Forum Agenda

- City of San Diego Community Plan Updates
- Model Development Update
- Climate Action Planning
City of San Diego Community Plan Updates

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San Diego Community Plan Updates

- Background / Administration
- Community Plan Update Status
  - On going
  - Upcoming
- Travel Demand Modeling component
- Process
San Diego Community Plan Updates

- Background / Administration
  - Master contract
    - Task orders submitted to the Service Bureau
  - Prime consultant contract
    - Consultant involvement varies
  - In House
San Diego Community Plan Updates

- Community Plan Update Status

**On Going**

Task Orders:
1) Old Town / Midway
2) San Ysidro

Consultant:
1) Southeastern & Encanto

**In House:**
1) North Park / Golden Hill / Uptown

**Five Year Outlook**

Task Orders or Consultants:
12 – 15 Community Plan Updates
Order of communities to be analyzed yet to be determined
San Diego Community Plan Updates

- Community Plan Update Components
  - Land Use
    - Regional model vs. community plan land uses

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San Diego Community Plan Updates

- Community Plan Update Components
  - Zoning
    - Implementation tool of the land use
    - Economic analysis

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San Diego Community Plan Updates

- Community Plan Update Components
  - Mobility
    - Multi-modal network analysis
San Diego Community Plan Updates

- Travel Modeling Process
  - Subarea model development
  - Model calibration
  - Future-year scenarios (Adopted & Proposed)
  - Post-forecast analysis
San Diego Community Plan Updates

- Subarea model development
  - Splitting TAZs
  - Updating traffic counts
  - Updating trip generation rates

City of San Diego

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**San Diego Community Plan Updates**

- **Quantifying Model calibration**
  - Criteria and targets

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**Link Calibration Status:**
- **Within +/- 10.0%**
- **-50.0% to -10.0% - 10.0% to 50.0%**
- **More Than +/- 50.0%**
- **Links without a Calibration Count**
- **Zone Connector**
- **Zone Boundary**
- **Community Plan Areas**

- 75% of the cases within the study area will be within +/- 10% ADT.
- 85% of the cases within the study area will be within +/- 10% of the observed counts.
San Diego Community Plan Updates

- Future-year scenarios (2035)
  - Adopted (General Plan)
  - Proposed
    - Network
    - Land Use

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San Diego Community Plan Updates

- Post-forecast analysis
  - Average daily traffic (ADT)
  - Mode choice
  - Link and/or zonal distribution
San Diego Community Plan Updates

- Planning Process and Implementation
  - A Community Plan Update is essentially an amendment to the General Plan
  - Environmental Impact Reports
    - Significant impacts & mitigations
    - Findings
    - SOCs
  - Plan acceptance and approval
    - Advisory Committees
    - Planning Commission
    - City Council
Model Development Update
Model Development Update

- Activity Based Model maintenance  Wu
- Commercial Vehicle Model  Rick
- Active Transportation  Wu
- Service Bureau Land Use Overrides  Mike
- Base Year Model Calibration  Clint
- Dynamic Traffic Assignment  Rick
ABM Maintenance

Development
Model estimation
Model calibration
Model validation

ABM Development Start
Jan. 2009

ABM Development Complete
Jan. 2013

Transition
Post Development Year 1
Dec. 2013

Post Development Year 2
July. 2014

Post Development Year 3
July. 2015

Application
RTP applications
AT Enhancement

Land use review
PopSyn III
Military GQ Treatment
CTM Integration
Sensitivity Tests

Byear 2010
Byear 2012
ABM DB & PMs
Version/Software Management
**ABM Maintenance**

- **Completed FY14 Key Tasks**
  - 2010 model calibration and validation
  - 2012 model calibration and validation
  - Software bug fixes
  - ABM database design and implementation
  - RTP performance metrics and project evaluation criteria implementation
  - ABM and EMFAC2011
  - Work flow streamlining
ABM Maintenance

