Development of a Regional Greenhouse Gas Inventory and Forecast Including Direct and Consumption-Based/Energy-Cycle Emissions

Holly Lindquist, Stephen M. Roe, Jim Wilson, Maureen Mullen, Brad Strode, Jackson Schreiber

E.H. Pechan & Associates

Hillel Hammer, Jelena Matic, Teresa Lin

AKRF, Inc.

Jeffrey Perlman

North Jersey Transportation Planning Authority

Outline

- Objective
- Inventory Approach
- Sample Methods and Results
  - Solid Waste Management
  - Onroad Transportation

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Objective

- Create region-wide Inventory & Forecast for North Jersey Transportation Planning Authority
- 13 counties and over 350 municipalities
- Allow counties and municipalities to begin GHG mitigation planning
- Clearly inform planners of relative merits of mitigation actions

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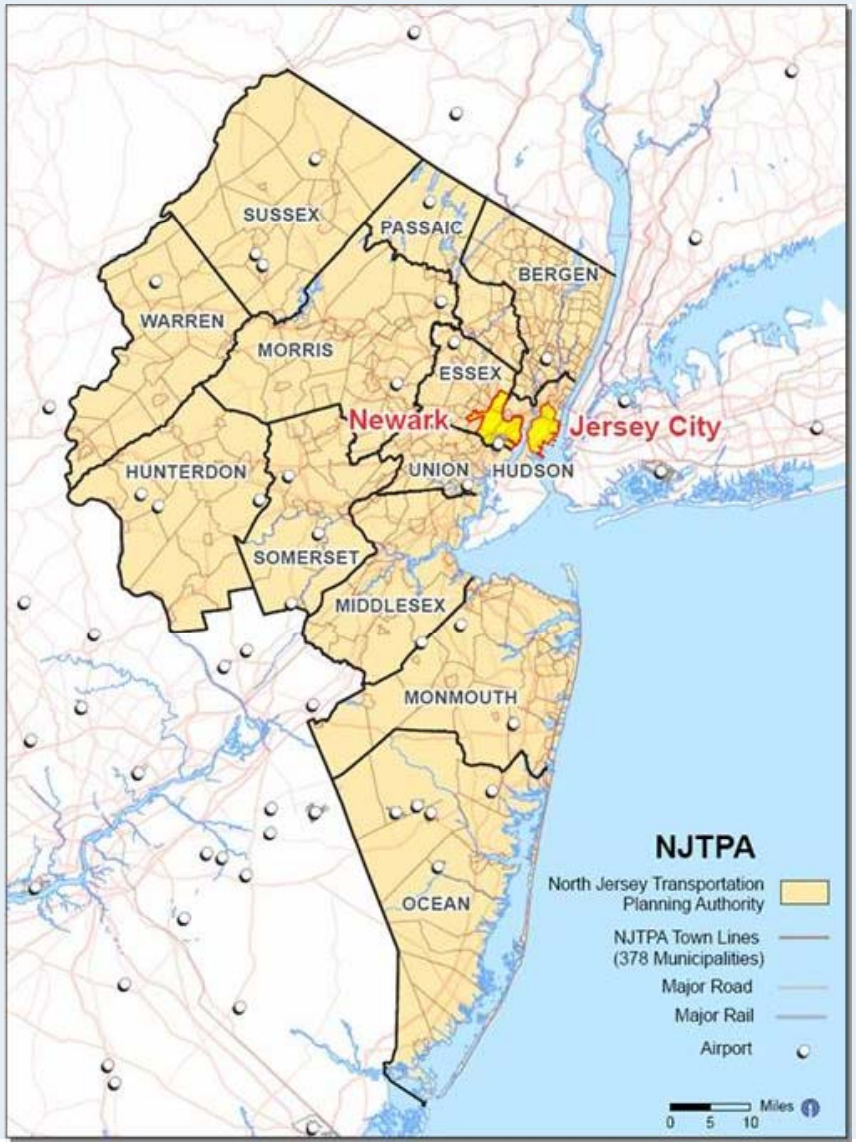
NJTPA Region



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Inventory Approach: Accounting Methods

- Direct and Consumption-Based GHG emissions
  - Direct: emissions at the source (e.g., of fuel combustion, process, etc.)
  - Consumption-Based: emissions attributed to the point of some GHG emitting activity (e.g., trip origin/destination, waste or wastewater generation)
- Energy-cycle emissions
  - Emissions from upstream fuel cycle (extraction, transport, processing/refining, distribution)

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Inventory Approach: Accounting Methods – Pros and Cons

