a Healthy Los Angeles.



about<sup>1</sup>



**66% of residents between the ages of 23-44**



**79% of residents have a college degree**



**average median income is \$98,000**



**62% of residents walk to work**



**DTLA grows to a weekday population of 500,000+**



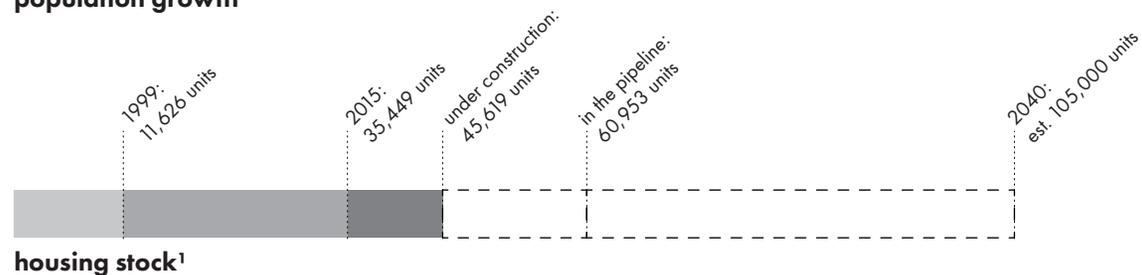
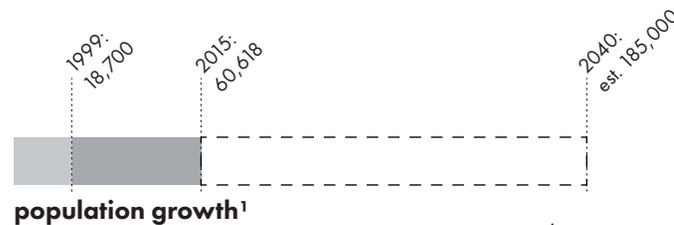
**19 million annual visitors**



**\$24,400,600,000 investment in DTLA between 1999-2015**

community plan area

CENTRAL CITY NORTH



## PROBLEM STATEMENT

DTLA is faced with a slew of problems associated with growth: available housing stock, lack of jobs in growth sectors, strains on our aging and failing infrastructure, traffic congestion, wasting of natural resources, and government inefficiency. This plan aims to address these problems with technological solutions.

## VISION STATEMENT

A smart city providing housing, vitality, opportunity, transit options, and jobs to all residents. DTLA can apply technological solutions to problems faced both in other parts of Los Angeles and cities throughout the world. Reconfiguring our priorities to aim not just to become sustainable, but to become productive, doing more than enough. We can no longer accept the financial bottom line as the primary driver in decision making. Technology alone will not solve every problem DTLA faces, but it should be applied where applicable to conserve resources, future-proof our infrastructure, improve efficiency in our government, and increase the quality of life for all DTLA residents. Making DTLA a technological smart city allows us to be the global leader in technological solutions and a guiding light for cities and communities facing similar problems.

# INFRASTRUCTURE

#internet #conservation #water #energy #zerowaste

DTLA's infrastructure is aging and failing. Precious resources are wasted, costing the city billions of dollars per year. 67% of DTLA's pipes are more than 75 years old and another 20% of which an age cannot even be ascertained. We need future-proofed infrastructure accommodating the needs of residents today while being smart and flexible enough to provide for future DTLA populations.

A reliable, fast broadband network is paramount, and will be the skeleton on which all other solutions are built. The current broadband network is not sufficient for the smart solutions proposed in this plan and must be addressed before any other policies are implemented.

## Objectives

- » Blanket the neighborhood in fast, reliable broadband internet.
- » Recycle all water.
- » Reduce waste and extract potential energy.
- » Upgrade all relevant infrastructure to "smart" alternatives.

## Goal: Conservation of resources by incorporating smart, flexible infrastructural solutions.

### Policy i0.1: Create a reliable, fast broadband network blanketing DTLA.

**Implementation i01.1:** The City shall partner with industry-leading internet providers to construct a fast, reliable broadband network blanketing DTLA by 2020.

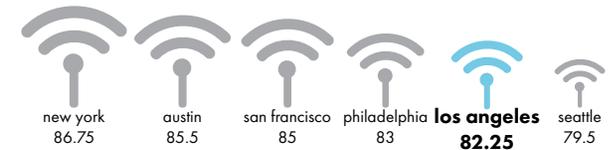
**Implementation i01.2:** The City shall identify existing infrastructure (streetlights etc.) on which to install wi-fi routers and boosters for full network coverage of DTLA.

