CCAP works with policymakers around the world to develop, promote and implement innovative, market-based solutions to major climate, air quality and energy problems.

Key themes

GHG Mitigation
- “MAIN”
- Colombia TOD NAMA
- Electricity

Public-private collaboration

Climate Adaptation
- Green Resilience
SELECTED PUBLICATIONS:
TRANSPORTATION AND CLIMATE ADAPTATION

Environmental and Economic Benefits of TOD
- *Growing Cooler: The Evidence on Urban Development and Climate Change*
- *Growing Wealthier: Smart Growth, Climate Change, & Prosperity*

Climate Funding for TOD Implementation
- Colombia TOD NAMA
- Criteria for the Green Climate Fund

Climate Adaptation
- Ask the Climate Question
- Climate Adaptation & Transportation
- Critical Infrastructure Resilience: Washington DC
- Green Resilience: Climate Adaptation & Mitigation Synergies

www.ccap.org
Ask the Climate Question

How will key policies and infrastructure investments affect greenhouse gas (GHG) emissions and Climate Resilience?

↓ GHGs 😊 or ↑ GHGs 😞 ?

↑ Resilience 😊 or ↑ Vulnerability 😞 ?

CCAP’s Urban Leaders Adaptation Initiative partners asked the Climate Question across departments and functions
- Thank you to Ron Sims and Jim Lopez
EFFICIENT VEHICLE TECHNOLOGIES: FREIGHT TRANSPORTATION
SYSTEM EFFICIENCY:
PANAMA CANAL ENHANCES FREIGHT ACCESSIBILITY
EFFICIENT TECHNOLOGIES: PASSENGER TRANSPORTATION
SIDEWALKS ARE AS SEXY AS HYBRIDS

2 km
“Cabo de Hornos”

1 km
“Panama Canal”

Image source: Larry Frank
Transportation a means to an end. **Accessibility**, not mobility, is the goal.

TOD integrates **Land Use** and transportation

- Reduces trip lengths
- Increase walking and transit use
- Enhances pedestrian and regional accessibility.
TRANSIT ORIENTED DEVELOPMENT (TOD): OVERVIEW

• **What?**
  – TOD is higher-density, mixed-use development within walking distance of transit stations.

• **Why?**
  – **Increase Return on Investment** in public infrastructure and private development
  – **Improve quality of life**, social equity, health
  – Reduce greenhouse gas emissions

• **How?**
  – Coordinate policies and investments
  – Catalytic pilot projects
  – **Green Climate Fund?**
TOD focuses public and private development around transit stations …

… to create neighborhoods where people can safely walk, live, work, shop and play.
VITAL INGREDIENTS FOR TOD

HIGH QUALITY TRANSIT

DENSE COMPACT MIXED USE

CYCLE and PEDESTRIAN CONNECTIONS

Images: CityLab - Felipe Targa
NOT TOD

Source: Carlos Pardo
STATION-AREA TOD: PASADENA, CA
TOD NEIGHBORHOOD: COLUMBIA HEIGHTS, WASHINGTON DC
8% of County land generates 33% real estate taxes
TOD CITY:
NEW YORK, NEW YORK
TOD METROPOLITAN REGION: PARIS, FRANCE
• **What?**

• **Why?**
  - Increase Return on Investment
    • Public infrastructure: Transportation, social housing …
    • Private development: Commercial, office, housing
  - **Improve quality of life**, social equity, health
  - Improve air quality and **reduce CO2 emissions**
HIGH OPPORTUNITY COSTS OF NOT DOING TOD
Vehicle technology and fuel improvements are insufficient for reducing GHG emissions

Must address **land use**: location and design:

- ↑ walking, cycle, transit use
- ↓ trip lengths

Empirical and modeling evidence: a 20-40% reduction in driving from compact development

Integrated measures can meet GHG goals
METRO WASHINGTON DC: FAIRFAX, VA
TOD REDUCES DRIVING 30-70%
ARLINGTON, VIRGINIA

METRO WASHINGTON DC: ARLINGTON, VA

PEOPLE DRIVE 30-70% LESS THAN THE REGIONAL AVERAGE

Design: DavidMob
Daily Driving – Washington DC region

(VMT/capita)

Regional avg 34.2

Montgomery Cty 33.3

Rosslyn-Ballston 17.4

Washington DC 12.8

Fairfax County 35.2

Arlington Cty 21.6

Jefferson-Davis 10.9

Charles County 65.6

Data Source: Dennis Leach, Arlington County
TOD LOWERS GHG EMISSIONS BY 50%: CURITIBA, BRAZIL

People drive 50% less than auto-oriented Brasilia, and emit 50% less CO2 per vehicle, even with higher motorization rate and median income.