- Direct emissions are only basis for adding emissions cumulatively without double-counting
- National, State, and other local inventories primarily developed on direct emissions basis
- Consumption-based plus energy-cycle emissions may best fit needs of mitigation planners

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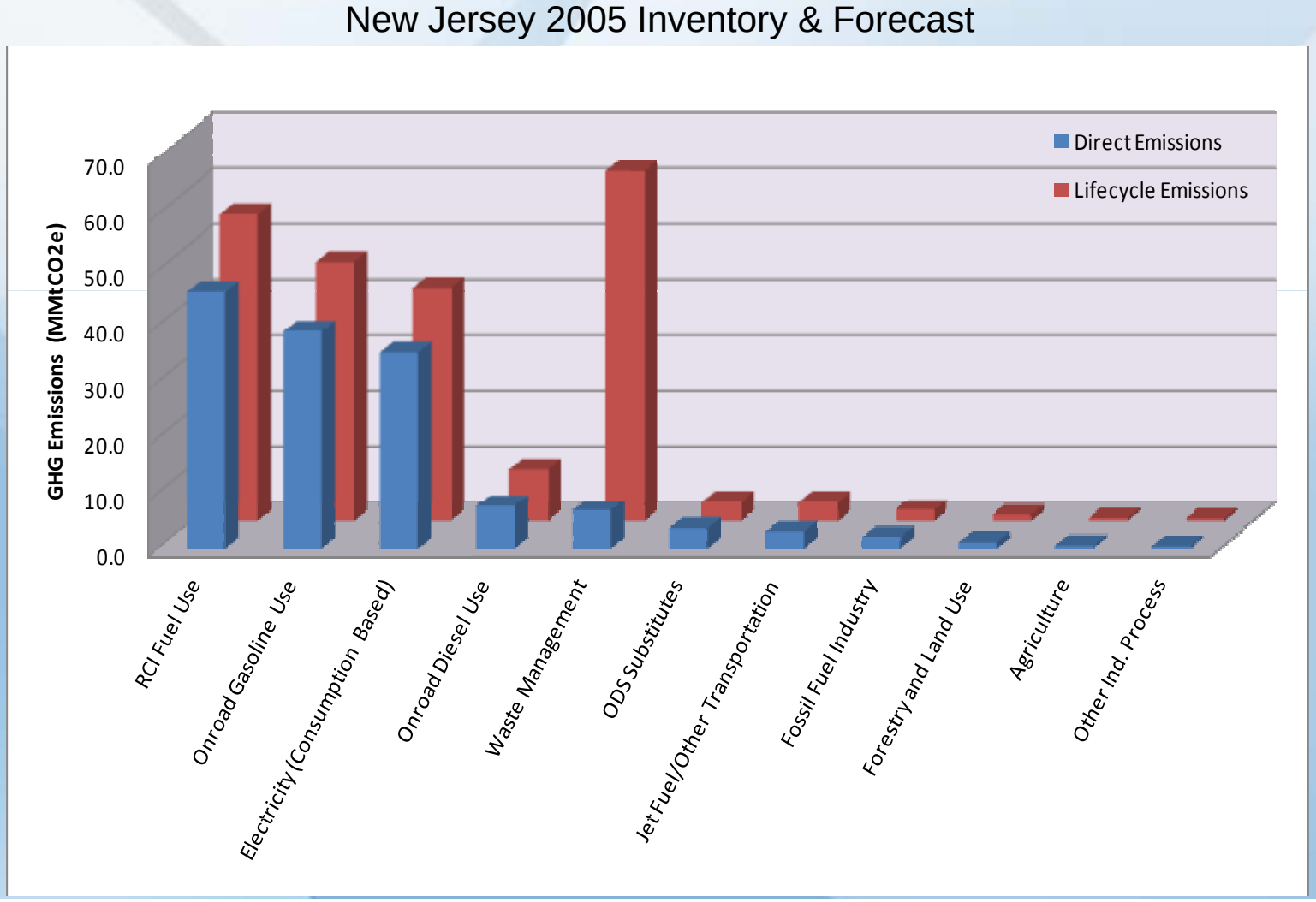
Example of Direct vs. Energy-cycle Emissions



Solid Waste Management Inventory

- Includes solid waste landfills, composting, recycling, and residential open burning
- Direct Emissions
  - Landfill and composting facility data provided by NJDEP
  - Residential open burning based on per capita burning rate
  - No direct recycling emissions

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Solid Waste Management Inventory

- Consumption-based Emissions
  - Solid waste management profile developed for each county
  - Waste generated in county that is sent to landfill or composting facility regardless of facility location
  - WARM transportation emission factor used for landfilling, recycling, and composting
- Energy-cycle Emissions
  - Emissions factors for embedded emissions from WARM
  - Process energy, non-energy process emissions, transportation of raw materials and manufactured goods
  - Dependent on waste composition