### Policy i0.2: Eliminate the waste and pollution of potable water.

**Implementation i02.1:** The Department of Water and Power shall identify all failing and at-risk of failing pipes in DTLA by 2020.

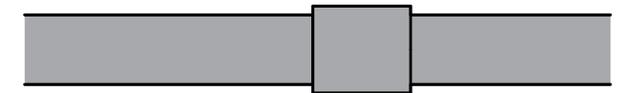
**Implementation i02.2:** The Department of Water and Power shall replace by 2040 all pipes (in order of riskiness) with smart pipes monitoring both water pressure (protecting against both bursts and leaks) and contamination (protecting public health).

**Implementation i02.3:** The Bureau of Sanitation shall create a local water treatment plant to treat and recycle all grey and black water for non-potable uses (e.g. watering public parks, water in public toilets).

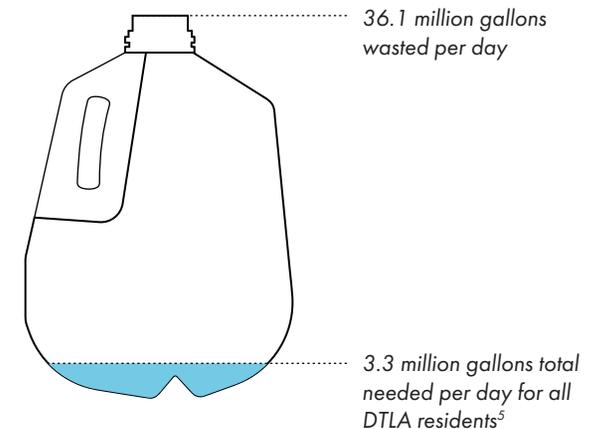
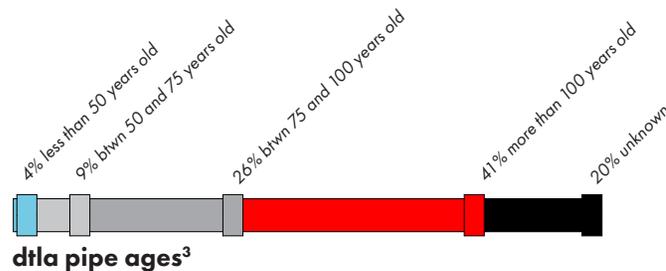


los angeles' broadband network lags behind other cities in speed & reliability scores.<sup>2</sup>

### there are currently 33 known leaks in DTLA<sup>3</sup>



Due to leaks, Los Angeles wastes 36.1 million gallons per day<sup>4</sup>



**Policy i03: Minimize the amount of waste going to landfills, and extract all potential energy, while maximizing efficiency in trash collection.**

**Implementation i03.1:** The Bureau of Sanitation shall upgrade by 2020 all residential, commercial, and public trash receptacles into “smart cans,” allowing waste management to optimize collection routes.

**Implementation i03.2:** The Bureau of Sanitation shall build multi-purpose, subterranean waste-to-energy plants below parking lots and parks. Use extracted energy to charge electric vehicles in parking lot by 2030.