- **FY15 Key Tasks**
  - Model improvement
    - Population synthesizer upgrade
    - Military group quarter modeling
    - University student location choice modeling
  - Software/Runtime improvement
    - Visitor model
    - TOD choice model
  - Sensitivity and uncertainty tests
Commercial Travel Model
Commercial Travel Model (CTM) & External Truck Model (HDTM)

- **CTM**
  - Internal Trips Only (II)
  - Light Duty and Truck Commercial Trips
  - Based on Establishment Survey

- **HDTM**
  - Heavy Duty Truck Trips Into (EI), Out of (IE), or Through (EE) San Diego
  - Based on FAF3

IE and EI

EE

I = Internal
E = External
CTM Survey

- **Work Related Travel Survey (2013)**
  - 363 establishments
  - 3,655 surveys returned
CTM: Travel or Vehicle Model?
CTM Validation: Weigh In Motion

2012 Validation WIM Time of Day

- Est_Trk_EA
- Est_Trk_AM
- Est_Trk_MD
- Est_Trk_PM
- Est_Trk_EV
- 1 to 1 Correspondance
CTM Validation: Classification Counts

2012 Vehicle Classification Observed by TOD vs 2012 Estimated by TOD
**CTM: Toll Choice Calibration**

- Calibration based on
  - ATRI (American Transportation Research Institute)
  - SANDAG survey data

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<th>Time Period</th>
<th>Vehicle Type</th>
<th>Observed</th>
<th>SANDAG Model</th>
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Active Transportation Model
Active Transportation Model

- Phase 1 Model Development
- Phase 1.5 RTP Applications
- Phase 2 Model Development

Timeline:
- June 2014
- December 2014
- June 2016
Active Transportation Model

- Phase 1.5 Key Tasks
  - Future all street networks
  - ABM mode choice re-estimation
  - ABM mode choice re-calibration
  - Streamline ABM/AT integration
  - Streamline and automate AT network generation
  - Sensitivity tests
Active Transportation Model

- Phase 2 Key Tasks
  - Surveys and data collection
  - Bike route choice model estimation
  - Bike route choice model calibration/validation
  - Re-estimate ABM mode choice model
  - Re-calibrate/validate ABM mode choice model
  - Software improvement
  - Final report and model deployment
Active Transportation Model

- Surveys and Data Collection
  - Bike route choice survey
  - Intercept survey to capture AT traveler behavior
  - Additional count data collection
    - Permanent counts
    - Cordon counts for model development
  - State and national survey data processing
  - Possible coordination with local universities
Service Bureau Land Use Overrides
## Service Bureau Land Use Overrides

### Schedule, tasks and deliverables

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>Completion Date</th>
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<tr>
<td>Task 1</td>
<td>Evaluate existing process and job categories</td>
<td>November 2014</td>
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<td>Task 2</td>
<td>Create a publishable “Tour Generation” report</td>
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<td>Task 3</td>
<td>Investigate and define the threshold for rerunning growth allocation models</td>
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<td>Task 4</td>
<td>Automate the creation of land use override input files using SANDAG’s land use density tables by Land Use Zone (LUZ)</td>
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<td>Task 5</td>
<td>Develop software</td>
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<td>Task 6</td>
<td>Sensitivity tests and performance measures</td>
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<td>Task 7</td>
<td>Evaluate existing staff and computer time for complete 4-step model runs and document staff and computer time required to run the ABM</td>
<td>July 2015</td>
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<td>Task 8</td>
<td>Prepare documentation</td>
<td>August 2015</td>
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## Service Bureau Land Use Overrides

### Current Process

- **Old Town / Midway example**

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<th>TAZ</th>
<th>LU Code</th>
<th>LU Desc</th>
<th>Measure</th>
<th>DU</th>
<th>Floor Area</th>
<th>KSF</th>
<th>Rooms</th>
<th>Students</th>
<th>Pumps</th>
<th>Beds</th>
<th>Parking Spaces</th>
<th>Berths</th>
<th>Employees</th>
<th>Acres</th>
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Service Bureau Land Use Overrides

- Current process
  - Land use override challenges

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<th>LU Code</th>
<th>LU Desc</th>
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Service Bureau Land Use Overrides