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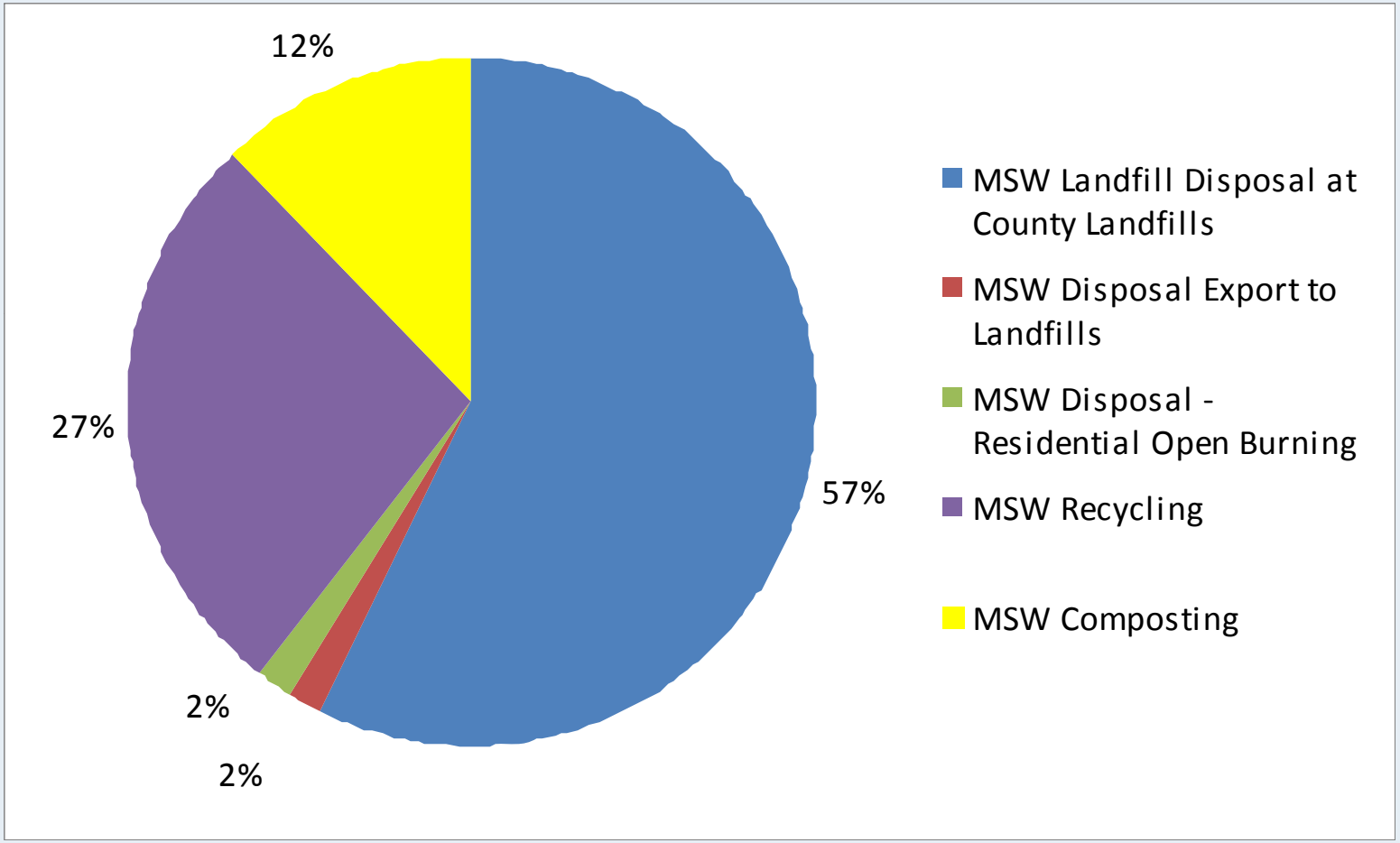
Ocean County Waste Management Profile



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Solid Waste Management Forecast

- Direct Emissions
  - Assumed constant waste emplacement at landfills until anticipated year of closure
  - Composting based on state annual average growth rate for 2000-2006
  - Open burning forecast based on population growth
- Consumption and Energy-Cycle Emissions
  - Based on each county's per-capita waste generation growth rate for 1995-2006