**Policy i04: Eliminate wasted energy used to power streetlights while the area is empty.**

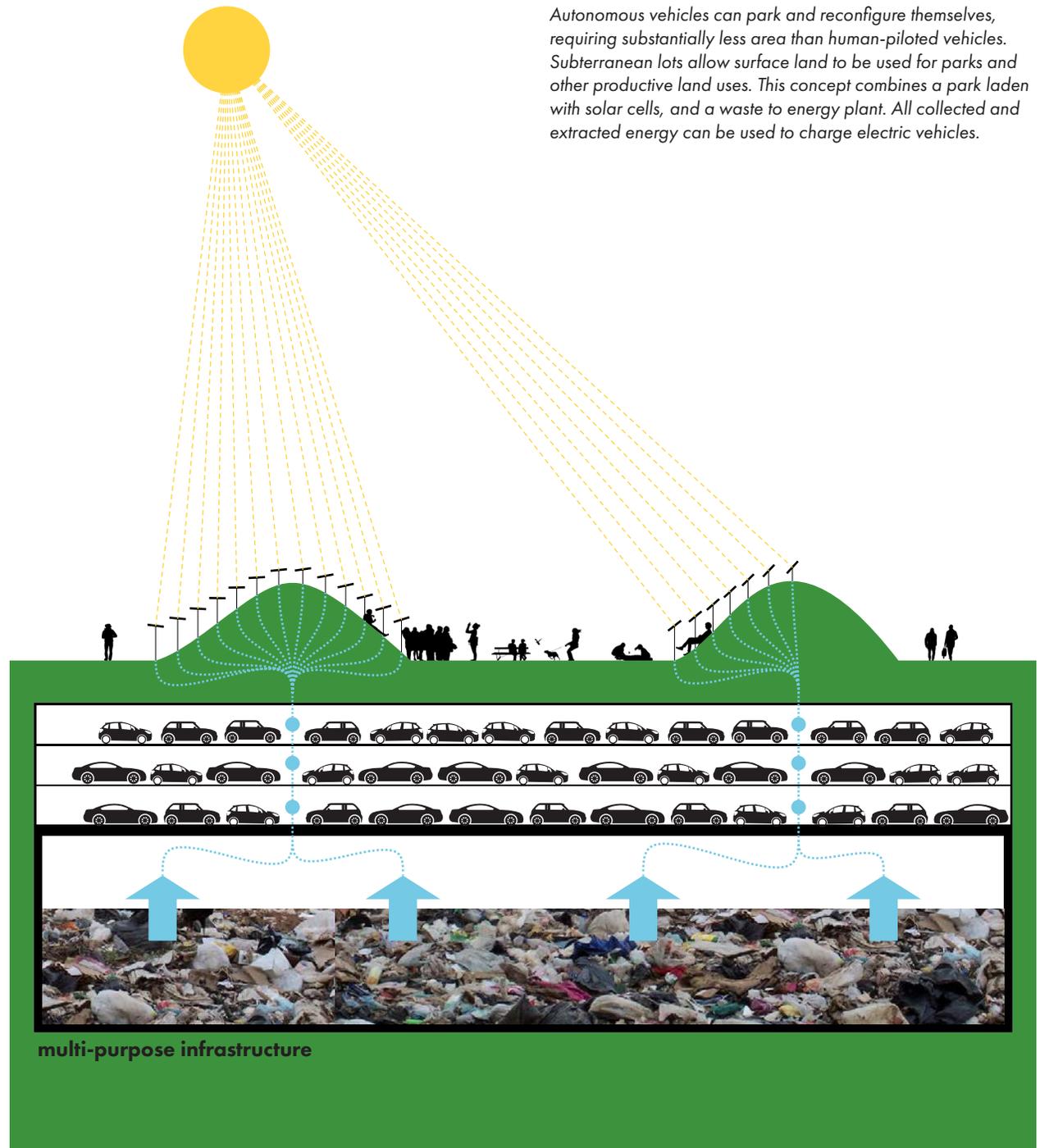
**Implementation i04.1:** The Bureau of Street Lighting shall upgrade by 2020 all DTLA streetlights to sensor-activated low-energy LEDs.

**Indicators**

To evaluate the success of the infrastructure policies, the City shall monitor the following indicators:

- broadband network availability
- broadband network speed
- broadband network coverage
- number of pipe leaks
- number of pipe upgrades
- gallons of recycled water used for non-potable means
- miles traveled for waste collection
- megawatts of energy extracted from trash
- percentage of streetlights upgraded to smart, efficient technology

Autonomous vehicles can park and reconfigure themselves, requiring substantially less area than human-piloted vehicles. Subterranean lots allow surface land to be used for parks and other productive land uses. This concept combines a park laden with solar cells, and a waste to energy plant. All collected and extracted energy can be used to charge electric vehicles.



# ARCHITECTURE

#productive #buildings #IoT #smartgrid  
#energy #water #housing

We are at a breakpoint where we can no longer continue to build wasteful, unhealthy buildings. For decades we have traded health for affordability, creating normative polluting building practices. Technologies currently exist (and are increasingly less expensive) to design and construct productive buildings. Sustainable design implies “good enough” while productive means our buildings create more energy than they use. Within the building envelope we can employ on-site equipment to dramatically reduce water waste, and have our environments adapt to us, optimizing electricity usage.

## Objectives

- » Do no harm.
- » Make all residential buildings productive by 2040
- » Waste no water.
- » Convert all appliances, light bulbs, outlets and thermostats to smart IoT connected equivalents by 2040.
- » Develop a smart grid for monitoring, distributing, and reclaiming electricity.

## Goal: House DTLA’s projected population growth in healthy, productive buildings.

### Policy a01: All new buildings to meet or exceed net-zero energy performance standards.

**Implementation a01.1:** Immediately require all new construction to include solar roofs and facades, and other energy production equipment to collect more energy than used.

