CLIMATE Imperative

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Climate Change

- Climate change is the largest issue facing humanity at this time. Decisions must be made to **mitigate greenhouse gas emissions** that contribute to climate change.
- The main greenhouse gases are: carbon dioxide, methane, ozone, nitrous oxide and hydrofluorocarbons. Our site should focus on **carbon dioxide and ozone emissions**
- Local emissions are attributed to:
  - Building energy that relies on nonrenewable energy sources (oil, coal, natural gas)
  - Smog from combustion-engines (cars, buses)
  - Lack of urban green infrastructure

- Climate change is the largest issue facing humanity at this time.
- Decisions must be made to **mitigate greenhouse gas emissions** that contribute to climate change.
- While there are several major greenhouse gases, our site should focus on **carbon dioxide and ozone emissions**.
- Local emissions are attributed to:
  - Building energy that relies on nonrenewable energy sources (such as coal, oil, and natural gas)
  - Smog from combustion-engines (like cars and buses)
  - Lack of urban green infrastructure
For context, Venice Blvd. is the major arterial road for our site, which intersects Centinela, Grand View, and Inglewood in the Mar Vista neighborhood of LA.
Site Statistics

- In LA County alone, building energy is the largest source of emissions by sector at approximately 39.2% followed by road transportation at 33.5%.
- Los Angeles receives more than 250 days of sunshine per year.
- The Mar Vista neighborhood has a solar potential of 88.98M kWh equivalent to 62,286 MTCO$_2$e.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Emissions (MT CO2e)</th>
<th>Percent of Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Energy</td>
<td>38,900,762</td>
<td>39.2%</td>
</tr>
<tr>
<td>On-Road Transportation</td>
<td>33,226,317</td>
<td>33.5%</td>
</tr>
<tr>
<td>Stationary Sources</td>
<td>19,516,169</td>
<td>19.7%</td>
</tr>
<tr>
<td>Solid Waste</td>
<td>4,327,123</td>
<td>4.4%</td>
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<tr>
<td>Water Conveyance</td>
<td>1,117,283</td>
<td>1.1%</td>
</tr>
<tr>
<td>Ports</td>
<td>1,059,131</td>
<td>1.1%</td>
</tr>
<tr>
<td>Off-Road Transportation</td>
<td>515,044</td>
<td>0.5%</td>
</tr>
<tr>
<td>Wastewater Treatment</td>
<td>443,832</td>
<td>0.4%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>26,105</td>
<td>0.03%</td>
</tr>
<tr>
<td>Los Angeles Worlds Airport</td>
<td>2,760</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total</td>
<td>99,134,526</td>
<td></td>
</tr>
</tbody>
</table>

- In LA County alone, building energy is the largest source of emissions by sector at approximately 39.2% followed by road transportation at 33.5%.
- Los Angeles receives more than 250 days of sunshine per year and has enough rooftop space to hold 5,500 MW of solar power.
- The Mar Vista neighborhood has a solar potential of 88.98M kWh equivalent to 62,286 MTCO$_2$e.
Site Analysis

- General lack of shade on Venice
- Well-planned bike lanes along Venice Blvd. and Grand View Blvd.
- Six different types of bike parking, such as parking loops on meters, bike racks, etc.
- Wide sidewalks throughout the site
Site Analysis

- Many roofs with direct sunlight beneficial for residential or commercial solar panels.

- Three Bus Lines, No. 14, 33, 733 run through Venice Blvd. and Centinela Ave. No bus lines on other roads.

- Many roofs with direct sunlight beneficial for residential or commercial solar panels as seen on the right.

- Three Bus Lines, No. 14, 33, 733 run through Venice Blvd. and Centinela Ave. No bus lines on other roads.
Overall Climate Protection Goals

- Increase green infrastructure
- Increase renewable energy usage
- Increase energy efficiency upgrades
- Increase number of cool roofs
- Increase electric vehicle (EV) use
- Increase active transportation

Overall Climate Protection Goals

Increase green infrastructure, renewable energy usage, energy efficiency upgrades, number of cool roofs, electric vehicle (EV) use, and active transportation.
Climate Goal: Increase Green Infrastructure

- Green streets and alleys
- Green parking

For the first climate goal, increase green infrastructure.

As different parts of the country become drier, wetter or hotter, green infrastructure practices can help communities prepare for and manage these effects of climate change.

Green infrastructure practices can reduce local temperatures and shade building surfaces:
  - Less energy is required to cool buildings.
  - CO2 emissions are captured.
We are giving two suggestions to this neighborhood. The first one is changing the sidewalks into green streets.

- We should include tree planting as part of regular capital improvement projects (e.g., street upgrades or road maintenance).
- We should partner with tree-focused nonprofits to encourage residential or street-tree volunteer planting or canopy mapping events.
Changing Bare Parking Lots into Green Parking

The second one is changing bare parking lots into green parking. Planted trees provide cooling energy savings and reduce carbon dioxide emissions. Greenery also reduces heat in urban areas.
Turning Lots into Urban Greenery

Urban Agriculture Incentive Zone → Public Park

Speaker Notes: It is interesting to note that these two lots are zoned to incentivize urban agriculture. This could be an opportunity to community gardens, which contribute to carbon sequestration and urban cooling.