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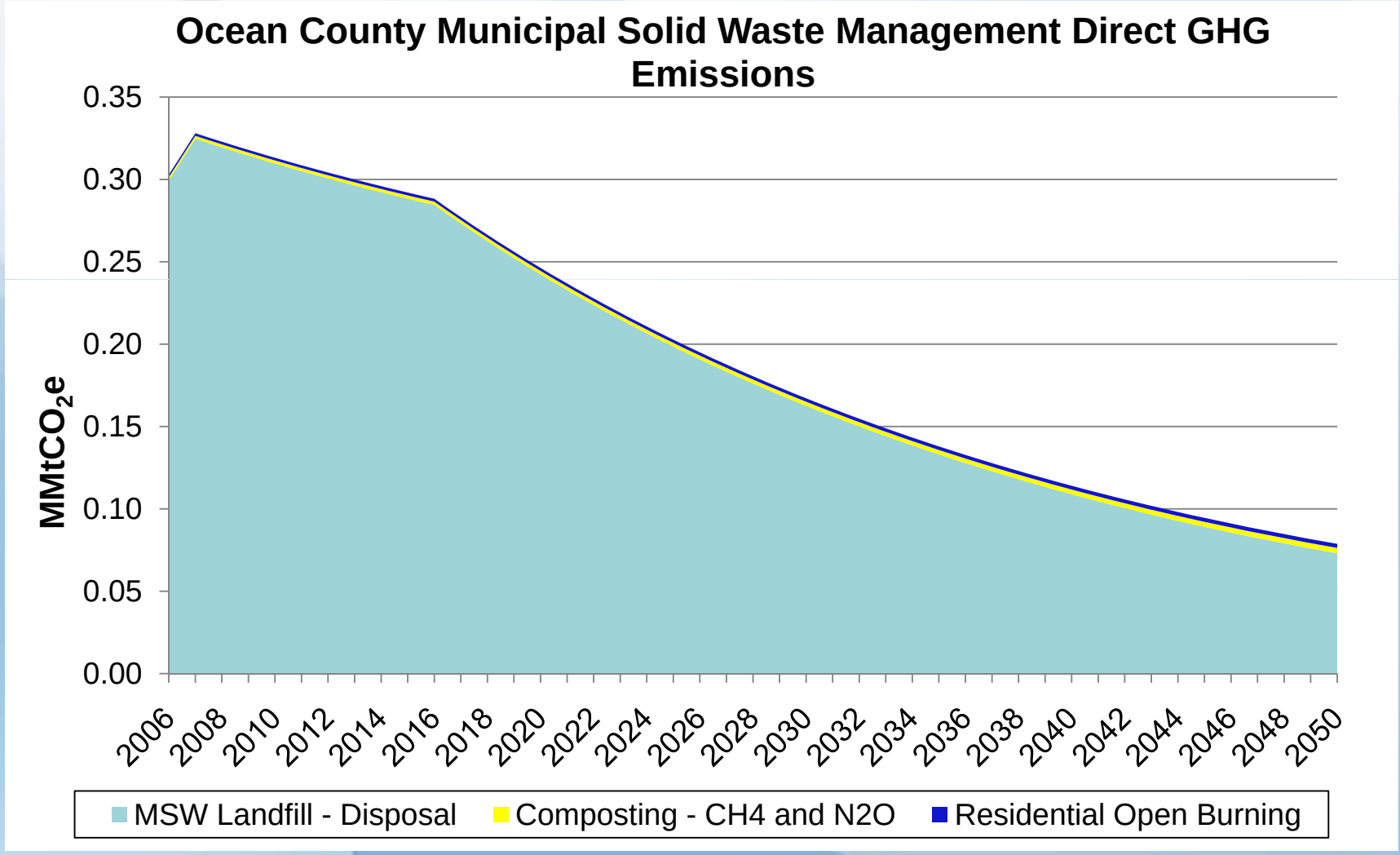
Sample Draft Results