**Implementation a01.2:** Immediately require installation of low-energy mechanical systems.

### Policy a02: Retrofit existing buildings to meet or exceed net-zero energy performance standards.

**Implementation a02.1:** Offer tax incentives for existing building owners to install solar roofs and facade, and other energy production equipment to collect more energy than used.

**Implementation a02.2:** Offer tax incentives for existing building owners to install low-energy mechanical systems.

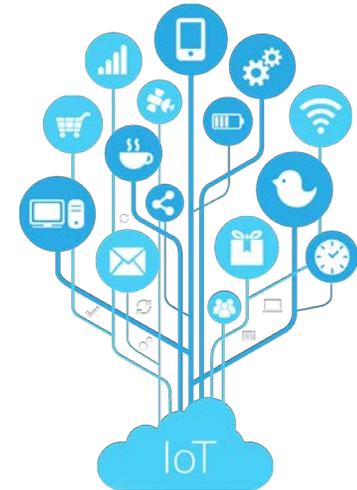


The Bullitt Center in Seattle, Washington produces 60% more energy than it uses.

### Policy a03: Integrate IoT connected devices and appliances into new construction.

**Implementation a03.1:** Immediately require all new construction to include smart IoT connected outlets, thermostats, and light fixtures.

**Implementation a03.2:** Offer tax incentives for existing building owners to install low-energy mechanical systems.



### Policy a04: Allow residents and developers to supply surplus energy back to a smart grid.

**Implementation a04.1:** Offer tax incentives to owners whose buildings produce more energy than they use.

**Implementation a04.2:** Penalize building owners whose buildings use more energy than they produce.

## Policy a04: Use all greywater and recycled blackwater for toilet use.

**Implementation a04.1:** Immediately require all new construction to install on-site wastewater treatment systems recycling grey and black water for non-potable uses.

**Implementation a04.2:** Incentivize existing building owners through tax incentives to install on-site wastewater treatment systems recycling grey and black water for non-potable uses.

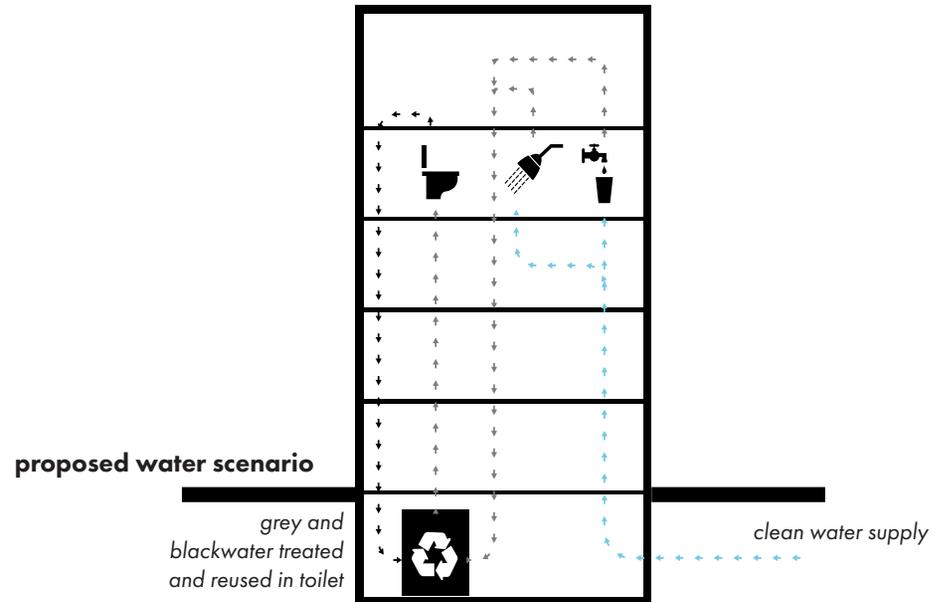
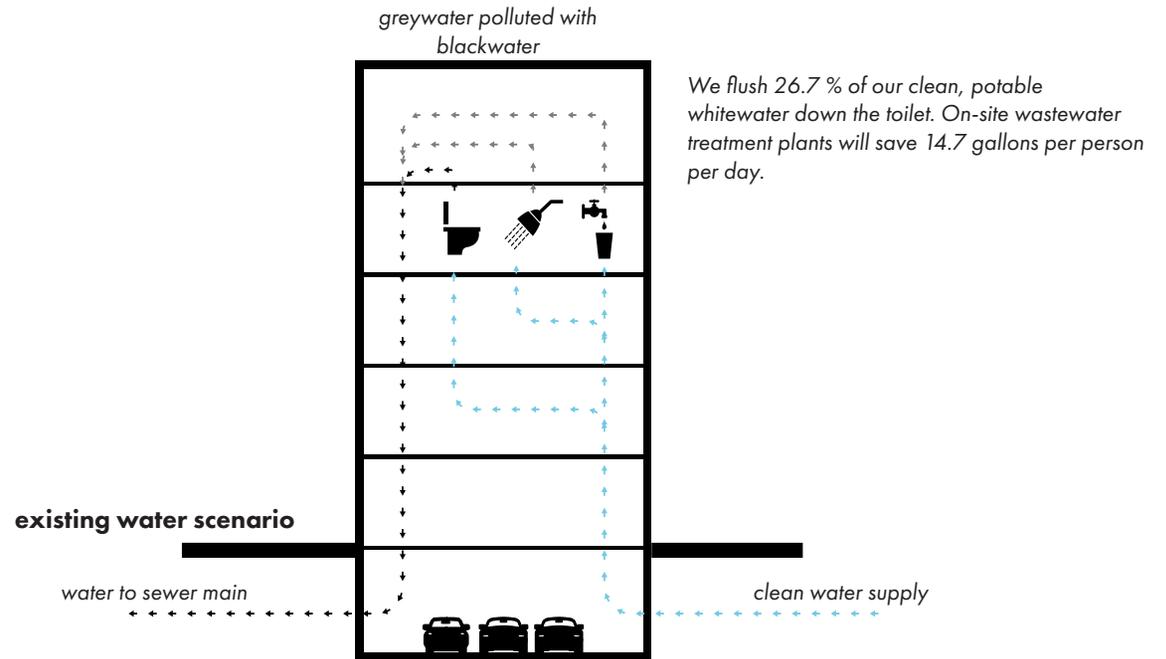
## Policy a05: Promote a car-free lifestyle.

