“M & E” FOR TOD NAMA

Monitoring & Evaluation Design for Colombia’s TOD NAMA

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NEW APPROACH TO MRV IS NEEDED: "M & E" MONITORING & EVALUATION

- **Old approach: MRV for the Clean Development Mechanism**
  - CDM was focused on projects and short-term reductions
  - Stringent MRV required because generate emission reduction credits
  - Criticized for limited sustainable development benefits

- **NAMA Opportunity: "M & E"**
  - **Transformative, sectoral policies** to reduce **long-term** GHGs
    - With short-term implementation and benefits
  - Emphasis on **sustainable development** (economic, social)
  - **Leverage finance: private sector**, international, shift public investment
  - **Do, Measure, Learn.**

M&E: KEY POINTS

- **Practical and meaningful metrics required to assess progress, benefits & enhance policy performance**
  - Some impacts short-term, others take longer to manifest
- **Metrics for TOD areas should be compared to non-TOD areas** or urban averages to assess policy performance
- **M&E approach will evolve as NAMA Facility provides guidance**
  - Will be finalized in cooperation with Colombia & NAMA Facility

BROADER APPROACH TO MEASUREMENT

- **Implementation Progress**
  - Zoning changes, PPPs, policies (CONPES, Decree, PPP guidance…)
- **Transformational Aspects**
  - National and local policy shifts
  - Market transformation
- **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)

1. IMPLEMENTATION PROGRESS

Assess whether the NAMA is on track:

- **Land use**
  - updated site zoning to accommodate TOD
  - improved design to enhance pedestrian connectivity
- **Public-Private collaboration**
  - selection of PPPs on TOD
  - formalization of agreements delineating public and private sector roles and responsibilities for TOD implementation (e.g., who funds and builds infrastructure, social housing)

2. TRANSFORMATIONAL ASPECTS

Is the NAMA on track to catalyze transformation?

- National and local policy shifts
  - CONPES, Decree, guidance for PPP on TOD
- Evidence of replication: share of public infrastructure funds in TOD areas
- Market shifts: interest by private sector, public

3. LAND DEVELOPMENT AND TRAVEL ACTIVITY

- **Land use**
  - **Location:** % of development in TOD areas (m^2, $)
  - **Design:** Mix of uses, pedestrian orientation, parking requirements

- **Travel activity: <u>TOD areas vs. Control areas</u>**
  - **VKT/capita**
  - **mode share**
  - **trip length**

  Methods: Traffic counts, surveys, calibrated models

- **Motorization**
  - **Vehicle registrations**

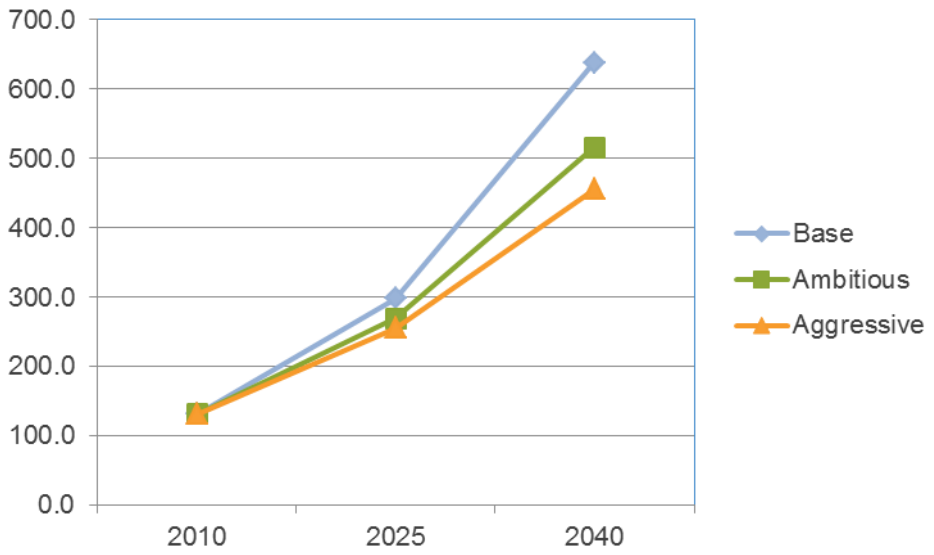
4. GHG REDUCTIONS

GHG savings are derived from VKT reductions due to more efficient land use patterns. The following metrics will be key for evaluating GHG impacts and refining projections.