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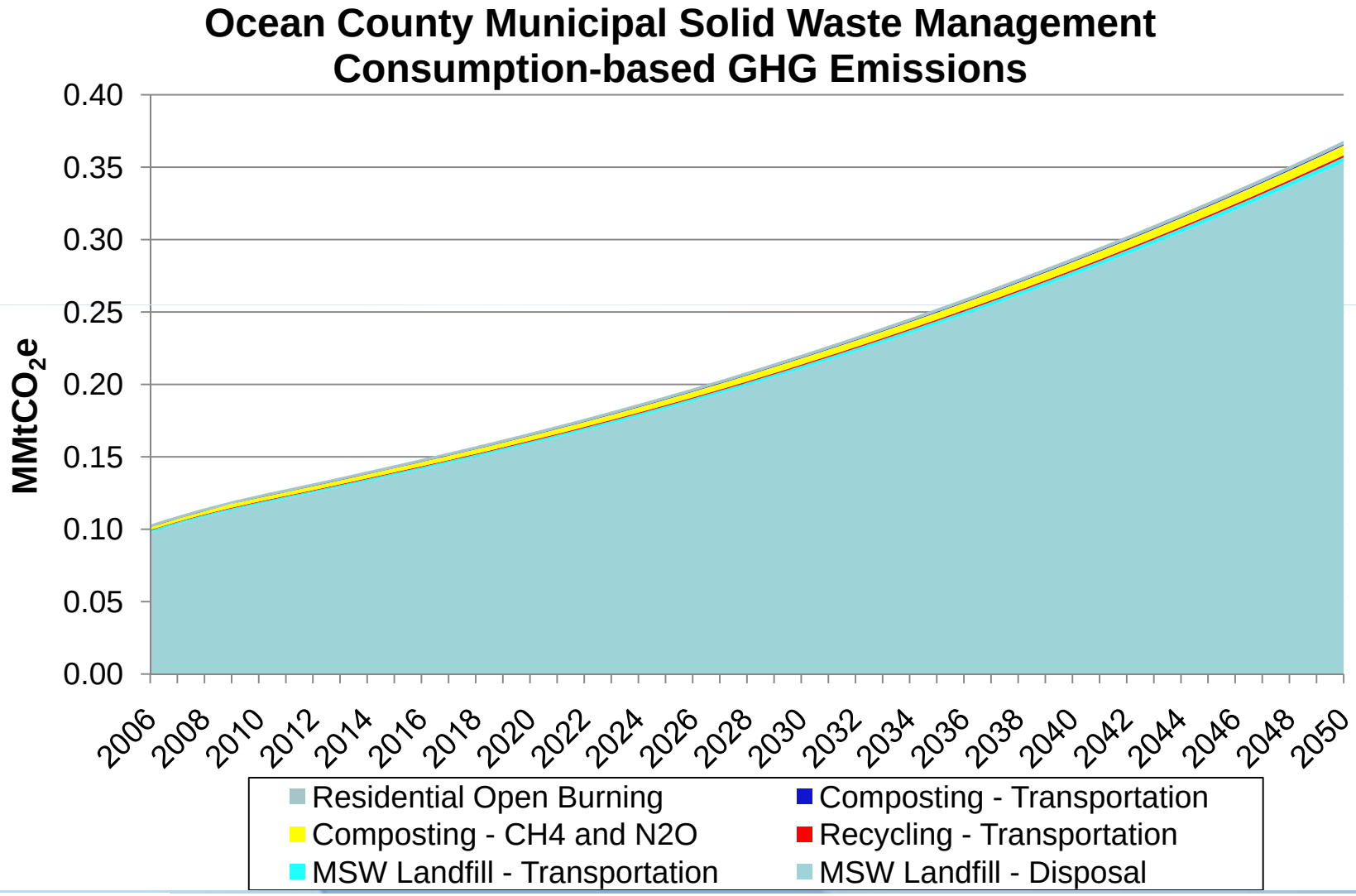
Sample Draft Results