**Implementation a05.1:** Immediately remove parking minimums from all new residential construction.

### Indicators

To evaluate the success of the architecture policies, the City shall monitor the following indicators:

- ratio of energy produced to used per building
- number of installed solar roofs
- kilowatts of energy used per resident
- number of IoT installations
- number of on-site wastewater treatment systems installed
- gallons of water saved per year
- energy returned to smart grid



# TRANSPORTATION

#visionzero #autonomous  
#completestreets #dronedelivery

Downtown devotes more than 50% of its land to the automobile. This wasteful practice prioritizes the speedy movement of a single human over neighborhood vitality for the entire community. DTLA shall create a connected efficient closed environment for the autonomous vehicle, while reclaiming land for humans.

## Objectives

- » Eliminate congestion and reliance on fossil fuels.
- » Incrementally close DTLA streets to human-piloted vehicles by 2040.
- » Enact policy allowing for autonomous vehicles.
- » Achieve vision zero.
- » Eliminate parking minimums.
- » Build smart, connected infrastructure in preparation for autonomous vehicles.
- » Promote drone delivery of most goods.
- » Reclaim space given to the automobile for humans.

## Goal: More space and safer mobility for DTLA by implementing the safest and most efficient transportation network.

### Policy t01: Close streets to human-piloted vehicles, creating a connected autonomous vehicle-only zone.

**Implementation t01.1:** The Department of Transportation shall partner with leading autonomous car manufacturers to create a standardized autonomous communication/sensor system and build communicative transportation infrastructure by 2030.

**Implementation t01.2:** The Department of Transportation shall close all DTLA streets to human-piloted vehicles (with the exception of emergency services) by 2030, with the exception of four thoroughfares: Olympic Boulevard/9th Street, 1st Street, Alameda Street, and Figueroa Street.

**Implementation t01.3:** The Department of Transportation shall close all DTLA streets to human-piloted vehicles by 2040.

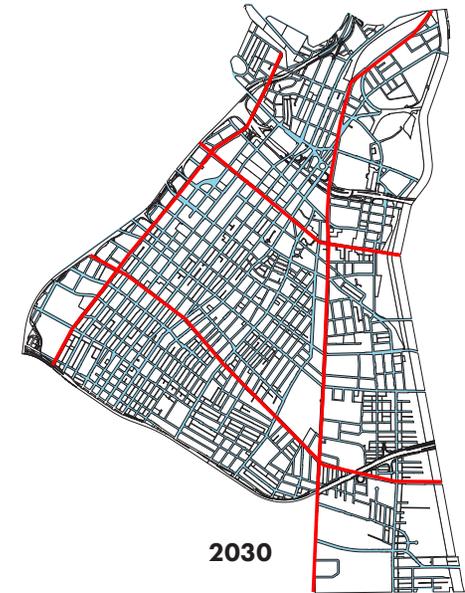
**Implementation t01.4:** Metro shall create an autonomous bus fleet deployable by 2030.

