THE TOD STANDARD

Luc NADAL, Ph.D., D.P.L.G.
TOKYO 2017-05-30

Institute for Transportation & Development Policy
ITDP
Institute for Transportation and Development Policy

Sustainable and Equitable Transport and Development Worldwide
THE WORLD NOW:
7 BILLION PEOPLE, 50% URBAN, 1 BILLION CARS

THE WORLD IN 3 SHORT DECADES:
(If current trends hold)
9 BILLION PEOPLE, 70% URBAN, 2 BILLIONS CARS
50 kilometers from the center of Guangzhou - China
Beijing – Tianjin megalopolis
STOP BUILDING A WORLD THAT IS CENTERED ON AND DEPENDENT ON CARS

Beijing – Tianjin megalopolis
THE VICIOUS CIRCLE OF CAR DEPENDENCY & ACCESS DEPRIVATION
TOD

Urban

middle

development

South

governance

imaginaries

greater

emerging

also

urban

socio-spatial

solutions

new

cities

classes

city

challenges

global

contribute

research

transformations

extreme

political

inequalities

major

production

processes

agenda

limited

towards

non-liberal

changing

inequality

major

various

official

production

local

public

recent
BRT STATION

2016 Olympic Athletes Village, Rio de Janeiro, Brazil
Ilha Pura Olympic Village, Rio de Janeiro, Brazil
Ilha Pura Olympic Village, Rio de Janeiro, Brazil
Sino-Singaporian EcoCity – Tianjin, China
Shafencun, Guangzhou, China
MANY CHALLENGES

LACK OF AWARENESS & POOR UNDERSTANDING
WEEK POLITICAL WILL
FRAGMENTED INSTITUTIONS
OUTDATED POLICY FRAMEWORKS
MISGUIDED LAWS AND CODES
INCOMPLETE PROJECT PLANNING & DESIGN
FAULTY PLANS
POOR OUTCOMES & PRODUCTS
FAILURE TO PREPARE FOR A SOUND FUTURE
CLEAR DEFINITIONS
SIMPLE STANDARDS

SHARE THE VISION

RAISE AWARENESS & SUPPORT

GALVANIZE POLITICAL WILL

GUIDE POLICY

GUIDE LAW AND CODES WRITING

GUIDE PROJECTS PLANNING & DESIGN

ASSESS PLANS AND DESIGNS

EVALUATE OUTCOMES & PRODUCTS

RECOGNIZE SUCCESS
8 Principles of Transport in Urban Life

WALK | CYCLE | CONNECT | TRANSIT | MIX | DENSIFY | COMPACT | SHIFT
HUMAN CENTRIC / USER CENTERED

ITDP Proposal for Ashram Road, Ahmedabad, India
SHIFT AWAY FROM MOTOR VEHICLE DEPENDENCY

TRANSIT

WALK

DENSIFY

CYCLE

MIX

CONNECT

COMPACT
Principle 1: **WALK**

**Objective A.**
Pedestrian realm is safe, complete and **accessible to all**

Metric 1.A.1 Walkway completeness
Metric 1.A.2 Crosswalk completeness

**Objective B.**
Pedestrian realm is active and vibrant

Metric 1.B.1 Visually Active Frontage
Metric 1.B.2 Physically Permeable Frontage

**Objective C.**
Pedestrian realm is comfortable and temperate

Metric 1.C.1 Shade and Shelter
Tokyo, Japan
Principle 2: CYCLE

Objective A: Cycling network is safe and complete
Metric 2.A.1 Cycle Network

Objective B: Cycle parking and storage is ample and secure.
Metric 2.B.1 Cycle Parking at Transit Stations
Metric 2.B.2 Cycle Parking at Buildings
Metric 2.B.3 Cycle Access in Buildings
Objective A.
Walking and cycling routes are short, direct and varied

Metric 3.A.1 Small Blocks

Objective B.
Walking and cycling routes are shorter than motor vehicle routes

Metric 3.B.1 Prioritized Connectivity
PUBLIC TRANSIT

Zhongshan Lu, Guangzhou, China
Principle 4: TRANSIT

Objective A. High quality transit is accessible by foot.