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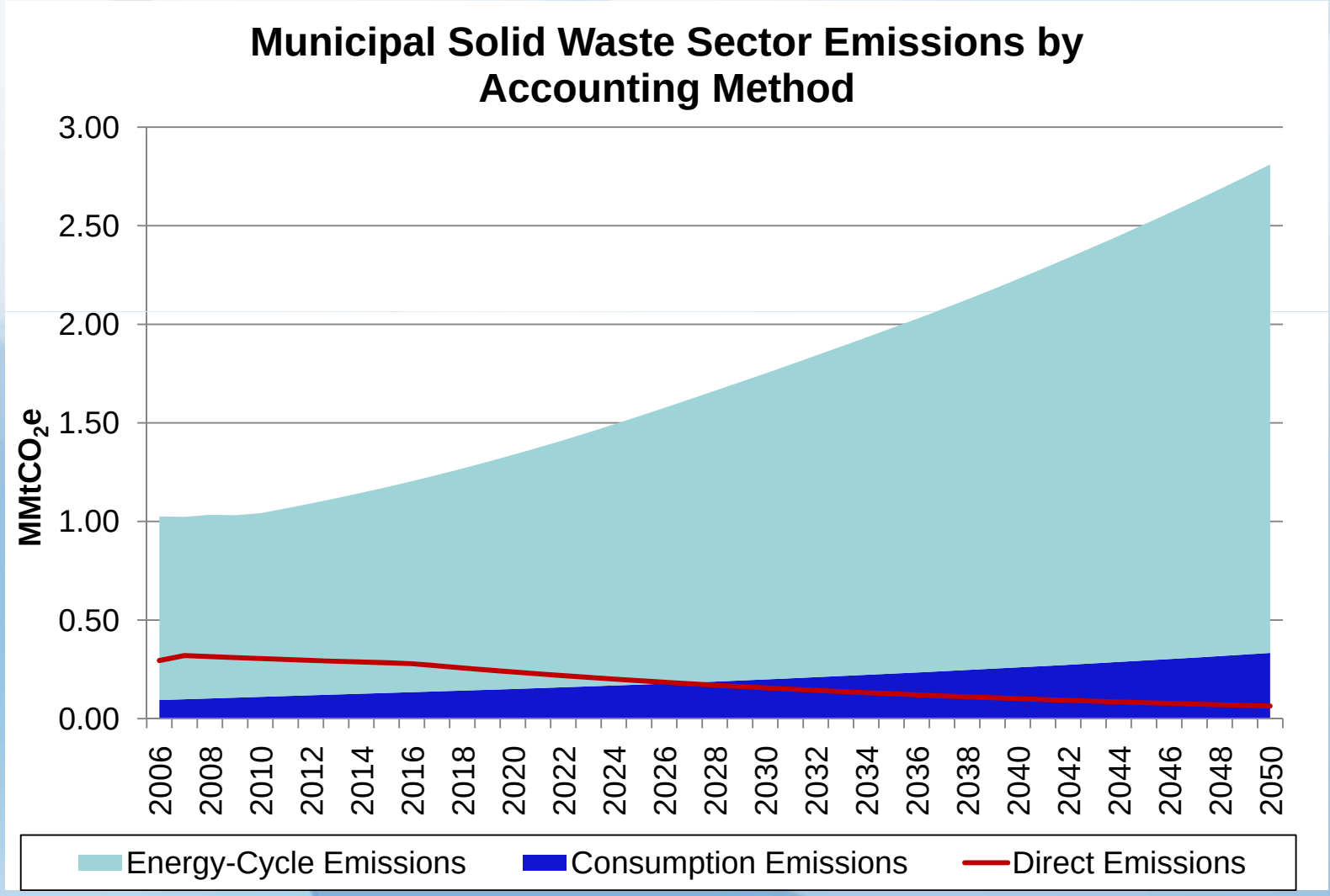
Example of Direct vs. Consumption-based/Energy-cycle Emissions



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Highway Transportation

- Includes all onroad vehicles
  - Activity data from NJTPA Transportation Model
    - Link and zone level transportation data
- Emission factors calculated using EPA's MOVES2010 model
  - CO_2, CH_4, N_2O
- Emissions calculated within customized software (PPSUITE)

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Highway Transportation

- Direct Emissions
  - Includes emissions for travel occurring within municipality/county
  - Excludes portion of trip occurring outside region
  - EPA's MOVES model
- Consumption-based Emissions
  - Includes half of emissions from any trip originating or ending within the municipality
  - Trips over which the county or municipality has some control

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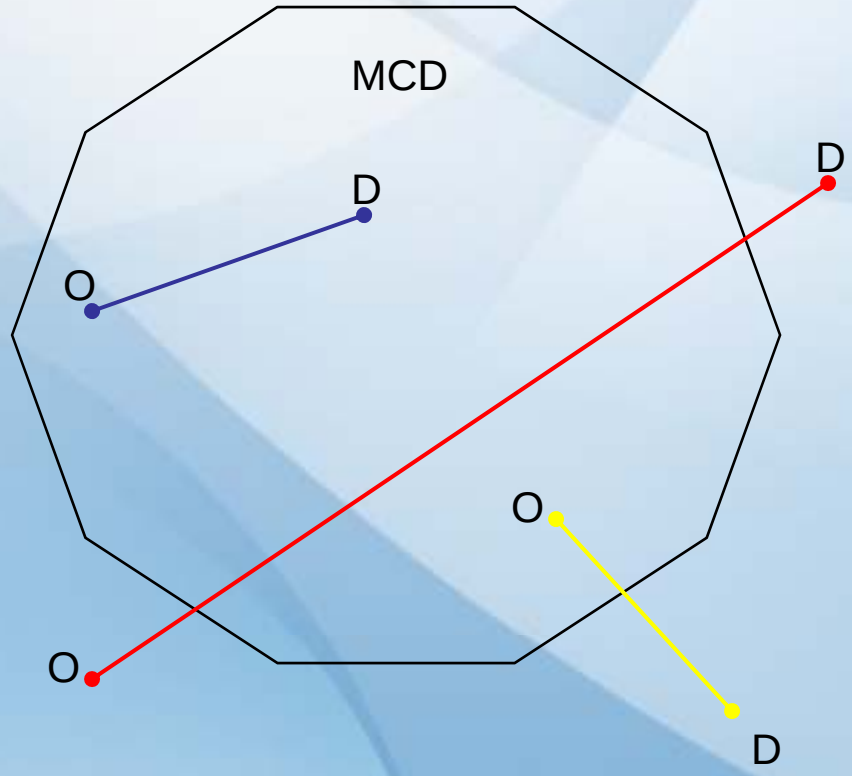
Direct versus Consumption-Based VMT