**Implementation t01.5:** The Department of Transportation shall reclassify all DTLA streets to prioritize pedestrians, bicyclists, transit and autonomous cars. Strategically build protected bike lanes to create a full DTLA bike lane network. Remove automobile lanes, returning that space to pedestrians.

### 2010-2015 DTLA collisions involving a motor vehicle<sup>6</sup>

 pedestrian  
total: 940  
fatalities: 18  
injuries: 865

 bicycle  
total: 625  
fatalities: 2  
injuries: 623



2030 shows **autonomous-only streets** and **human-piloted vehicle streets**. By 2040, all DTLA streets shall be closed to human-piloted vehicles.

## Policy t02: Reclaim valuable land currently used for parking.

**Implementation t02.1:** Eliminate parking minimums in DTLA.

**Implementation t02.2:** Build efficient multipurpose, subterranean, autonomous-only parking lot/charging stations.

**Implementation t02.1:** Build 6 perimeter parking structures for non-autonomous vehicle parking. Structures shall be designed in a manner for ease of adaptive reuse at their time of obsolescence.

## Policy t03: Promote drone package delivery.

**Implementation t03.1:** Require all new construction to provide rooftop (or balcony) delivery docks.

**Implementation t03.2:** Provide tax incentives for existing building owners to install delivery docks.

### Indicators

To evaluate the success of the transportation policies, the City shall monitor the following indicators:

- amount of congestion
- number of automobile caused injuries and deaths
- number of streets closed to human-piloted vehicles
- number of AV registrations
- Autonomous bus ridership numbers
- number of existing parking lot conversions
- number of drone deliveries



# VITALITY

#jobs #parks #education  
#augmentedreality

Los Angeles is primed the potential to be the first “smart city” in America. We are home to world-class university, natural amenities unmatched anywhere else in the country, and venture capital. DTLA can be the center where all of this begins. The revitalization underway has made the city center a desirable place to live and work. DTLA shall continue to upgrade its infrastructure and amenities to help attract the citizenry needed to create a smart city.

## Objectives

- » Attract businesses in the technology sector
- » Create parks and other amenities expected by the young, educated tech workforce.
- » Create an open-source, extendable augmented reality framework.
- » Create “smart city” programs in varying disciplines at local universities.
- » Foster entrepreneurship by connecting start-ups to venture capital funding.

## Goal: A smart, entrepreneurial population living and working in DTLA creating the smart solutions for tomorrow.

### Policy v01: Attract existing tech companies by providing the infrastructure and amenities necessary to do business.

**Implementation v01.1:** Foster the growth of tech incubators and co-working spaces, enabling entrepreneurs to develop their ideas with low overhead costs.

**Implementation v01.2:** Los Angeles Recreation and Parks shall build “smart” parks that attract a young educated workforce.

### Policy v02: Provide free wi-fi in all public spaces.

**Implementation v02.1:** Partner with service providers to provide free wi-fi in all DTLA public spaces by 2020



DTLA is under-served in both [park space](#) and [public wi-fi](#).

### Policy v03: Make information and data accessible by creating an open-source augmented reality framework.

**Implementation v03.1:** Create the framework for a layered augmented reality overlay in DTLA.

**Implementation v03.2:** Create layers visualizing all data relevant to DTLA users: bus and train schedules and routes, bike share locations and costs, public building information, games at public parks, warnings etc.



An open-source augmented reality will display information about our city. The image above shows a bus schedule just by pointing your phone’s camera at a bus stop. Layers could be added and accessed for game playing, business, alerts, and any information developers and programmers add to the AR framework.

### Policy v04: Partner with local, world-renowned universities to create relevant “smart city” programs to the technological future vision of DTLA.

**Implementation v04.1:** Create grants to fund “smart city” research institutions within different disciplines at local universities including SCI-Arc, USC, Caltech, and LATTC.

**Implementation v04.2:** Raise money for endowments to entice the brightest students through scholarships and fellowships by 2020.

**Implementation v04.3:** Create 25 paid internship positions within the Innovation Delivery Team by 2020.

**Implementation v04.4:** Keep graduates in the area by hosting networking events including graduates, local businesses, and venture capitalists.

