MIDDLE-MODALISM
Derek Chisholm AICP, LEED GA, ENV SP

Rail-Volution
Building Livable Communities with Transit
Derek Chisholm AICP. LEED GA. ENV SP

- AECOM, Associate Vice President.
  New Orleans, Louisiana

- AECOM, National Complete Streets Practice Lead

- Former Planning Commission Chair and Adjunct Professor

- Released in 2018:
  ASCE Engineering for Sustainable Communities and
  Bicycle Urbanism, Reimagining Bicycle Friendly Cities
MIDDLE MODALISM:

<table>
<thead>
<tr>
<th>Miles Per Hour</th>
<th>Trip Length (in miles) and Percent of Trips is US</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td>0-1m</td>
</tr>
<tr>
<td>10</td>
<td>1-2m</td>
</tr>
<tr>
<td>15</td>
<td>2-3m</td>
</tr>
<tr>
<td>20</td>
<td>4-6m</td>
</tr>
<tr>
<td>25</td>
<td>6-10m</td>
</tr>
<tr>
<td>30</td>
<td>10-16m</td>
</tr>
<tr>
<td>35</td>
<td>16-30m</td>
</tr>
<tr>
<td>40</td>
<td>&gt;30m</td>
</tr>
<tr>
<td>45</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
</tr>
<tr>
<td>65</td>
<td></td>
</tr>
<tr>
<td>70</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td></td>
</tr>
</tbody>
</table>

Data Source - NTHS
MIDDLE MODALISM:

There lies a range of vehicles, between cars and bikes, that are in many ways the most ideal form of transportation for today’s cities. These vehicles, of which the electric bicycle is representative, constitute a NEW MODE of transportation, a mode between other modes.

And it is a mode we should embrace. The increased range, ease of use, hill climbing, hauling, and advantages for the mobility impaired would result in, if the mode were properly accommodated, a significant change in mode share, last mile options, residential and businesses locational choices, congestion levels, and air pollution levels.

But....

MIDDLE MODALISM requires the development of new designs for transportation facilities and requires proper consideration in urban planning and design.
PERSONAL TRIPS ANNUALLY in US - 430 Billion

MICROMOBILITY (~ Middle Modal) Trips - 84 Billion

> 5%

Sources: National Household Travel Survey & NACTO
Proliferation

“Three years ago we had three, but we’re now offering 11 under the Raleigh banner.” Raleigh Bikes

“In almost every case all sceptics need to do is sling a leg over to understand the potential.” Cycling Industry News

…US sales more than tripling by 2018. (Galbraith, 2012)

“Fewer than 100,000 e-bikes were sold in the U.S. market last year, but a clear trend is emerging as more American consumers give them a second look.” Bike Retailer and Industry News April 2014

“E-bikes are uniquely positioned to be a primary benefactor of this trend since they are low in cost relative to cars, do not require licenses to operate, and can take advantage of existing bicycling infrastructure.” – Ryan Citron, research analyst at Navigant Research
Increasingly deployed in public service fleets in Europe:

In Germany, e-bikes are used by postal employees.

As of August 2014, DHL Deutsche Post had over 6,000 power-assisted bikes in service.

Global E-Bike Sales Expected To Reach $24.3 Billion Annually By 2025
E-bike Shed Modeling

- Define trip generators: (libraries, downtowns, parks, colleges etc.)
- Define valid routes (streets, trails, and the major facilities in the corridor that have bike lanes etc)
- Join multiple valid route data sets into a single dataset, allowing for topological connections.
- Convert valid routes to routing network: using ArcGIS Network Analyst.
- Assess barriers to travel where network encounters blocked access.
- Modify grade-separated crossings with correct topology.
- Use slope factors, & assumptions on travel speeds and slope encumbrances to calculate travel time.
- Travel time contours were originally modeled at 15, 30, 45, and 60 minute increments. Later, when the e-bikes were modeled a five minute travel time contour was used.
- Delays at traffic signals were fixed at 25 seconds.
- Bicycle speed assumptions:

<table>
<thead>
<tr>
<th></th>
<th>uphill</th>
<th>flat grade</th>
<th>downhill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bike</td>
<td>8mph</td>
<td>10mph</td>
<td>12mph</td>
</tr>
<tr>
<td>E-Assist Bike</td>
<td>10mph</td>
<td>20mph</td>
<td>24mph</td>
</tr>
<tr>
<td>E-Power Bike</td>
<td>12mph</td>
<td>26mph</td>
<td>32mph</td>
</tr>
</tbody>
</table>
Bike, E-Assist Bike, and E-Power Bike Shed (5 Min) Portland – Urban Eastside

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Bike Acres</th>
<th>E-Assist Bike Acres</th>
<th>E-Power Bike Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suburban Neighborhood</td>
<td>1527.8</td>
<td>3043.7</td>
<td>5125.7</td>
</tr>
<tr>
<td>Urban Westside</td>
<td>828.7</td>
<td>1754.7</td>
<td>3014.8</td>
</tr>
<tr>
<td>Urban Eastside</td>
<td>1485.3</td>
<td>3237.7</td>
<td>5368.5</td>
</tr>
<tr>
<td>Commercial Mix</td>
<td>756.3</td>
<td>1557.6</td>
<td>2819.5</td>
</tr>
</tbody>
</table>