CURITIBA - BRAZIL

Design: DavidMob
But doesn’t driving make us prosperous?

Not like it used to.
By 1996 economic growth began to outpace driving growth.

*New York Times: Economix Blog, January 20, 2011*
Travel (VKT) that contributes little or nothing to households and local economies.
Travel (Person hours) that consumes nearly as much as it contributes to households and local economies.
Growing Wealthier Matrix
Growing Wealthier Matrix

**Return on Investment**

- Business
- Household
- Local government
- National

**Cost Savings**

- Business
- Household
- Local government
- National

**Quality of Life Improvements**

- Business
- Household
- Local government
- National

CCAP
CENTER FOR CLEAN AIR POLICY
**Business**

- **Dallas**: Retail sales grew 33% in 1st year after light rail began

**Household**

- **USA**: 30 - 40% lower transport costs
- **USA**: Placemaking attracts new businesses and tourists

**Local government**

- **USA**: Lower rates of pedestrian fatalities in compact urban areas

**National**

- **Washington DC**: $100 M in NoMa Metro Station attracted $3 billion in private development

**Growing Wealthier Matrix**

- **Bogotá**: 15-20% increase in property values near the original line of TransMilenio
- **San Francisco**: $140 M health savings by 2035
- **Sacramento**: Infrastructure cost savings: $9 billion

**Quality of Life Improvements**

- **Bogotá**: 32% reduction in travel time
- **USA**: Placemaking attracts new businesses and tourists

University of California (Davis) and ITDP: “Global High Shift Scenario”

- TOD can save $100 trillion through 2050 (Excludes many of the benefits documented in Growing Wealthier)

Al Gore and Felipe Calderon in Davos:

- We can redesign cities so that people don’t need cars -- by redirecting the trillions of dollars we will spend on urban infrastructure.
TRANSIT ORIENTED DEVELOPMENT (TOD): HOW?

• What?

• Why?

• How?
  – Coordinate policies and investments
  – Catalytic pilot projects
  – Green Climate Fund?
VITAL INGREDIENTS FOR TOD

Physical Elements

Images:
CityLab - Felipe Targa
Yuck

Source: Urban Advantage
Better

Source: Urban Advantage
Ugly

Source: Urban Advantage
Better design

Source: Urban Advantage
Some more density

Source: Urban Advantage
Mixed Uses

Source: Urban Advantage
Even new awnings!

Source: Urban Advantage
VITAL INGREDIENTS FOR TOD

Implementation

- Political Champions
- Plans, Policies, Investments
- Private Sector Engagement

DENSE COMPACT MIXED USE

CYCLE and PEDESTRIAN CONNECTIONS

Images: CityLab - Felipe Targa
QUÉ FALTA?

Safety

Plans, Policies, Investments

S. Winkelman
Convenience

S. Winkelman
Parking enforcement
Qué falta?

DENSE COMPACT MIXED USE

Public space Schools

S. Winkelman

New York City
Qué falta?

Private Sector Engagement
QUÉ FALTA?

And jobs...