## Policy v05: Create a business-friendly environment

**Implementation v05.1:** Ease regulation and expedite permitting of technology companies, fabrication facilities, and think-tanks.

**Implementation v05.2:** Attract venture capital funding and provide networking opportunities for DTLA startups.



## Indicators

To evaluate the success of the vitality policies, the City shall monitor the following indicators:

- total number of new business licenses in the technology sector
- ratio of green space per person in DTLA
- number of public wi-fi spots
- number of students enrolled in smart city programs at local universities
- number of internship positions filled within the Innovation Delivery Team
- number of new hires from local university programs
- number of “layers” and developer contributions to the AR framework
- amount of venture capital invested in DTLA



Co-working spaces and incubators, like DTLA’s The Reef (top) and the Los Angeles Cleantech Incubator (bottom) at the La Kretz Innovation Campus in the Arts District, supports entrepreneurship by providing space and resources in a creative work environment.

# GOVERNANCE

#government #access #transparency  
#apps #efficiency #gamification

An efficient government is a good government. The City of LA shall be a leader in the adoption of efficient emerging technologies. All modes of working shall be evaluated for a more efficient technological solution.

The City shall take measure to ensure that all sensitive, private data being used by the “smart city” are encrypted to the highest security standard, and be completely transparent about the way the data are used.

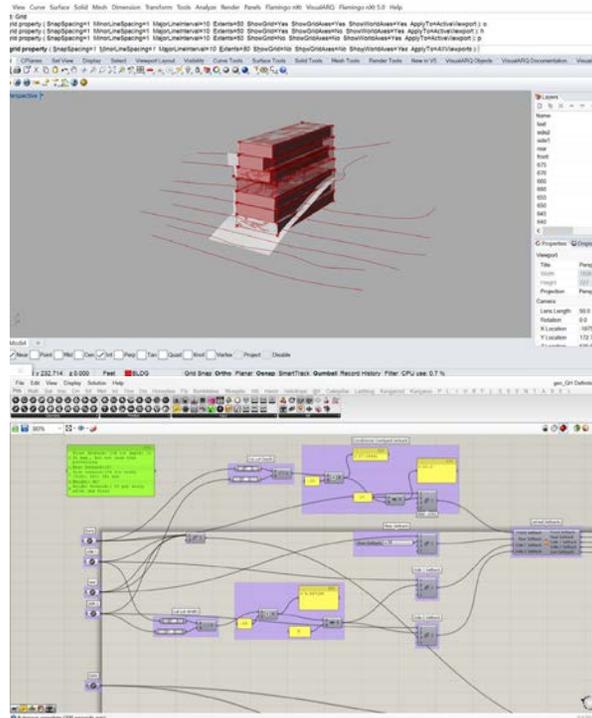
## Objectives

- » Reduce building permitting time through parametric and BIM-based evaluation.
- » Create a larger social media presence.
- » Share all public data.
- » Create an LA City suite of apps, offering citizens a profile of their resource use, and suggestions for reduction.
- » Create “technology task forces within City departments.

**Goal: An efficient and transparent government that interacts with an informed, engaged citizenry.**

**Policy g01: Expedite building permitting by implementing computational evaluations, replacing inefficient paper drawing sets.**

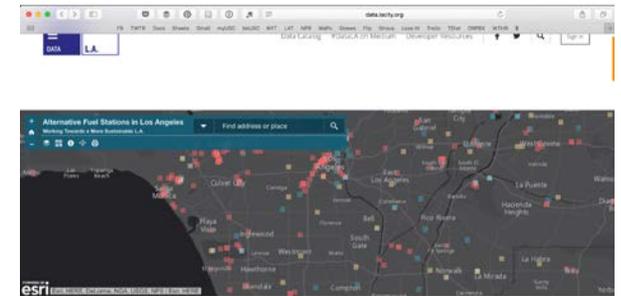
**Implementation g01.1:** With the adoption of the findings of ReCode: LA, the Department of Building and Safety shall implement BIM (Building Information Modeling) plan check evaluation, replacing the inefficient, costly, and potentially erroneous current method of a plan check engineer poring through hundreds of two-dimensional drawings.



**Policy g02: Digitize and share all current and historical public data, allowing citizens and developers access to the data informing our future.**

**Implementation g02.1:** Digitize all public records, making the data available through the DataLA portal.

**Implementation g02.2:** Promote innovation by encouraging “citizen scientists” through education programs and hack-a-thons.