Metric 4.A.1 Walk Distance to Transit
Objective A.
Opportunities and services are within a short walking distance of where people live and work, and the public space is activated over extended hours

Metric 5.A.1 Complementary Uses
Metric 5.A.2 Access to local services
Metric 5.A.3 Access to parks and playgrounds
Objective B.
Diverse demographics and income ranges are included among local residents

Metric 5.B.1 Affordable Housing
Metric 5.B.2 Housing Preservation
Metric 5.B.3 Business and Services Preservation
Principle 6: **DENSIFY**

**Objective A:** Densities support high quality transit and local services.

**Metric 6.A.1:** Nonresidential Density

**Metric 6.A.2:** Residential Density

New York, USA
Objective A. The development is in an existing urban area.

Metric 7.A.1 Urban Site

Objective B. Traveling through the city is convenient.

Metric 7.B.1 Transit Options
SHIFT Away from car-dependency
SHIFT Towards a car-free lifestyle
Objective A. The land occupied by motor vehicles is minimized

Metric 8.A.1 Off-Street Parking
Metric 8.A.2 Driveway Density
Metric 8.A.3 Roadway Area
SHIFT AWAY FROM MOTOR VEHICLE DEPENDENCY

MIX

DENSIFY

TRANSIT

WALK

CYCLE

CONNECT

COMPACT

ITDP Proposal for Ashram Road, Ahmedabad, India
SHIFT AWAY FROM EXCLUSION
SHIFT AWAY FROM EXCLUSION
SHIFT AWAY FROM EXCLUSION

Niteroi, Brazil, June 2013

Photo: Montague/CNN
SHARED PROSPERITY MUST BE VISIBLE

VERSION V.3 OF TOD STANDARD: MORE WEIGHT TO AFFORDABLE HOUSING

Cali, Colombia
UPGRADED EXISTING INFORMAL HOUSING = COUNTS AS NEW AFFORDABLE HOUSING
*NO* DISPLACEMENT

REWARDS UPGRADING PRE-EXISTING HOUSEHOLDS AND BUSINESS ON A DEVELOPMENT SITE

DISPLACEMENT disrupts communities, destroys social capital, and generally moves vulnerable people to less accessible places.
OBJECTIVE: 100% (NEW) URBAN POPULATION NEAR RAPID TRANSIT

Medellin, Colombia
CLEAR DEFINITIONS SIMPLE STANDARDS

SHARE THE VISION

RAISE AWARENESS & SUPPORT

GALVANIZE POLITICAL WILL

GUIDE POLICY

GUIDE LAW AND CODES WRITING

GUIDE PROJECTS PLANNING & DESIGN

ASSESS PLANS AND DESIGNS

EVALUATE OUTCOMES & PRODUCTS

RECOGNIZE SUCCESS
# Breaking the Vicious Circle of Car Dependency

## Principles & Metrics

### Walk

**Objective A:** The pedestrian realm is safe, complete, and accessible to all.
- Metric 1.A.1: Walkways
  - Percentage of sidewalk segments with safe, all-accessible sidewalks: 3 points
- Metric 1.A.2: Crosswalks
  - Percentage of intersections with safe, all-accessible crosswalks in all directions: 3 points

**Objective B:** The pedestrian realm is active and vibrant.
- Metric 1.B.1: Visually Active Frontage
  - Percentage of sidewalk segments with visual connection to interior building activity: 6 points
- Metric 1.B.2: Physically Permeable Frontage
  - Average number of shops, building entrances, or other pedestrian access per 100 linear meters of blockfrontage: 2 points

**Objective C:** The pedestrian realm is temperate and comfortable.
- Metric 1.C.1: Shade and Shelter
  - Percentage of sidewalk segments that incorporate shaded or sheltered elements: 1 point

### Cycle

**Objective A:** The cycling network is safe and complete.
- Metric 2.A.1: Cycle Network
  - Access to a safe cycling street and path network: 2 points

**Objective B:** Cycle parking and storage are ample and secure.
- Metric 2.B.1: Cycle Parking
  - Cycle parking at transit stations: 1 point
- Metric 2.B.2: Cycle Parking
  - Percentage of buildings that provide ample, secure cycle parking: 1 point
- Metric 2.B.3: Cycle Access
  - Buildings allow interior access and storage within tenant-controlled spaces for cycles: 1 point

### Connect

**Objective A:** Walking and cycling routes are short, direct, and varied.
- Metric 3.A.1: Small Blocks
  - Length of longest pedestrian block: 10 points