Acres Accessed by Mode/ Middle Mode

- Bike
- E-Assist Bike
- E-Power Bike

Urban Morphology

- Suburban Neighborhood
- Urban Eastside

Acres accessed:
- Suburban Neighborhood: 1527.8
- Urban Eastside: 1485.3
- Urban Eastside: 5368.5
### Bike, E-Assist Bike, and E-Power Bike Shed (5 Min) Portland – Urban Eastside

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Bike Acres</th>
<th>E-Assist Bike Acres</th>
<th>E-Power Bike Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suburban Neighborhood</td>
<td>1527.8</td>
<td>3043.7</td>
<td>5125.7</td>
</tr>
<tr>
<td>Urban Westside</td>
<td>828.7</td>
<td>1754.7</td>
<td>3014.8</td>
</tr>
<tr>
<td>Urban Eastside</td>
<td>1485.3</td>
<td>3237.7</td>
<td>5368.5</td>
</tr>
<tr>
<td>Commercial Mix</td>
<td>756.3</td>
<td>1557.6</td>
<td>2819.5</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Bike</th>
<th>E-Assist Bike</th>
<th>E-Power Bike</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Bike]</td>
<td>![E-Assist Bike]</td>
<td>![E-Power Bike]</td>
</tr>
</tbody>
</table>

---

Scale bar: 1 mile (1609.34 ft)
Propensity to Cycle Tool (PCT)

4 possible futures.
Govt Target - dbl cycling.
Go Dutch - even higher
Ebikes scenario higher still.

Under the Go Dutch scenario, nearly one in five people across England would cycle to work – around a six-fold increase.

Under Ebikes, it’s more than one in four.

Source – the Guardian, Environment, Bike Blog
In the United States, Federal law allows an e-bike to be regulated as a bicycle when it has under 750 watts of power, functional pedals, and a maximum speed under 20 mph. (15 U.S.C. 2051 et seq. LOW-SPEED ELECTRIC BICYCLES SEC. 38. (a)).
In 2016, four states (North Carolina, Tennessee, Utah and Vermont) enacted legislation concerning e-bikes.

In 2017, the BPSA and PeopleForBikes were actively working on e-bike bills in Arizona, Illinois, Ohio, Michigan, Wisconsin, Connecticut and New York. - Source: Bicycle Retailer

In 2018, many states started to draft escooter regulations as well.
The three-tiered e-bike classification system...

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1 ebike</td>
<td>...provides assistance only when the rider is pedaling, ...ceases to provide assistance when &lt;at&gt; 20 miles per hour.</td>
</tr>
<tr>
<td>Class 2 ebike</td>
<td>...a motor that may be used exclusively to propel the bicycle, and ...not capable of providing assistance &lt;above&gt; 20 miles per hour.</td>
</tr>
<tr>
<td>Class 3 ebike</td>
<td>...that provides assistance only when the rider is pedaling, and that ceases to provide assistance &lt;above&gt; 28 miles per hour, and is equipped with a speedometer.</td>
</tr>
</tbody>
</table>
Legal and Other Challenges

On average, New York City drivers kill one pedestrian or cyclist every two days...

e-bike riders have been involved in zero traffic-related deaths during the time that the city has collected data on their use.

Source – Daily News
Legal and Other Challenges

E-bikes should be legalized 'now more than ever,' city lawmakers say
Fourteen Council members argued the case in a letter to the State Senate and Assembly.

Park City Council Votes 65 And Older Can Use E-bikes On Trails, No Pilot Program In Round Valley
By EMILY MEANS • SEP 3, 2019

Johnson City looking into e-scooters and e-bikes in the city

NEWS RELEASE
National Park Service Announces Policy for Electric Bicycle Use in National Parks

Date: August 30, 2019
Contact: NewsMedia@nps.gov

Use of e-bikes will increase access to recreational opportunities in parks
The Oregon Bicycle and Pedestrian Guide states: “many early bikeway designs assumed that bicyclists resemble pedestrians in their behavior. This led to undesirable situations... Only under special circumstances should bicyclists and pedestrians share the same space...”
Cycle Track
Cycle Track

Source: Toole Design Group
Cycle Track - Middle Modal Boulevard - BAT lane - Multi-Use Mobility Path

Upper left: Xiamen, Fujian Province. Source: Author
Upper Right: Wellington New Zealand. Source: NACTO
Below: Example cross-section from Design Guides. Source: NACTO
Cycle Track - Middle Modal Boulevard - BAT lane - Multi-Use Mobility Path

Upper left: Amsterdam, The Netherlands.  
Source: NACTO

Right: New Delhi, India.  Source: NACTO
Advisory Bike Lanes
Advisory bike lanes are delineated with skip stripe bike lane markings.
Separated Users
Bike Passing Lane

When bicycle volumes warrant, a bicycle passing lane provides passing opportunities for higher speed bicyclists.
Separated Users
Storage, Security and maintenance
MIDDLE-MODALISM:
Derek Chisholm, AICP, LEED GA, ENV SP
AECOM Associate Vice President, New Orleans based
225 907 1280
derek.chisholm@aecom.com

Thank you