- Trip Generation
- Population Synthesis
- ABM land use format
  - Population by structure type
  - Employment by industry type
- Density tables by LUZ
- Other considerations
  - School enrollment by school type
  - Special market models (i.e. visitor, parking, etc.)
"I think you should be more explicit here in Step Two."
Base Year Model Calibration

- Unique uses
- Military
- airport
Dynamic Traffic Assignment

Regional patterns and mode shift; Transit analysis capability

Traveler information, HOT lanes, congestion pricing and regional diversion patterns

Traffic control strategies such as ramp metering and arterial traffic signal control
Dynamic Traffic Assignment

- **Oct 2013**: Requirements Workshop & DTA Software Selection
- **Jan 2015**: Model Development Plan & Validation Data
- **Jul 2015**: Draft DTA Model with Performance Metrics
- **Jan 2016**: ABM Integration
- **Mar 2016**: Sensitivity Tests
- **Jun 2016**: Training & Documentation

*Timeline:
- Oct 2013
- Jan 2015
- Jul 2015
- Jan 2016
- Mar 2016
- Jun 2016*
Dynamic Traffic Assignment

- Realistic Network Representation
Dynamic Traffic Assignment

- **Signals**
  - TCOVED = RAMS (Regional Arterial Management System)
  - NEMA phasing
Climate Action Planning

Dr. Nilmini Silva-Send

silvasend@sandiego.edu
Climate Action Planning

- Regional Greenhouse Gas Inventory
- Local Government Process
- Climate Action Plans - Results
Regional GHG Inventory

- **Scope:**
  - San Diego County
  - All Economic Sectors

- **Method:**
  - 2008 & 2010
    - CARB Method
      - Based on the IPCC Protocols
    - Modified where Appropriate
  - 2012
    - Consistent with ICLEI Local Government Protocol, where possible
## GHG Emissions Inventory Categories and Subcategories

### Agriculture
- Enteric Fermentation
- Manure

### Industrial Processes and Products
- HFC refrigerants
- Sulfur hexafluoride
- Other

### Natural Gas End Uses
- Residential
- Commercial
- Industrial
- Mining
- Agricultural

### Off-Road Equipment and Vehicles
- Construction and Mining Equipment
- Pleasure Craft
- Industrial Equipment
- Agriculture Equipment
- Other

### On-Road Transportation
- Passenger Vehicles
- Light-Duty Trucks
- Heavy-Duty Trucks and Vehicles
- Motorcycle

### Sequestration from Land Cover
- Forest growth
- Woodland growth
- Chaparral, scrub, and grasslands

### Waste
- Landfills
- Wastewater Treatment

### Water-Borne Navigation
- Ocean Going Vessels (OGV)
- Harbor Craft

### Wildfires
- Forest
- Woodlands
- Chaparral, scrub, and grasslands

### Civil Aviation
- Interstate Flights
- Intrastate Flights

### Electricity
- Residential
- Commercial
- Industrial
- Mining
- Agricultural
- Telephone, communications, utilities
- Street Lighting

### Development
- Loss of farmland
- Loss of native vegetation
Regional GHG Inventory 2012

- Electricity: 23.6%
- Transportation: 40.4%
- Natural Gas: 8.3%
- Industrial: 4.4%
- Other Fuels: 4.9%
- Solid Waste: 4.4%
- Aviation: 4.1%
- Water: 1.8%
- Other - Thermal Cogen: 1.9%
- Rail: 0.3%
- Agriculture: 0.2%
- Marine Vessels (excluding pleasure craft): 0.1%
- Off-Road: 2.7%
- Wildfire: 2.4%
- Wastewater: 0.5%
- (excluding pleasure craft)
Regional Inventories

Regional GHG Inventories
San Diego Region

Million Metric Tons CO2e

2010 2015 2020 2025 2030 2035 2040 2045 2050

2008 Inventory

2010 Inventory

2012 Inventory BAU Using OD VMT Data

EPIC, USD
Regional BAU, Targets and Mitigation

- Pavley I & CAFE
- Low-Carbon Fuel Standard
- Renewable Portfolio Standard
- Distributed PV

Emissions Targets Trajectory

Emissions Reduction Gap

Net Emissions

2010 2015 2020 2025 2030 2035 2040 2045 2050

Million metric Tons CO2e
Why greenhouse gas planning at city-level?