- **Calculate based on travel and land use metrics**, comparing TOD and Control areas
  - Travel: Mode share, trip length…
  - Land use: location, design

- **Take into account:**
  - Vehicle technology
  - Fuel carbon content
  - Travel speeds

GHG METHODOLOGY AND ASSUMPTIONS: VEHICLE KM TRAVELED (VKT)



Passenger Vehicle VKT (millions)

GHG reductions based on passenger VKT reductions.

Reduce *growth* in driving (VKT) by 25 - 36% due to changed land use and travel patterns

Considers a range of savings based on variation in TOD performance and penetration supported by literature

Range of VKT Savings (2040)			
	% of pop	Low	High
Large Cities	47%	27%	40%
Medium Cities	12%	20%	30%
Small Cities	30%	13%	20%
Rural	10%	0%	0%
Weighted average	100%	19%	29%

GHG METHODOLOGY AND ASSUMPTIONS: MODE SHARE & TRIP LENGTH

Representative assumptions for a 30% VKT reduction

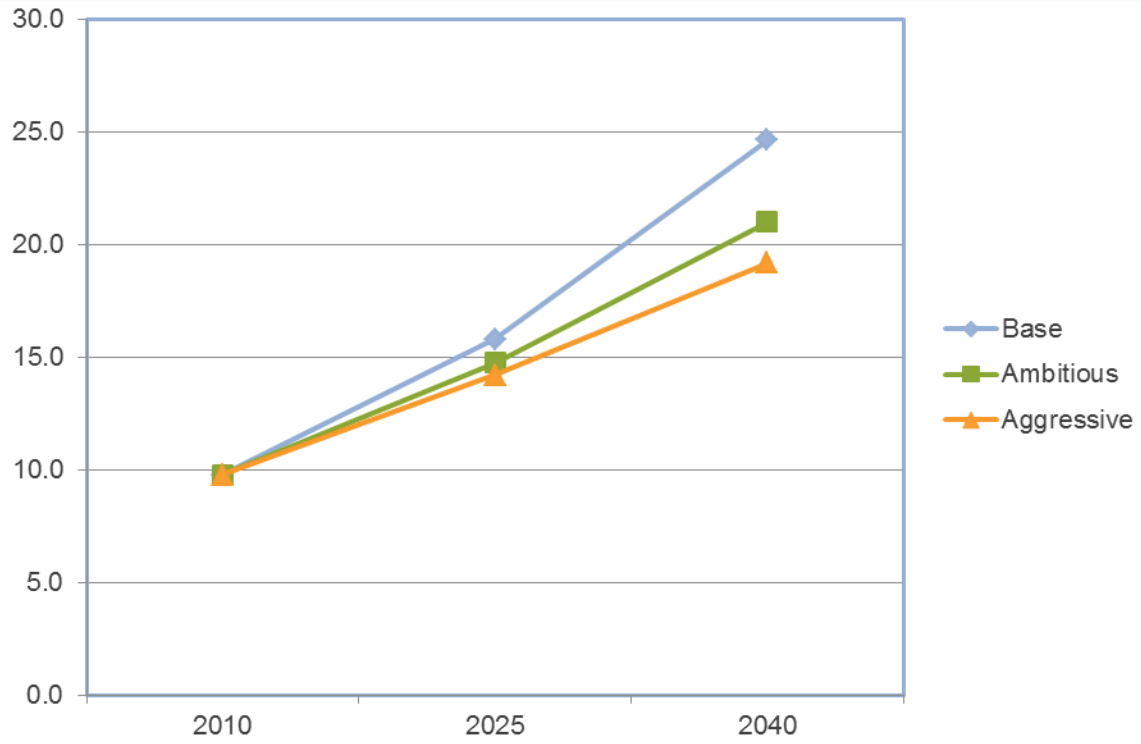
	Mode Share			
Mode	Base 2010	BAU 2040	TOD 2040	Change vs. BAU
Car	7%	25%	15%	-10%
Motorcycles	7%	25%	17%	-8%
Transit	54%	29%	41%	12%
Walk & Bike	20%	9%	15%	6%
Taxis	6%	6%	6%	0%
Other	6%	6%	6%	0%
TOTAL	100%	100%	100%	
Average Trip Length	12	12	10.2	-15%

VKT reductions come from shifting to other modes and shorter average trip lengths

Performance of TOD “technology” depends on technical, market and political considerations.