LOS ANGELES OPEN DATA

**Policy g03: Foster technological innovation within City Hall.**

**Implementation g03.1:** Increase funding for the Innovation Delivery Team in order to increase staff and reach.



## Policy g04: Grow digital presence and social media engagement for transparent government/citizen communication and interaction.

**Implementation g04.1:** Appoint a Social Media Communications Director to increase social media presence and engagement. Exchange ideas and listen to concerns of DTLA citizens.

**Implementation g04.2:** Create a suite of apps for citizens to interact with city departments.

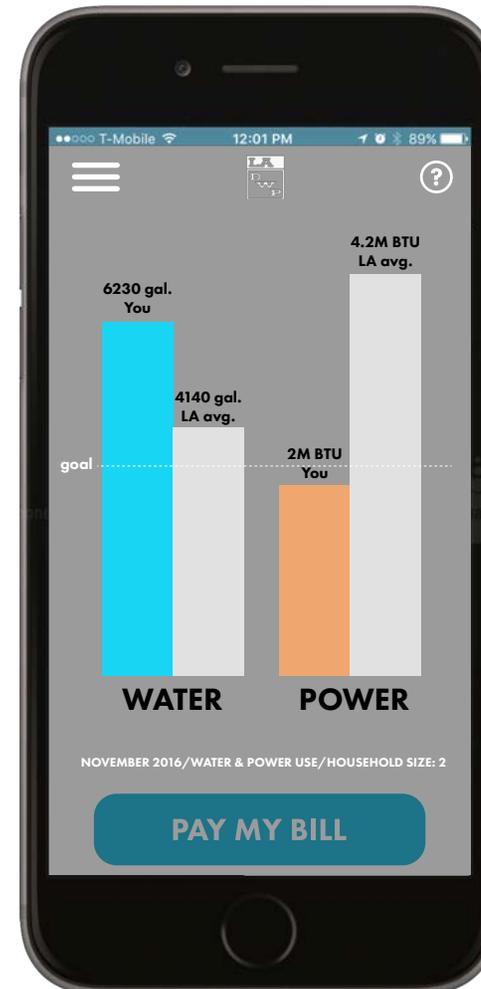
**Implementation g04.3:** The Department of Water and Power shall create an app allowing users to pay their bills, see their resource usage, compare their resource usage to city averages and ideal benchmarks, while offering ideas for reduction. This “gamification” will engage users, enforcing the idea that everyone’s actions make a difference.

### Indicators

To evaluate the success of the governance policies, the City shall monitor the following indicators:

- amount of time from submittal to building permit
- Twitter, Facebook, Instagram and Snapchat engagements
- app downloads and daily user numbers
- number of staff members on the Innovation Delivery Team

App mock-up showing potential functionality. Additional interface items can display reduction tips, incentives, and daily and yearly metrics. App can be gamified for additional engagement.



## Works Cited

<sup>1</sup>Downtown Center Business Improvement District. "2015 Downtown Los Angeles Survey Report." 2015.

<sup>2</sup>Segan, Sascha. "Fastest Mobile Networks 2016." *PCMag*, <http://www.pcmag.com/article/345123/fastest-mobile-networks-2016/17>.

<sup>3</sup>Krishnakumar, Priya and Poston, Ben. "Los Angeles water main leaks since 2010." *LA Times*, <http://graphics.latimes.com/los-angeles-pipe-leaks/>.

<sup>4</sup>Reicher, Mike. "California water agencies lose millions of gallons underground." *Los Angeles Daily News*, <http://www.dailynews.com/general-news/20141021/california-water-agencies-lose-millions-of-gallons-underground>.

<sup>5</sup>Mini, Caroline, 2013: "Residential water use and landscape vegetation dynamics in Los Angeles," Ph.D. Dissertation, University of California, Los Angeles, CA 90095

<sup>6</sup>Transportation Injury Mapping System. <https://tims.berkeley.edu>

## Image Credits

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Page 5: Author Creation

Page 6: IoT graphic from IoT League / Bullitt Center photograph from Discover Magazine

Page 7: Author Creation

Page 9: "The Hive" rendering by Hadeel Ayed Mohammad, Yifeng Zhao, and Chengda Zhu.

Page 10: AR photo from Los Angeles Metro

Page 11: The Reef & La Kretz Innovation Campus from thier websites

Page 12: BIM/Parametric image by Author / Data LA screenshot from web / Innovation Team from website

Page 13: Author Creation

## GIS Data

All maps created using shape file data from LA County GIS Data Portal