



Maine GHG Baselines & Methods

The Center for Clean Air Policy

December 17, 2003



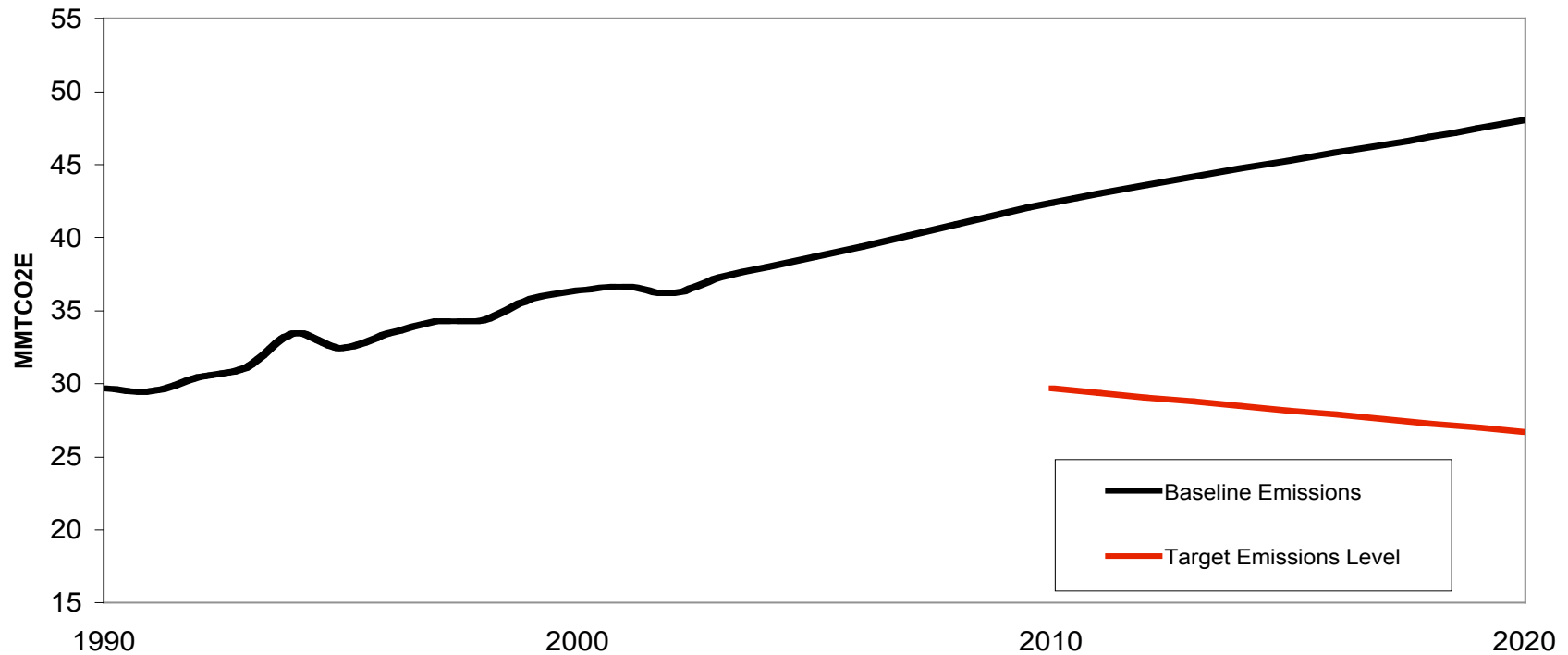
Baselines & Targets

- General Sources, Methods, Assumptions
 - **All Sector Baseline combines individual sectors for Maine (not the region)**
 - **Initial baselines provide a starting place for analysis and planning**
 - **Forecasts are numerical estimates based on key methods, data sources, and assumptions**
- Targets
 - **Maine Legislature's target: 1990 levels of greenhouse gases (GHG's) by 2010, 10% below 1990 levels by 2020**
 - **Note: Maine targets are statewide and *not* sector based; sectoral target lines are provided for illustration only**