- the NAMA will address these
- M&E will measure

GHG METHODOLOGY AND ASSUMPTIONS: CO2 SAVINGS



Colombian light duty vehicle emissions ($MMTCO_2e$)

Annual savings by 2040:
3.6 to 5.5 $MMTCO_2$

(15-22% below base case)

Emissions corrected for increased transit emissions

Assumes 20% vehicle efficiency improvement in all scenarios

5. ECONOMIC IMPACTS

Benefits and Costs

- for households, businesses and governments

- **Travel**: household transportation costs
- **Leveraged Investment:** private and international funds invested in TOD districts
- **Property values, retails sales, new businesses** (TOD vs. non-TOD areas)
- **Tax revenues**: increased property and sales tax revenue
- **Public costs**: per-capita infrastructure costs

6. SOCIAL IMPACTS

Impacts of TOD on quality of life, health and equity

- **Travel**: daily average travel time and distance
- **Household costs**: % of household budget spent on transportation
- **Accessibility**: % of population within 0.5 km of transit, shopping, jobs and services
- **Health:** physical activity levels; accident rates; air pollutant emission rates

TOD VS. CONTROL SITES

Measured at Pilot City Level

- Dollars of investment (%) to TOD planned areas (in public infrastructure and in private urban renewal or new development) *vis a vis* traditional BRT station areas
- Per capita vehicle ownership trend
- Per capita VKT trend
- Average trip length trend
- Transit and NMT mode share trend

OUTPUTS

Local Assistance	National Policy	Institutional Sustainability	M&E System
• Local technical assistance causes at least 3 TOD neighborhoods to develop	• National policies and practices for replication of TOD are mainstreamed into policy and planning with inter-institutional coordination mechanisms in place	• Institutional structure in place for continuity of CIUDAT functions (sustainability plans, formal/legal entity promoting TOD is in place)	• Measurement and evaluation process in place and functioning in pilot cities, national capacity growing to show pilot neighborhoods are on path to meet TOD standards

KEY DATA AVAILABILITY: NATIONAL

Existing databases on vehicle registrations, drivers, travel demand on public transit systems, land use

- Need to connect, integrate (RUNT, SISETU, IDGT, IAU, IEEO…)

Colombian Ministry of Transport programs collect data for cities with transit built using national funds.

- Travel time: public and private vehicles
- Travel costs
- Transit service quality (*como vamos*)
- % of mass transit users with access to private vehicles
- Local air pollutant concentrations (PM10, O3, CO, NO2, SO2)
- Passenger/kilometers, vehicle occupancy, vehicles per hour and direction, platform passenger density
- BRT system financial data

KEY DATA AVAILABILITY: LOCAL

Bogotá's Mobility Survey (2005 & 2011)

- **Origin-Destination (OD) Household Surveys**
  15,500, all trips. Also, trip length distribution in the city
- **OD Intercept Surveys**
  70,000 (car, transit); OD, purpose. Vehicle counts, occupancy
- **Travel Speed Studies** Along main corridors peak and off-peak (using floating car GPS measurement in selected segments)

Cali Green Corridor

- Starting primary data collection
- Assess VMT per mode with calibrated trip/mode generation model sensitive to accessibility and land use

CONCLUSIONS

- **Appraisal process will determine essential M&E needs**
- **Need for data, capacity building and model improvements**
  - Included small portion of NAMA budget for M&E, data improvements
  - Could be built into national policies, infrastructure investments
- **Sustainable development metrics key for deep penetration**
- **Measuring catalytic effect will be done over time**
  - Replication actions in other neighborhoods, cities
- **Partnering will be important** for comprehensive, long-term measurement of travel, environmental, social and economic benefits
  - Univ. los Andes CityLab: travel surveys and traffic counts
  - Business groups and NGOs: economic and social data
  - With international experts (such as you!)

¡GRACIAS!

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