MOVING in the face of CLIMATE CHANGE
Health and the Built Environment

Hawai‘i Public Health Association, 2015
October 09 – Hawai‘i Convention Center

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Intergovernmental Panel on Climate Change
IPCC: http://www.ipcc.ch/
SPM: http://www.climatechange2013.org/

Climate Change 2013:
The Physical Science Basis

IPCC Working Group I Contribution to AR5
The Twelfth Session of Working Group I (WG1-12) was held from 23 to 26 September 2013 in Stockholm, Sweden. At the Session, the Summary for Policymakers (SPM) of the Working Group I contribution to the IPCC Fifth Assessment Report (WG1 AR5) was approved and the underlying scientific and technical assessment accepted.
Regional Climate Assessment (PIRCA)

Hawaii climate change impacts

A summary of climate change and its impacts to Hawaii's ecosystems and communities

2014

Summary of Local Impacts of Climate Change to Hawaii

- The rate of warming of temperatures in Hawaii has already resulted in a 4°F increase in the past 50 years. This warming could change Hawaii's ecosystems, and overall, and had substantial impacts to ecosystems as well as expanded ranges for pathogens and invasive species.

- A recent study in the prevailing Hawaii trade winds, where climate change has resulted in a sea level rise of 8.3 inches per decade, which has contributed to coral bleaching, warming of the oceans, and a decrease in the water supply.

- Sea surface temperatures have increased by 1°F to 2°F (0.6°C to 1.1°C) in the past 50 years. This warming trend is expected to continue in the future.

- Warming temperatures are expected to result in increased ocean temperatures and changes in sea surface temperatures, leading to changes in ocean ecosystems and the marine environment.

- Over 80% of Hawaii's population lives in the coastal areas, which are most vulnerable to climate change impacts. This includes changes in sea level rise, increased hurricane activity, and increased risk of coastal erosion and flooding.

- Hawaii's economy is highly dependent on tourism, which is expected to be significantly impacted by climate change. In the future, tourism infrastructure and activities may be affected by increased hurricane activity, coastal erosion, and flooding.

- Changes in climate are expected to affect Hawaii's agriculture, with impacts on crop yields and water availability.

- Climate change is expected to affect Hawaii's water resources, with impacts on water supply, water quality, and water use.
Carrots and Sticks

Carbon is global...

Adaptation is local...
Carrots and Sticks

**THIS CHANGES EVERYTHING**

**CAPITALISM vs THE CLIMATE**

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Carrots and Sticks

**YOU CAN'T ALWAYS GET WHAT YOU WANT**

But if you try sometimes, YOU JUST MIGHT FIND (YOU GET WHAT YOU NEED)**
Hawai‘i…

…is the most fossil fuel dependent state in the nation…
- Hawai‘i Clean Energy Initiative

…is the only state in the US that still permits the construction of new cesspools…
- US EPA

…suffers from the highest older pedestrian fatality rate in the country…
- Smart Growth America

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Dangerous by Design

“Pedestrian fatality rates for older adults vary widely from state to state (see Table 3 on page 18). Hawai‘i suffers from the oldest pedestrian fatality rate in the country, with 6.81 deaths per 100,000 for adults aged 65 years and older, three times the statewide rate for all ages. For those 75 and older living in Hawai‘i, the rate is an astonishing 9.75 per 100,000” (p.17).

Smart Growth America, 2014. ‘Dangerous by Design’
Hawaiʻi’s Imported Oil | $$$

The cost of fossil fuel impacts our state economy and our individual pocketbooks. Statewide, Hawaii spent $4.9 billion on imported fossil fuel in 2012, down from the peak of $5.3 billion in 2011.

Aloha+ Challenge Dashboard
https://dashboard.hawaii.gov/aloha-challenge

Hawaiʻi’s Imported Oil | Sector Usage

The above graph shows that the majority of our fossil fuel use goes to transportation (e.g., fuel for cars and buses) and power/energy generation (e.g., fossil fuel burned for electricity by the utility), followed by industrial, commercial, and residential use (e.g., propane gas and diesel).

