#### Development of a Regional Greenhouse Gas Emissions Inventory for the Lake Tahoe Basin

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### **Presentation Outline**

- Background
- Overview
- Technical Approach
- Results
- Next Steps





### Background (1 of 3)

Recent research into the effects of climate change on Lake Tahoe has identified several noteworthy trends:

- A decrease in the annual number of days on which average air temperatures are below freezing
- A decrease in the percentage of annual precipitation that falls as snow
- Increasing average water temperatures in Lake Tahoe



### Background (2 of 3)

Regional planning agencies have begun formulating a Basin-wide strategy to address climate change impacts.

- CTC has funded the development of a regional GHG emissions inventory that will:
  - Establish an emissions baseline that regional planners can use to set reduction targets and measure future progress; and
  - Provide insight into the scale of emissions from various source sectors within the Basin.



### Background (3 of 3)

#### Key California initiatives:

- AB 32 (Global Warming Solutions Act) requires statewide GHG emissions to return to 1990 levels by 2020
- SB 375 (Sustainable Communities and Climate Protection Act) – requires planning agencies to meet regional GHG reduction targets for passenger vehicles through integrated land use and transportation planning (2005 base year)





### Overview (1 of 3)

#### Key steps

- Establish project work group:
  - Tahoe Regional Planning Agency
  - Sierra Nevada Alliance
  - Placer County
  - City of South Lake Tahoe
  - Nevada Dept. of Env. Protection
  - Tahoe Science Consortium
  - U.S. Forest Service
  - Desert Research Institute
  - Ascent Environmental
- Establish inventory boundaries





### Overview (2 of 3)

### Key steps (cont'd)

- Select inventory years:
  - 2005 base year (coordinate with SB 375 targets)
  - 2010 interim year
  - 2020 and 2035 future years
- Identify and prioritize emissions sources
- Collect activity data
- Calculate emissions

Emissions Type	Source Sector	Source Category
Direct	Transportation	On-road mobile sources (motor vehicles: passenger cars, trucks, buses)
		Off-road vehicles (boats, snowmobiles, lawn and garden equipment, etc.)
		Wood combustion (campfires, fireplaces, stoves)
	Fuel combustion	Natural gas combustion (residential and commercial)
		Other fuel combustion
		On-road mobile sources (motor vehicles: passenger cars, trucks, buses)
	Fires	Wildfires and prescribed burns
	Land use	Livestock
		Forestry carbon stock
	Waste	Wastewater treatment
Indirect	Energy	Electricity consumption
		Wastewater treatment
	Transportation	Aircraft
	Waste	Municipal solid waste



### Overview (3 of 3)

### **Baseline results**

- 1,313,511 metric tons of CO<sub>2</sub>e in 2005
- 6% increase in 2010
- 3 sectors account for 90% of emissions





# Technical Approach (1 of 5)

### Energy

- Residential and commercial electricity consumption from local utilities (Liberty Energy and Nevada Energy)
- Utility-specific emission factors reflecting mix of generation sources





# Technical Approach (2 of 5)

#### Transportation

- On-road motor vehicles:
  - Link-level VMT data from TRPA's TransCAD travel demand model
  - SB 375 VMT classification scheme
  - Fuel economy data from ARB's EMFAC 2011 model
- Recreational boats:
  - Fuel consumption for 2004 and 2010 from Shorezone EIS
  - Spatial allocation using boat launches by marina/ramp



# Technical Approach (3 of 5)

#### Fuel combustion

- Natural gas combustion:
  - Residential and commercial usage from local utilities (Southwest Gas)
- Wood combustion:
  - TRPA/UCR survey on winter residential activity and summer campfire activity (2004)
  - Updated to 2005 and 2010 based on changes in the number of households and visitors



Basin-wide natural gas usage by year



## Technical Approach (4 of 5)

#### Fires

- Wildfire/prescribed burns
  - BlueSky/SMARTFIRE system (reconciles satellite detects and ground-based reports)
  - CalFire Fire and Resource Assessment Program data
- Pile burns
  - USFS Lake Tahoe Fuel Reduction Plan





## Technical Approach (5 of 5)

#### Waste

- Solid waste:
  - Used "methane commitment" method (focuses on waste generated in a given year)
  - Waste generation data from local utilities (e.g., South Lake Tahoe Refuse)
  - Methane capture system installed at Lockwood Landfill in 2009
- Wastewater treatment:
  - All local wastewater treated aerobically (no methane emissions)
  - Energy usage for Truckee facility treated as an indirect source



CO2e emissions from solid waste by year

### Results (1 of 3)

#### **Baseline results**

- 1,313,511 metric tons of CO<sub>2</sub>e in 2005
- 6% increase in 2010
- 3 sectors account for 90% of emissions
- Significant change in fire and waste emissions from 2005 to 2010





### Results (2 of 3)

#### Spatial distribution

- The CA portion of the Basin accounts for 68% of total GHG emissions in 2005 and 71% of total GHG emissions in 2010
- The City of South Lake Tahoe accounts for 27% of total GHG emissions in both 2005 and 2010
- Placer County accounts for 26% of total GHG emissions in both 2005 and 2010





### Results (3 of 3)

#### **Preliminary Forecasts**

- For 2020, GHG emissions for various scenarios were 1% to 5% higher than 2005 totals
- For 2035, GHG emissions for various scenarios were 5% to 12% higher than 2005 totals



### Next Steps

- Review of baseline inventories by the GHG EI work group
- Development of final 2020 and 2035 inventories once forecast data are finalized
- Comparison of on-road emissions with results from integrated model being developed for the regional transportation plan update



### Questions?

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