Political Champions
CASE STUDY:
COLOMBIA TOD NAMA

TRANSPORT: US$7.3B
8 SITM + 7 SETP

ENVIRONMENT:
LOW CARBON DEVELOPMENT

HOUSING: US$2.3B
100,000 FREE HOUSES

Design: DavidMob
LAND USE & TRANSIT: NOT WELL INTEGRATED

BOGOTÁ - AVE. NQS

Design: DavidMob
BENEFITS OF BRT AT RISK

Design: DavidMob
TOD BENEFITS FOR COLOMBIA

- Preserves transit and walk mode shares
- Transit system financial sustainability
- Efficient and sustainable land-use and transport
- Better quality of life and competitiveness

Design: DavidMob
• **€14.7 million from the German/UK NAMA Facility**
  – CCAP lead development of the proposal
  – €1.5 million potential from French Global Environmental Fund (FFEM)
  – Will leverage $8 billion in new public investment + more private

• **Technical and Financial Assistance for**
  – Catalytic TOD Projects
  – Transformative Policies

• **CIUDAT: Expert staff and consultants** to address local needs
  – Market analysis, Design, Financial Packaging, Private sector engagement
  – Construction: stations, pedestrian & cycle amenities, public space
  – Policy analysis: Land Use value capture, Social Housing & TOD

• **Enhancing institutional and stakeholder coordination is central**
  – National: **Transport, Housing, Environment, Planning**
  – National/Local; Public/Private; Communities and civil society
“CIUDAT”

Centro para Intervenciones Urbanas de Desarrollo Avanzado hacia el Transporte

BOARD OF DIRECTORS & Advisory Committee

- DNP
- Ministerio de Ambiente, Vivienda y Desarrollo Sustentable
- MinTransporte
- MinVivienda
- CCAP
- Findeter

- Technical Staff & Consultants
- Financial Staff & Consultants

- € 3.0M (GIZ)
- € 11.7M (KfW)

Funding from UK-German NAMA Facility

- Catalytic Pilot Projects
- National Policies for Replication
- Measurement & Evaluation
Cali
Transformation of the old industrial center of Cali into a transit- and pedestrian-oriented Green Corridor. Connecting investments in social housing, transit, public space, market-rate housing and retail.
Medellín
Private-sector lead effort to build new Metro station between two existing stations to trigger redevelopment in the under-utilized river valley which is targeted for redevelopment in city plan.
**Implementation Progress**
- Zoning changes, PPPs, policies (CONPES, Decree, PPP guidance…)

**Land Development and Travel**
- Land use: % of development in TOD areas
- Travel: VKT/capita, mode share, trip length

**GHGs**
- Estimate upfront, measure over time.

**Economic** (household, business, governments)
- Investment in TOD areas, travel costs, infrastructure, tax revenues, property values, retail

**Social**
- Household travel time, spending on transportation, health

Robust measurement can enhance policy performance.
- If address local priorities, it’s desired not a burden (like CDM MRV)
Reduce growth in driving (VKT) by 25 - 36% due to changed land use and travel patterns

Annual savings by 2040: 3.6 to 5.4 MMTCO₂

Considers a range of TOD performance and penetration supported by literature

### Range of VKT Savings (2040)

<table>
<thead>
<tr>
<th></th>
<th>% of pop</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Cities</td>
<td>47%</td>
<td>27%</td>
<td>40%</td>
</tr>
<tr>
<td>Medium Cities</td>
<td>12%</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>Small Cities</td>
<td>30%</td>
<td>13%</td>
<td>20%</td>
</tr>
<tr>
<td>Rural</td>
<td>10%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Weighted average</strong></td>
<td><strong>100%</strong></td>
<td><strong>19%</strong></td>
<td><strong>29%</strong></td>
</tr>
</tbody>
</table>
HOW TO GET STARTED ON TOD

• Build upon existing assets and efforts
  – Panama City: Metro de Panama, regenerate central areas, PIMUS, planes parciales)
    • World Bank, IDB, CAF
  – Colón (urban renovation)

• Follow the Money
  – Transit, Housing, Critical Infrastructure, Public Buildings
  – Ask the Climate Question
  – Quantify opportunity costs of business-as-usual development vs. benefits of TOD

• Identify catalytic pilot projects

• Green Climate Fund?
### 3x3 Green Resilience Matrix
Identifying Climate Adaptation + Mitigation Synergies