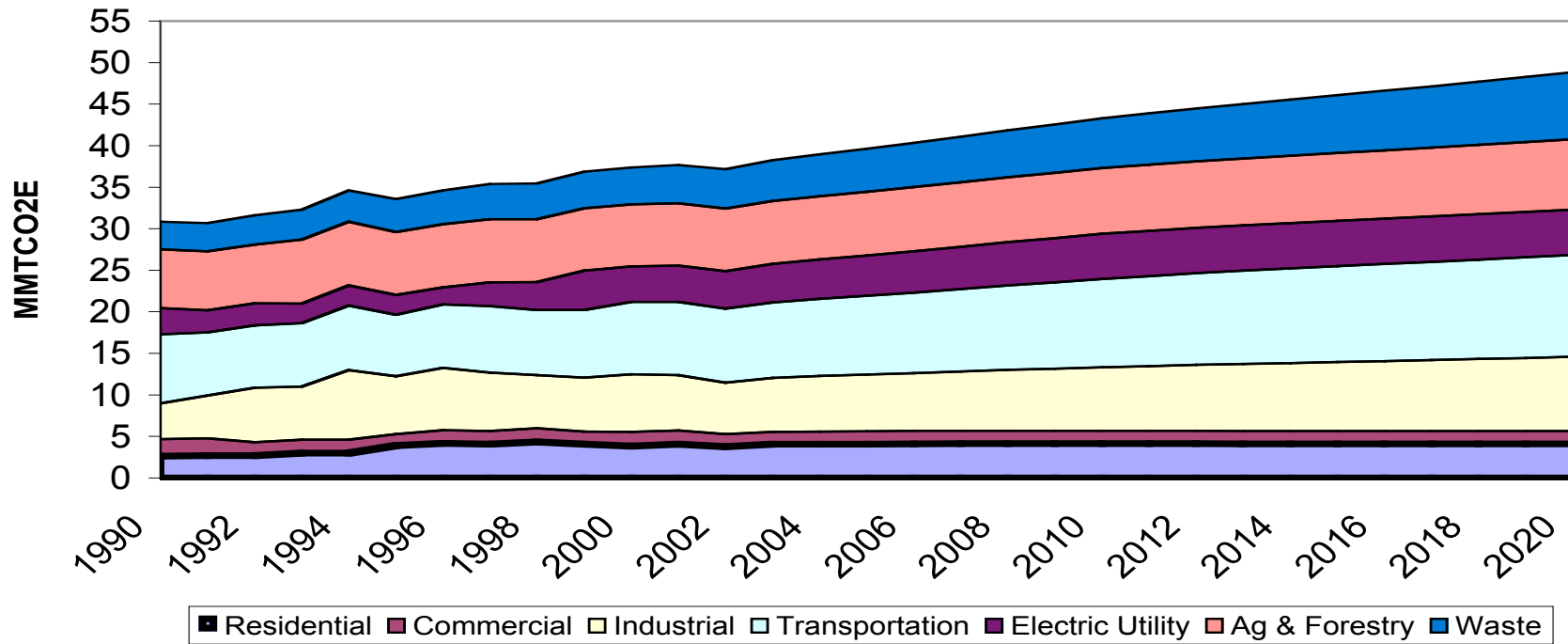
Maine GHG Baseline & Target

Maine's All Sector GHG Emissions





Sector GHG Baselines





Inventory & Baselines

- Initial baselines created by linking inventory results with growth forecasts for each sector
- Inventory Assumptions
 - **Energy Information Administration (EIA) State Energy Report Constitutes Bulk of Inventory Data**
 - **Technical Notes on EIA Data:**
http://www.eia.doe.gov/emeu/states/_price_multistate.html#pr_technotes