Aloha+ Challenge Dashboard
https://dashboard.hawaii.gov/aloha-challenge
Getting in Step: Making our values explicit and living them

- Pedestrian and Bicycle Friendly City – Section 6-1706, Revised Charter of the City and County of Honolulu. In November 2006, >77% of voters supported the charter amendment to make the roadway safer for people riding bicycles and/or walking.
- Complete Streets
  - State of Hawai‘i: Law, June 2009; Effect, January 2010 – Act 54
  - County of Kaua‘i: September 2011 – Resolution No. 2010-48
  - County of Hawai‘i: October 2011 – Resolution 171-11
  - City and County of Honolulu: March 2012 – Bill 26
  - County of Maui: April 2012 – Resolution No. 12-34
- Hawai‘i Statewide Pedestrian Master Plan
- O‘ahu Bike Plan
- Kaua‘i Multimodal Land Transportation Plan

Implementation?
**Comparison of island-wide annual Vehicle Miles Traveled (VMT) through 2035**

Kaua‘i Multimodal Land Transportation Plan (p. ES-1): [http://movekauai.net/?page_id=520](http://movekauai.net/?page_id=520)

### County of Kaua‘i MLTP | Preferred Scenario

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2010 Level</th>
<th>Difference between 2010 and 2035</th>
<th>Scenario</th>
<th>Preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual VMT (Vehicle Miles Traveled)</td>
<td>271.4 million</td>
<td>39.9%</td>
<td>0.95%</td>
<td>0.95%</td>
</tr>
<tr>
<td>Annual VMT per Capita</td>
<td>9,846</td>
<td>0.23%</td>
<td>0.30%</td>
<td>0.30%</td>
</tr>
<tr>
<td>Annual Gallons of Water Used Consumed</td>
<td>267 million</td>
<td>0.13%</td>
<td>0.21%</td>
<td>0.21%</td>
</tr>
<tr>
<td>Annual Gallons of Water Used Consumed per Capita</td>
<td>965</td>
<td>0.15%</td>
<td>0.15%</td>
<td>0.15%</td>
</tr>
<tr>
<td>Annual GHG Emissions (Greenhouse Gas Emissions)</td>
<td>21.94 million</td>
<td>0.13%</td>
<td>0.17%</td>
<td>0.17%</td>
</tr>
<tr>
<td>SUV Mode Share</td>
<td>54.9%</td>
<td>1%</td>
<td>0.29%</td>
<td>0.29%</td>
</tr>
<tr>
<td>MUP Mode Share</td>
<td>28.7%</td>
<td>1%</td>
<td>0.29%</td>
<td>0.29%</td>
</tr>
<tr>
<td>Transit Mode Share</td>
<td>5.4%</td>
<td>0.15%</td>
<td>0.15%</td>
<td>0.15%</td>
</tr>
<tr>
<td>Multi Mode Share</td>
<td>8.1%</td>
<td>0.15%</td>
<td>0.15%</td>
<td>0.15%</td>
</tr>
<tr>
<td>Total Non-Vehicle Mileage per 100 Million VMT</td>
<td>3,810</td>
<td>1%</td>
<td>0.29%</td>
<td>0.29%</td>
</tr>
<tr>
<td>Weekly Transit Ridership</td>
<td>3,481</td>
<td>0.7%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>% of Adults Meeting the Minimum Levels of Physical Activity**</td>
<td>57.7%</td>
<td>1%</td>
<td>0.29%</td>
<td>0.29%</td>
</tr>
<tr>
<td>Average Annual Household Transportation Costs</td>
<td>$30,000</td>
<td>1%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

*SAV = Single Occupant Vehicle, MUP = Multi-Purpose Use

**The Preferred Scenario mode share of all person trips for 2020 and 2035 (shown here) will serve as policy targets for the County to implement this plan.

Kaua‘i Multimodal Land Transportation Plan (p. ES-2): [http://movekauai.net/?page_id=520](http://movekauai.net/?page_id=520)
County of Kaua‘i | Complete Streets

Getting in Step

Implementation?