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The Urban Agriculture Incentive Zone (UAIZ) is a state program in California as of 2013. This program incentivizes urban agriculture in urbanized areas reduced tax assessments in exchange for converting property to an agricultural use. Community gardens and small-scale crops are a few examples of permitted agricultural uses.

Add a mini public park for carbon sequestration!
Climate Goal: Increase Renewable Energy (Solar)

- Build more rooftop solar panels

The average cost of solar power declined 73% between 2010 and 2016.
- The Mitsuwa Market is a potential commercial site for solar energy
  - The energy generated could save 616 pounds of carbon dioxide emissions each year.
- This photo shows a single house in our site with roof solar panels on it.
Climate Goal: Increase Energy Efficiency Upgrades

- Largest energy consumers / sources of emissions in Mar Vista neighborhood are primarily from commercial and residential buildings older than 1978
- Single-family homes all together were the largest consumers / largest sources of emissions of all building categories followed by multi-family buildings.

![Building Ages Chart]

- Largest energy consumers / sources of emissions in Mar Vista neighborhood are primarily from commercial and residential buildings older than 1978
- Approximately 83 percent of existing structures of the two main Block Groups of the Mar Vista neighborhood were built before 1979. Thus, there is potential for ensuring these buildings become more energy efficient.
- Single-family homes all together were the largest consumers / largest sources of emissions of all building categories followed by multi-family buildings.
- The Los Angeles County has residential financing options such as the PACE Program enabling homeowners to install energy efficiency improvements.
  - Currently in Mar Vista, 43 projects have been completed:
    - Property Participation Rate: 0.49%
Site Opportunities

If commercial buildings were more prevalent, they would consume more energy and produce more emissions than residential buildings.

Our site is predominantly single-family residential. However, commercial buildings are more energy and carbon intensive. One opportunity is to get commercial buildings that leave their lights on at night to use energy-efficient lighting.
Climate Goal: Increase Number of Cool Roofs

- Roofs make up 20-25% of urban surfaces

Benefits of Cool, Reflective Roofs:

- Cost-effective
- Reduce smog formation
- Increase energy savings
- Reduce peak energy demand
- Make buildings more desirable and comfortable places to live

Roofs make up 20-25% of urban surfaces and absorb over 80 percent of the sunlight that contacts the surface. Hence, a cool roof will reflect more sunlight than traditional roofs using measures such as solar reflectance and thermal emittance.

City Council approved a cool roof requirement as part of the L.A. Green Building Code which became effective January 2015.
Sites marked here indicate buildings with white coated roofs and is assumed that they meet the cool roof ordinate requirements in LA.
Cool roofs do not always equate to a white coated roof because cool roofs come in a number of colors and styles. Therefore it is difficult to determine sites that already satisfy the cool roof criteria. Our potential sites include commercial and industrial buildings (outlined in yellow) or multi-family residential buildings (outlined in purple) that are deemed to have flat, non-white roofs.
Climate Goal: Increase Electric Vehicle (EV) Use

- Create infrastructure for electric vehicles and electric scooters:
  - Charging stations connected to the grid
  - Solar EV autonomous charging stations
- Publicize rebates and incentive programs, such as those through the Los Angeles Department of Water and Power (LADWP)

- Goal: Promote Electric Vehicle (EV) Use
- EVs have the capability to run on renewable energy, and therefore reduce the amount of combustion-engine vehicles on the road that emit greenhouse gases.
- It is imperative to install EV charging stations in the district, which can be:
  - Private, or semi-public (such as at a grocery store)
  - Public (such on as street lights and parking meters)
- When grid connection is not feasible, solar EV autonomous charging stations provide stand-alone alternatives.
- In order for the implementation of EV infrastructure to be effectual, it is imperative to promote the perks of owning an EV. For example:
  - LADWP offers rebate programs and electricity discounts for EV customers
  - Additionally, EV owners can use high occupancy vehicle (HOV) lanes on freeways.
Specific to the site, we can:

- Install solar and grid-connected EV charging stations in parking lots and meters.
- Install grid-connected electric scooter charging stations, as well.
**Climate Goal: Increase Active Transportation**

- Install bike lanes made from solar panels
  - Case Study: Netherlands
- Implement bike share stations
- Increase noticeability of bike parking

- **Goal: Increase Active Transportation**
- **Importance:** In order to reduce GHG emissions from transportation, it is necessary to promote alternative forms of active transportation, such as walking and biking.
- **Goals:**
  - Install bike lanes made from solar panels (Case Study: the town of Krommenie near Amsterdam, in the Netherlands).
    - Town in the Netherlands did this with SolaRoad.
    - SolaRoad bike lanes have a thick layer of protective glass which allows bikers to ride on top of them.
    - SolaRoad was widely used and even outperformed lab estimates for energy production. (Van Rooij)
    - Caltrans is set to work on implementing another SolaRoad pilot project in Kern County.
    - This is a great opportunity for the Mar Vista EcoDistrict to explore.
  - Implement bike share stations
  - Increase noticeability of bike parking by painting bike parking stations a distinguishing color.
Site Opportunities

Specific to the site, we can:

- Install solar panels on existing bike lanes along Venice Blvd, since it provides a flat, sunny stretch of road.
- Highlight bike parking to make it more noticeable at popular destinations, so as to avoid improper bike parking methods, seen here.
- Implement bike share stations on wide sidewalks and paved open areas.
Sources

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