**Objective B:** Walking and cycling routes are shorter than motor vehicle routes.
- Metric 3.B.1: Prioritized Connectivity
  - Ratio of pedestrian inter-sections to motor vehicle intersections: 5 points

### Transit

**Objective A:** High-quality transit is accessible by foot.
- Metric 4.A.1: Walking Distance to Transit
  - Walking distance to the nearest transit station: 10 points

### Mix

**Objective A:** Opportunities and services are within a short walking distance where people live, work, and the public space is activated over extended hours.
- Metric 5.A.1: Complementary Uses
  - Residential and nonresidential uses within one or two adjacent blocks: 8 points
- Metric 5.A.2: Access to Local Services
  - Percentage of buildings that are within walking distance of an elementary or primary school, a healthcare service or pharmacy, and a source of fresh food: 3 points
- Metric 5.A.3: Access to Parks and Playgrounds
  - Percentage of buildings located within a 500 meter walking distance of a park or playground: 1 point

### Densify

**Objective A:** High residential and job densities support high-quality transit, local services, and public space activity.
- Metric 6.A.1: Nonresidential Density
  - Nonresidential density in comparison with best practice in similar projects and station catchment areas: 7 points
- Metric 6.A.2: Residential Density
  - Residential density in comparison with best practice in similar projects and station catchment areas: 7 points

### Compact

**Objective A:** The development is in, or near, an existing urban area.
- Metric 7.A.1: Urban Site
  - Number of sides of the development that adjoin existing built-up sites: 8 points

### Shift

**Objective A:** Total off-street area dedicated to parking as a percent of the development area.
- Metric 8.A.1: Off-Street Parking
  - Total off-street area dedicated to parking as a percent of the development area: 8 points
- Metric 8.A.2: Driveway Density
  - Average number of driveway ways per 100 meters of blockfrontage: 1 point

**Objective B:** Total on-street area used for motor vehicle travel and on-street parking as a percent of total development area.
- Metric 9.A.1: Roadway Area
  - Total on-street area used for motor vehicle travel and on-street parking: 6 points
Beirut, Lebanon. Photo Source: http://mediad.publicbroadcasting.net/p/
ありがとうございます
THANK YOU!
RIO DE JANEIRO PNT
28% IN 2015, UP FROM
23% IN 2010

Population density and Rapid Transit service sheds 2015
REMARKABLE PROGRESS
STILL TOO SLOW
LOW INCOME POP. DISCONNECTED.
Metro regions need more rapid transit

The Institute for Transportation & Development Policy has developed a new metric that looks at the percentage of the population living near rapid transit (PNT)—slow moving buses in mixed traffic and unregulated, informal transit do not qualify.

Here are the PNT scores for several global cities and their metro regions.

- **Paris**: 100% City PNT Score, 52.2% Metro Region PNT Score
- **London**: 90.6% City PNT Score, 61.2% Metro Region PNT Score
- **New York**: 76.8% City PNT Score, 34.8% Metro Region PNT Score
- **Beijing**: 59.8% City PNT Score, 45.7% Metro Region PNT Score
- **São Paulo**: 24.9% City PNT Score, 19.1% Metro Region PNT Score

See how other global cities’ transit systems stack up at itdp.org

**NEED AGGRESSIVE CAMPAIGNS: DEMAND HIGH PNT**
BUS RAPID TRANSIT

- High-quality, rapid bus-based transit system
  - fast, comfortable, and cost-effective services
  - metro-level capacities.

- BRT Standard evaluates BRT corridors
  - Uses wide range of metrics: the BRT Basics
  - Establish a common definition of BRT
  - Recognize high-quality corridors with either Bronze, Silver, or Gold rankings.
## BRT Standard Scorecard