**WHAT ARE YOUR TOP 3 INVESTMENTS?**

<table>
<thead>
<tr>
<th>Investments</th>
<th>Adaptation</th>
<th>Mitigation</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>$10,000,000</td>
<td>$10,000,000</td>
<td>$2,000,000,000</td>
</tr>
<tr>
<td>Dune restoration</td>
<td>Wind turbines &amp; Photovoltaics</td>
<td>Roads</td>
<td></td>
</tr>
<tr>
<td>#2</td>
<td>$5,000,000</td>
<td>$5,000,000</td>
<td>$1,000,000,000</td>
</tr>
<tr>
<td>Green Infrastructure</td>
<td>Green Buildings</td>
<td>Water treatment facilities</td>
<td></td>
</tr>
<tr>
<td>#3</td>
<td>$1,000,000</td>
<td>$500,000</td>
<td>$500,000,000</td>
</tr>
<tr>
<td>Vulnerability Assessment</td>
<td>Education &amp; Outreach</td>
<td>Transit system improvements</td>
<td></td>
</tr>
</tbody>
</table>

- **Millions**
- **Billions**
OPPORTUNITIES IN PANAMA CITY AND COLÓN?

Panama City
• Metro station-area TOD pilots:  
  **Exposicion, San Miguelito**
• Sustainable mobility investments
• Pedestrian design standards
• Parking enforcement
• Expand Ciclovia
• Extra mortgage subsidy in TOD areas

Colón
• Improved transit systems
• Social housing connected to transit
• Focus new investments in future TOD areas
• Mix land uses in job development strategies
CLIMATE CHANGE WILL EXACERBATE FLOODING AND HEAT IMPACTS
“GREEN INFRASTRUCTURE “ CAN SHADE SIDEWALKS AND BIKE LANES
“GREEN INFRASTRUCTURE” CAN COOL BUILDINGS AND NEIGHBORHOODS

Chicago City Hall green roof and nearby Infrared image of the roofs. Green roof: 23 °C Black tar roof: 66 °C

Source: Chicago Climate Action Plan report.
FLOOD MITIGATION: GREEN INFRASTRUCTURE HAS HIGHER ECONOMIC BENEFITS THAN “GREY”

Houston
Stormwater benefit from trees: $1.3B
No trees: $0B

Philadelphia
50% low impact development: $2.85B
Normal 30’ tunnel: $0.12B
GREEN CLIMATE FUND OPPORTUNITY

• $10.2 billion pledged to-date
  – Goal to commit 60% by 2017

• 50:50 balance mitigation and adaptation
  • There is a lack of bankable adaptation proposals

• Competitive selection process based on key criteria, such as
  – Impact, Paradigm Shift, Sustainable Development, Ownership, Economic

• Funds delivered through accredited financial intermediaries:
  • International (e.g., Multi-lateral, bilateral) or national

• Timing
  – Board aims to approve first proposals by June 2015
  – Then regular calls for proposals and rolling submissions
POTENTIAL PANAMA TOD PROPOSAL TO THE GREEN CLIMATE FUND?

- **Request both mitigation & adaptation support**
  - TOD projects and policies
  - Flood management, urban heat mitigation

- **$50 - $150 million??**

- **Multiple potential partners**
  - **CAF** identified by ANAM as intermediary for GCF
    - Nicolas Estupinan: former Colombia VM of Transport (key to TOD NAMA)
  - **World Bank** advancing TOD in Panama
    - Felipe Targa: former Colombia VM of Transport (key to TOD NAMA)
  - **IDB** identifying sustainable mobility investments, climate resilience
  - **CCAP** happy to assist
NEXT STEPS?

• **Form a Commission on TOD**
  – National: ANAM, Min Gobierno, ATTT, MIVIOT, MEF (MOP?)
  – Local: Alcaldía de Panamá, Metro de Panamá
  – **Provide input to GCF proposal**
    • Strategic project sites and interventions needs
    • Coordination of Policies, Plans and Investments

• **“Strategic Opportunism”**
  – We need detailed analyses, but common sense goes a long way
  – Build on momentum of policy priorities, new investments, market trends
  – **Get started** on catalytic TOD projects and policy changes

• **TOD can transform Panamian cities**
  – Improve social welfare and economic prosperity while cutting GHGs
  – Provide a model of sustainable urban development to inspire other countries
IF PANAMA CAN BUILD THE 8TH WONDER OF THE WORLD, YOU CAN CERTAINLY DO TOD!
¡Gracias!

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