  - Local and regional cooperation essential
  - CEQA guidelines (mandatory) for GHG analysis
    - 2010 SB 97 - Localities must review climate impacts of projects
  - CEQA related bills
    - Exemptions favoring low carbon measures
    - 2011 SB 226 - exemption for certain solar systems (s 21080.35)
    - 2010 SB 375 – regional GHG reduction targets from transportation
  - Attorney General Comments on GHG planning in general plans

- **CEQA Litigation**
Climate Planning Process in Cities

1. Analysis Phase

- Develop GHG Inventory
- Select and Estimate Reductions from Mitigation Measures
- Develop Draft Climate Action Plan

2. Implementation Plan

- Project Business As Usual Emissions to 2020, 2035
- Select 2020 and 2035 Emissions Targets
- Public Review/Comments

3. Monitoring Plan

- Finalize Draft Climate Action Plan
- Council/Board/Commission approval

CEQA Review?
Guidance from the State + Courts....

- Governor’s Office of Planning and Research (OPR) /Air Resources Board
  - For projections, apply federal and state measures now in place
    - Renewable Portfolio Standard (33% by 2020)
    - Fuel Efficiency Standards (54.5 mpg new passenger vehicles by 2025)
    - Low-Carbon Fuel Standard (10% GHG intensity reduction by 2020)

- Court’s directions:
  - Enforceable mitigation measures through 2020 or through life of GP
  - Demonstrate progress toward 2050 goal
EPIC City Climate Planning Tool

- Inventory Sectors for Cities
  - Electricity and Natural Gas
  - Transportation
  - Solid Waste
  - Wastewater Treatment
  - Water Use Energy
EPIC City Climate Planning Tool

Data

- Vehicle miles traveled (VMT) O-D from SANDAG per year
- CO2e/VMT intensity from EMFAC 2011 for our region
- Electricity Intensity calculated from actual power plants emissions and load data
- Electricity and NG usage from SDG&E
- Waste disposed from CalRecycle
- Urban Forestry Data
- Forecasts based on SANDAG and CEC
Community Scale Greenhouse Gas Emissions Model
San Diego Region
Module I: Part A - Business-As-Usual Projection

**Step 1:** From the dropdown menu below, select a city within the San Diego Region

**Chula Vista**

### Business-As-Usual Total CO2e Emissions Projection (MMT/Year)

**Chula Vista**

<table>
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<th>Business-As-Usual Emissions by Sector (MMT CO2e)</th>
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<th>2020</th>
<th>2035</th>
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<td><strong>Total BAU Emissions</strong></td>
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City Inventory Breakdown clipped vs. O-D VMT

Transportation 64%
Electricity 22%
Natural Gas 10%
Solid Waste Water 2%
Wastewater 0%

Transportation 31%
Natural Gas 19%
Water 3%
Solid Waste 3%
Wastewater 1%
Electricity 43%
**EPIC Climate Planning Tool**

Set Targets, Calculate Reductions Needed

**Step 2:** choose baseline year by selecting from dropdown menu below

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<th>Baseline Year</th>
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**Step 3:** choose default baseline emissions value

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**Step 4:** choose target reductions for 2020 and 2035 by selecting from dropdown menus below

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**Step 5:** move to next tab to select mitigation measures

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[Link to Mitigation Calculators](#)
Select Mitigation Measures

- **Jurisdiction/Authority**
  - Who has jurisdiction or authority to implement and enforce a measure?

- **Potential to reduce emissions**
  - How much emissions can a measure reduce?
  - What participation or activity level is required?