<table>
<thead>
<tr>
<th>Category</th>
<th>Max Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BRT Basics (pp. 26–37)</strong></td>
<td><strong>38 (TOTAL)</strong></td>
</tr>
<tr>
<td>Dedicated Right-of-Way</td>
<td>8</td>
</tr>
<tr>
<td>Busway Alignment</td>
<td>8</td>
</tr>
<tr>
<td>Off-Board Fare Collection</td>
<td>8</td>
</tr>
<tr>
<td>Intersection Treatments</td>
<td>7</td>
</tr>
<tr>
<td>Platform-level Boarding</td>
<td>7</td>
</tr>
<tr>
<td><strong>Service Planning (pp. 38–44)</strong></td>
<td><strong>19</strong></td>
</tr>
<tr>
<td>Multiple Routes</td>
<td>4</td>
</tr>
<tr>
<td>Express, Limited-Stop, and Local Service</td>
<td>3</td>
</tr>
<tr>
<td>Control Center</td>
<td>3</td>
</tr>
<tr>
<td>Located in Top Ten Corridors</td>
<td>2</td>
</tr>
<tr>
<td>Demand Profile</td>
<td>3</td>
</tr>
<tr>
<td>Hours of Operations</td>
<td>2</td>
</tr>
<tr>
<td>Multi-Corridor Network</td>
<td>2</td>
</tr>
<tr>
<td><strong>Infrastructure (pp. 45–52)</strong></td>
<td><strong>13</strong></td>
</tr>
<tr>
<td>Passing Lanes at Stations</td>
<td>3</td>
</tr>
<tr>
<td>Minimizing Bus Emissions</td>
<td>3</td>
</tr>
<tr>
<td>Stations Set Back from Intersections</td>
<td>3</td>
</tr>
<tr>
<td>Center Stations</td>
<td>2</td>
</tr>
<tr>
<td>Pavement Quality</td>
<td>2</td>
</tr>
<tr>
<td><strong>Stations (pp. 53–57)</strong></td>
<td><strong>10</strong></td>
</tr>
<tr>
<td>Distances Between Stations</td>
<td>2</td>
</tr>
<tr>
<td>Safe and Comfortable Stations</td>
<td>3</td>
</tr>
<tr>
<td>Number of Doors on Bus</td>
<td>3</td>
</tr>
<tr>
<td>Docking Bays and Sub-stops</td>
<td>1</td>
</tr>
<tr>
<td>Sliding Doors in BRT Stations</td>
<td>1</td>
</tr>
</tbody>
</table>

### Operations Deductions (pp. 66–72) **-63**
- Commercial Speeds **-10**
- Peak Passengers per hour per direction (pphpd) **-5**
- Below 1,000 **-5**
- Lack of Enforcement of Right-of-Way **-5**
- Significant Gap Between Bus Floor and Station Platform **-5**
- Overcrowding **-5**
- Poorly Maintained Infrastructure **-14**
- Low Peak Frequency **-3**
- Low Off-Peak Frequency **-2**
- Permitting Unsafe Bicycle Use **-2**
- Lack of Traffic Safety Data **-2**
- Buses Running Parallel to BRT Corridor **-6**
- Bus Bunching **-4**

### Minimum Requirements for a Corridor to be Considered BRT
1. At least 3 kilometers (1.9 miles) in length with dedicated lanes
2. Score >= 80 total points in all five BRT basics elements
3. Score 4 or more points in dedicated right-of-way element
4. Score 2 or more points in busway alignment element
5. Score 6 or more additional points in all five BRT basics elements

---

**Bronze**: 55–69.9 points
**Silver**: 70–84.9 points
**Gold**: 85–100 points
CLEVELAND, OH

- Transformed modest $50 million investment in bus rapid transit
- into $5.8 billion in new transit-oriented development.
- bus rapid transit (BRT) along a strategic corridor
- concentrating government redevelopment efforts there,
- leverage $114.54 dollars of new transit-oriented investment for every dollar it invested into the BRT system,
- adding jobs and revitalizing the city center.
Per dollar of transit investment, and under similar conditions, Bus Rapid Transit leverages more transit-oriented development investment than Light Rail Transit or streetcars.

Both BRT and LRT can leverage many times more TOD investment than they cost.
- 21 corridors we studied,
- 14 leveraged greater than $1 of TOD investment per $1 of transit spent.
  - 5 BRT,
  - 4 LRT,
  - 2 streetcars,
  - 3 improved bus (non-BRT).
PREDICTORS OF SUCCESS:

- Primary: Government support for TOD
- Secondary: The strength of the land market around the transit,
- Tertiary: The quality of the transit investment – how well it meets the best-practices detailed in the BRT Standard
<table>
<thead>
<tr>
<th>Corridor</th>
<th>BRT Standard</th>
<th>Land Potential</th>
<th>Government TOD Support</th>
<th>TOD Investment (Millions)</th>
<th>TOD Investment Per Dollar of Transit Investment (Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleveland HealthLine BRT</td>
<td></td>
<td>Emerging</td>
<td>Strong</td>
<td>$5,800</td>
<td>$114.54</td>
</tr>
<tr>
<td>Kansas City Main Street Metro Area Express (MAX) bus</td>
<td>Below Basic</td>
<td>Strong</td>
<td>Strong</td>
<td>$5,200</td>
<td>$101.96</td>
</tr>
<tr>
<td>Seattle South Lake Union (SLU) Streetcar</td>
<td>Below Basic</td>
<td>Strong</td>
<td>Strong</td>
<td>$3,000</td>
<td>$53.57</td>
</tr>
<tr>
<td>Portland Streetcar</td>
<td>Below Basic</td>
<td>Strong</td>
<td>Strong</td>
<td>$4,500</td>
<td>$41.48</td>
</tr>
<tr>
<td>Portland MAX Blue Line LRT</td>
<td></td>
<td>Emerging</td>
<td>Strong</td>
<td>$6,600</td>
<td>$3.74</td>
</tr>
<tr>
<td><strong>Moderate TOD Impacts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Las Vegas Strip &amp; Downtown Express (SDX) BRT</td>
<td></td>
<td>Strong</td>
<td>Moderate</td>
<td>$2,000</td>
<td>$42.28</td>
</tr>
<tr>
<td>Boston Washington Street Silver Line bus</td>
<td>Below Basic</td>
<td>Emerging</td>
<td>Moderate</td>
<td>$650</td>
<td>$20.97</td>
</tr>
<tr>
<td>Denver Central Corridor LRT</td>
<td></td>
<td>Strong</td>
<td>Moderate</td>
<td>$2,550</td>
<td>$14.88</td>
</tr>
<tr>
<td>Eugene Emerald Express Green Line (EmX) BRT</td>
<td></td>
<td>Emerging</td>
<td>Moderate</td>
<td>$100</td>
<td>$3.96</td>
</tr>
<tr>
<td>Pittsburgh Martin Luther King, Jr. East Busway BRT</td>
<td></td>
<td>Emerging</td>
<td>Moderate</td>
<td>$903</td>
<td>$3.59</td>
</tr>
<tr>
<td>Phoenix Metro LRT</td>
<td></td>
<td>Emerging</td>
<td>Moderate</td>
<td>$2,820</td>
<td>$1.99</td>
</tr>
<tr>
<td>Ottawa Transitway BRT</td>
<td></td>
<td>Emerging</td>
<td>Moderate</td>
<td>$1,000</td>
<td>$1.71</td>
</tr>
<tr>
<td>Charlotte Lynx LRT</td>
<td></td>
<td>Emerging</td>
<td>Moderate</td>
<td>$810.20</td>
<td>$1.66</td>
</tr>
<tr>
<td>Boston Waterfront Silver Line bus</td>
<td>Below Basic</td>
<td>Strong</td>
<td>Moderate</td>
<td>$1,000</td>
<td>$1.39</td>
</tr>
<tr>
<td>Los Angeles Orange Line BRT</td>
<td></td>
<td>Emerging</td>
<td>Moderate</td>
<td>$300</td>
<td>$0.83</td>
</tr>
<tr>
<td>Denver Southwest Corridor LRT</td>
<td></td>
<td>Limited</td>
<td>Moderate</td>
<td>$160</td>
<td>$0.71</td>
</tr>
<tr>
<td><strong>Weak TOD Impacts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ottawa O-Train LRT</td>
<td></td>
<td>Limited</td>
<td>Weak</td>
<td>nominal</td>
<td>nominal</td>
</tr>
<tr>
<td>Pittsburgh “The T” LRT</td>
<td></td>
<td>Limited</td>
<td>Weak</td>
<td>nominal</td>
<td>nominal</td>
</tr>
<tr>
<td>Las Vegas Metropolitan Area Express (MAX) bus</td>
<td>Below Basic</td>
<td>Limited</td>
<td>Weak</td>
<td>nominal</td>
<td>nominal</td>
</tr>
<tr>
<td>Pittsburgh West Busway BRT</td>
<td>Basic BRT</td>
<td>Limited</td>
<td>Weak</td>
<td>nominal</td>
<td>nominal</td>
</tr>
<tr>
<td>Pittsburgh South Busway BRT</td>
<td>Basic BRT</td>
<td>Limited</td>
<td>Weak</td>
<td>nominal</td>
<td>nominal</td>
</tr>
</tbody>
</table>