Internal Trip: Direct VMT = Consumption VMT

Through Trip: Direct VMT = portion in MCD; Consumption VMT = 0

Origin Trip: Direct VMT = portion within MCD; Consumption VMT = 50% of total trip VMT

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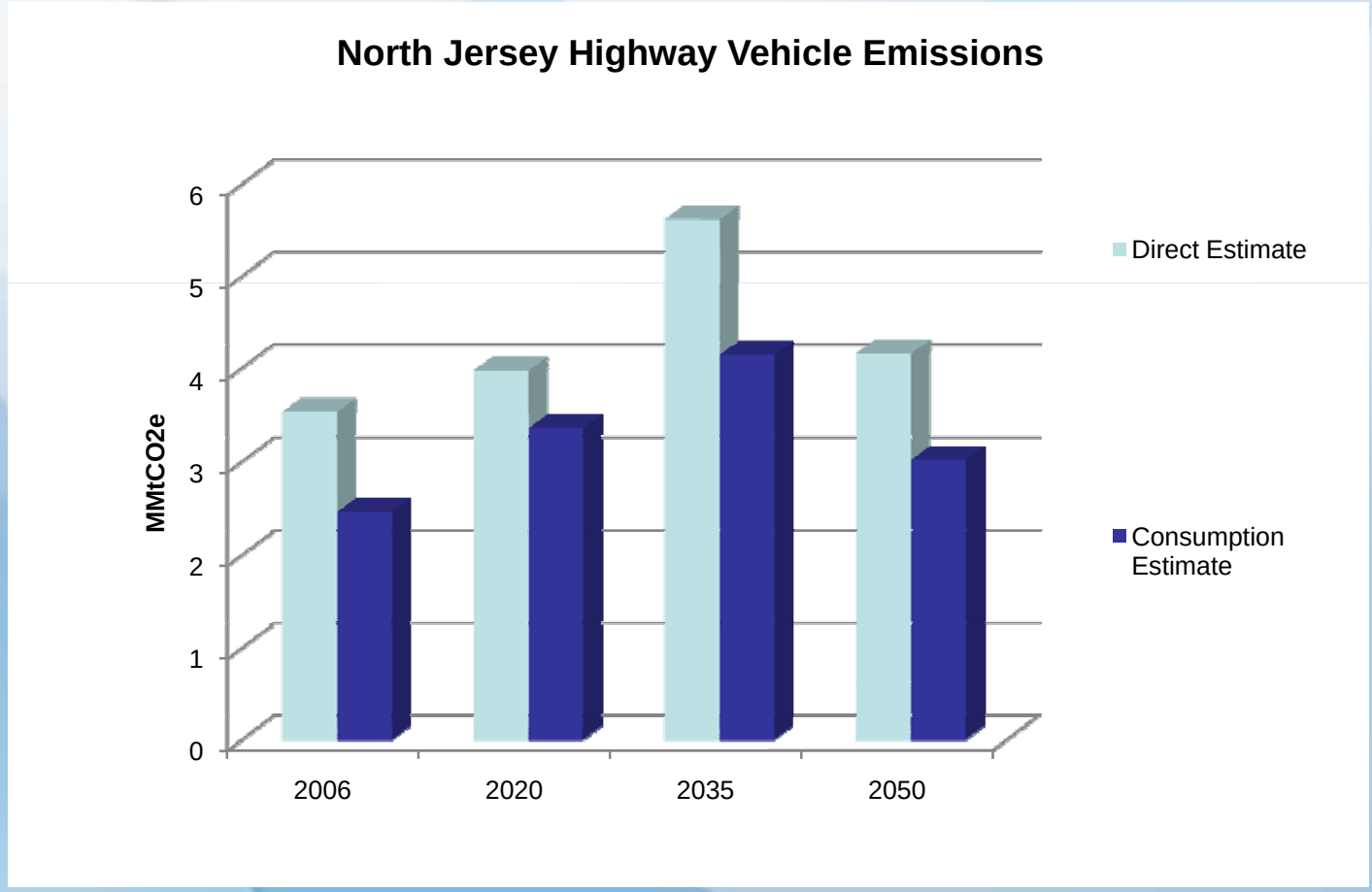
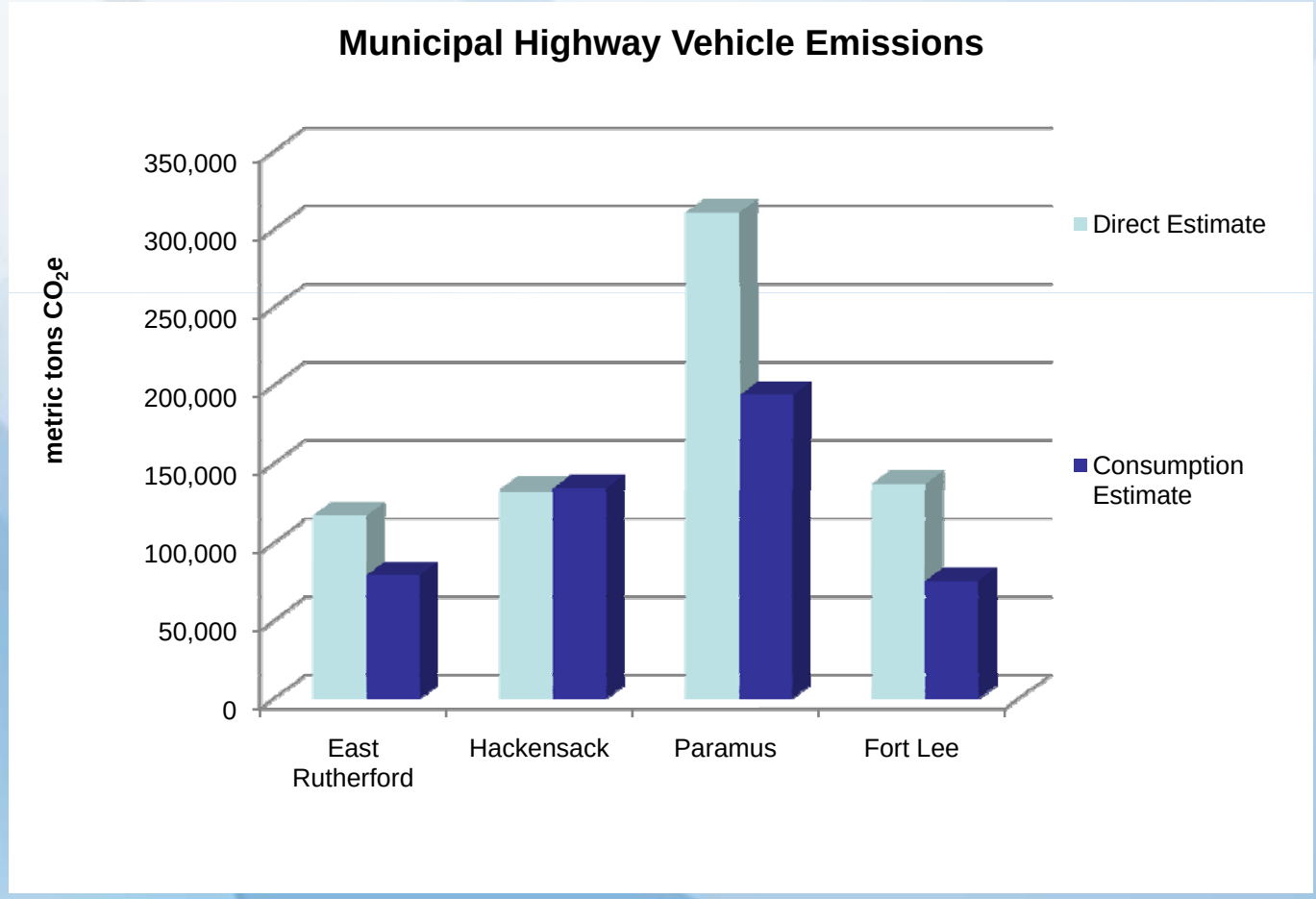
Example of Direct vs. Consumption-based Emissions



Example of Direct vs. Consumption-based Emissions



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Summary

- Pros and cons to different accounting methods.
  - Direct emissions can be added cumulatively without double-counting and are used by most other National, State, and local inventories
  - Consumption-based plus energy-cycle emissions may better inform planners for some sectors
- Estimating emissions for direct, consumption-based, and energy-cycle emissions provides more flexibility to mitigation planners

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