- **Cost to implement**
  - How much does a measure cost?
## Electric + Natural Gas

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<th>User Defined Inputs</th>
<th>Annual Emissions Reductions: (MMT CO2e)</th>
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<td>% of Sales</td>
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<td>% of Population Participating</td>
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# Mitigation Model

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<td>499.5</td>
<td>381.5</td>
</tr>
<tr>
<td>Low Carbon Fuel Standard (LCFS)</td>
<td>2010</td>
<td>2020</td>
</tr>
<tr>
<td>User Defined Emissions Reduction Factors</td>
<td>-</td>
<td>10%</td>
</tr>
<tr>
<td>Electric Vehicles</td>
<td>2010</td>
<td>2020</td>
</tr>
<tr>
<td>% of Total VMT Driven By Electric Vehicles</td>
<td>0.5%</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

| Mass Transit                                           | 2010               | 2020 | 2035 | 0.01 | 0.02 |
| Commuter Ridership (%)                                 | 5.7%               | 6.9% | 8.7% |      |      |

| Bicycle Strategy                                       | 2010               | 2020 | 2035 | 0.002| 0.004|
|                                                        |                    |      |      |      |      |
| Bicycle Lane Miles/Square Mile                         | 1.1                | 4    | 8    |      |      |
| Retiming Traffic Signals                               | 1.1                | 4    | 8    | 0.0014| 0.0015|
| Numer of Traffic Retimed Traffic Signals              | -                  | 25   | 30   |      |      |
| Roundabouts                                            | 2010               | 2020 | 2035 | 0.0003| 0.0004|
| Number of Roundabouts Installed                        | -                  | 5    | 8    |      |      |
**GHG Mitigation Measures Summary**

**Emissions Reductions Transportation**
- Pricing Parking
- Population Density
- Alternate Work Schedule
- Telecommuting
- Ecodriving
- Van Pooling
- Preferential Parking for EV’s
- Reducing Parking
- Bicycle Strategy
- Mass Transit
- Electric Vehicles
- Price of Gas
- Average Commute
- Low Carbon Fuel Standard (LCFS)
- Vehicle Emissions Efficiency (Pavley I through 2016)

**Emissions Reductions Electricity + Natural Gas**
- Cogeneration
- Commercial SHW Installs
- Residential Photo-Voltaics
- Commercial Photo-Voltaics
- Residential SHW Installs
- Commercial Retrocommissioning
- Residential Efficiency Retrofits - MF
- New Construction (Res. + Com.)
- Residential Efficiency Retrofits - SF
- Commercial Efficiency Retrofits
- Renewable Portfolio Standard
## Results

### Community Scale Greenhouse Gas Emissions Model

#### Module II: Mitigation Measures Calculator

**City of San Diego**

<table>
<thead>
<tr>
<th>Year</th>
<th>Targets</th>
<th>Target Emissions (MMT CO2e)</th>
<th>Emissions after Mitigation (MMT CO2e)</th>
<th>Target Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>15%</td>
<td>10.93</td>
<td>10.05</td>
<td>Yes</td>
</tr>
<tr>
<td>2035</td>
<td>50%</td>
<td>6.43</td>
<td>6.58</td>
<td>No</td>
</tr>
</tbody>
</table>

**Baseline Emissions:** 12.86 (MMT CO2e)

---

**Legend:**
- User Input
- Output

**Graph:**
- Business-as-Usual and Mitigated Emissions Projections
  - State Transportation
  - Local Transportation
  - State Elec. & NG
  - Local Elec. & NG
  - Solid Waste and Wastewater
  - Water
  - Land Use
  - Emissions After Mitigation
  - Target Emissions
Cities involved in climate action planning with EPIC

- San Diego 1,356,000
- Encinitas 61,588
- Del Mar 4,278
- Solana Beach 13,236
- Chula Vista 256,780
- Lemon Grove 26,141
- La Mesa 58,642
- Oceanside 172,794
Climate Action Planning

Thank You!

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619-260-2957
Open Discussion
Forum Agenda Recap

- City of San Diego Community Plan Updates
- Model Development Update
- Climate Action Planning

Next Transportation Modeling Forum:
June 10, 2015
Transportation Modeling Forum

December 10, 2014