Measures and Monitoring

Hawai‘i Physical Activity and Nutrition (PAN) Plan
Measures and Monitoring

Hawai‘i Physical Activity and Nutrition (PAN) Plan

3. Community Design and Access - Physical Activity

<table>
<thead>
<tr>
<th>Measure</th>
<th>Current</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding for Safe Routes to School</td>
<td>$220,530</td>
<td>$120,000</td>
</tr>
<tr>
<td>Workers Commuting by Active Transportation</td>
<td>11.1</td>
<td>11.0</td>
</tr>
<tr>
<td>Workers Commuting by Bicycling</td>
<td>9.1</td>
<td>9.9</td>
</tr>
<tr>
<td>Workers Commuting by Public Transportation</td>
<td>6.4</td>
<td>6.7</td>
</tr>
<tr>
<td>Workers Commuting by Walking</td>
<td>4.7</td>
<td>5.1</td>
</tr>
</tbody>
</table>


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Measures and Monitoring

Public Spaces

City and County of Honolulu

< 8,400 acres of parks
> 14,500 acres of road right-of-way (ROW)

Measures and Monitoring
Tree Canopy and Land Cover – Honolulu (HoLIS)

http://coh11.maps.arcgis.com/home/

Getting in Step

“[T]he idea [Complete Streets] harkens back to an idea that was essentially rendered obsolete in the early 20th century as the car began its ascent: that the public road is intended for more than one mode of transportation.”

Making active transportation more desirable and possible and habitual

- Safety
- Accessibility
- Aesthetics
- Better facilities
- Better connections with transit
- Better transit (which itself increases walking)
- Stronger financial incentives (e.g., higher gas prices, pre-tax bus passes)
- Better land-use decisions (e.g., housing + transportation index, density)
- Design guidelines, street and sidewalk treatments (e.g., block length, building facades, intersections/sq.mi., street trees)
Getting in Step

What is walking for?

In the US, commuting by any mode of travel accounts for < 15% of all trips and 28% of all trips in America are < 1 mile – “discretionary travel”

Hawaii’s numbers?

Who actually can commute to work via “active transportation”?

Other considerations:

• Relationships between land use, housing, and transportation
• Siting, distance, terrain
• Infrastructure

Getting in Step

Next Step = f(tolerance for/wish to avoid inconvenience, frustration, discomfort)

Results: people using escalators; preferring street-levels vs. elevated walkways or subterranean tunnels; jaywalking; “desire-lines” or “cow paths”

How to make walking as easy and enjoyable as possible?

How to make walking habitual?

What is walkable?
Getting in Step

Key Elements
- How Far Is It?
- How Long Will It Take?
- Will I Enjoy It?
- Do I Have To?

Key Elements
- Distance
- Travel Time
- Perception + Experience
- Choice/Necessity

1 mile = 5,280 feet = ~20 minutes

“What better way to understand pedestrians than to be out among them…”
Getting in Step

Kapiolani Blvd. + Pensacola St.

Getting in Step

Kalakaua Ave. – Kapiolani Blvd. and Ala Wai Blvd.
Getting in Step

Kalakaua Ave. – Kapiolani Blvd. to Ala Wai Blvd.

Getting in Step | Who

**Key Elements:**
- How Far Is It? *Distance.*
- How Long Will It Take? *Travel Time.*
- Do I Have To? *Choice/Necessity.*

**Four Types of Transportation Cyclists in Portland**

By Proportion of Population

Roger Geller, Bicycle Coordinator, Portland Office of Transportation

- Interested but Concerned: 60%
- No Way No How: 33%

- Strong & Fearless: <1%
  - Will ride regardless of facilities, trip distance is not such an issue

- Enthusied & Confident: 7%
  - Comfortable in traffic with appropriate facilities, prefer shorter trip distances

- Interested but Concerned: Not attracted by bicycle lanes, not comfortable in traffic, will ride in low-volume, low-speed conditions (boulevards, off-street)

- No Way No How: Not interested in using a bicycle for transportation
Getting in Step | How and Why

Smart Growth, Land Use Planning, and CIP and Infrastructure Investments
- Housing + Transportation Index, Location Efficiency, Siting Schools and Jobs and Getting to Schools and Jobs
All can have individual, community, and governmental benefits physically, ecologically, economically, and sociologically.

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