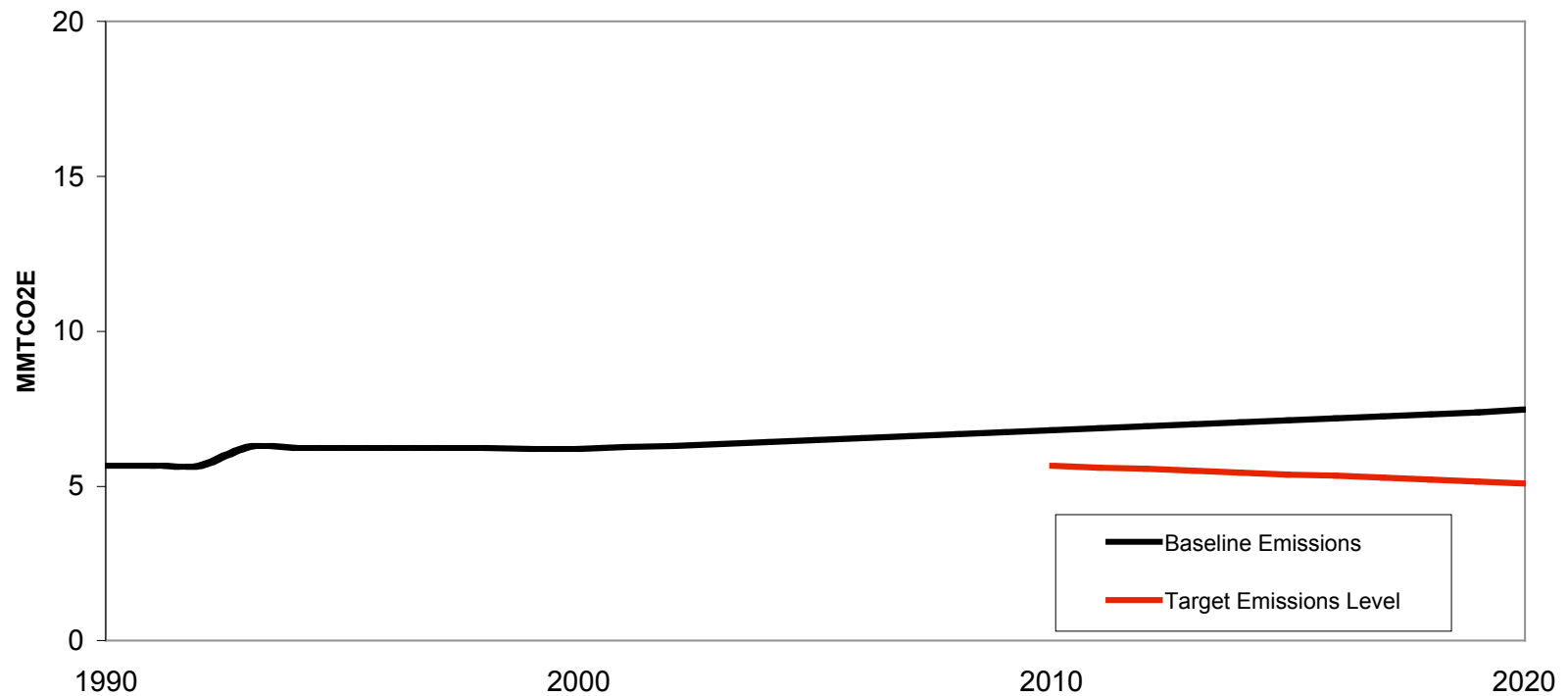
Baseline Assumptions

- Initial Baseline (Growth) Assumptions
 - **EIA Annual Energy Outlook 2003 (AEO 2003) 140 page assumptions document:**
 - [http://www.eia.doe.gov/oiaf/aeo/assumption/pdf/0554\(2003\).pdf](http://www.eia.doe.gov/oiaf/aeo/assumption/pdf/0554(2003).pdf)
- AEO 2003 projections used for Transportation and RCI sectors
 - **AEO uses National Emissions Modeling System (NEMS) for energy based estimates (CO₂)**
- Other data sources listed within individual sectors



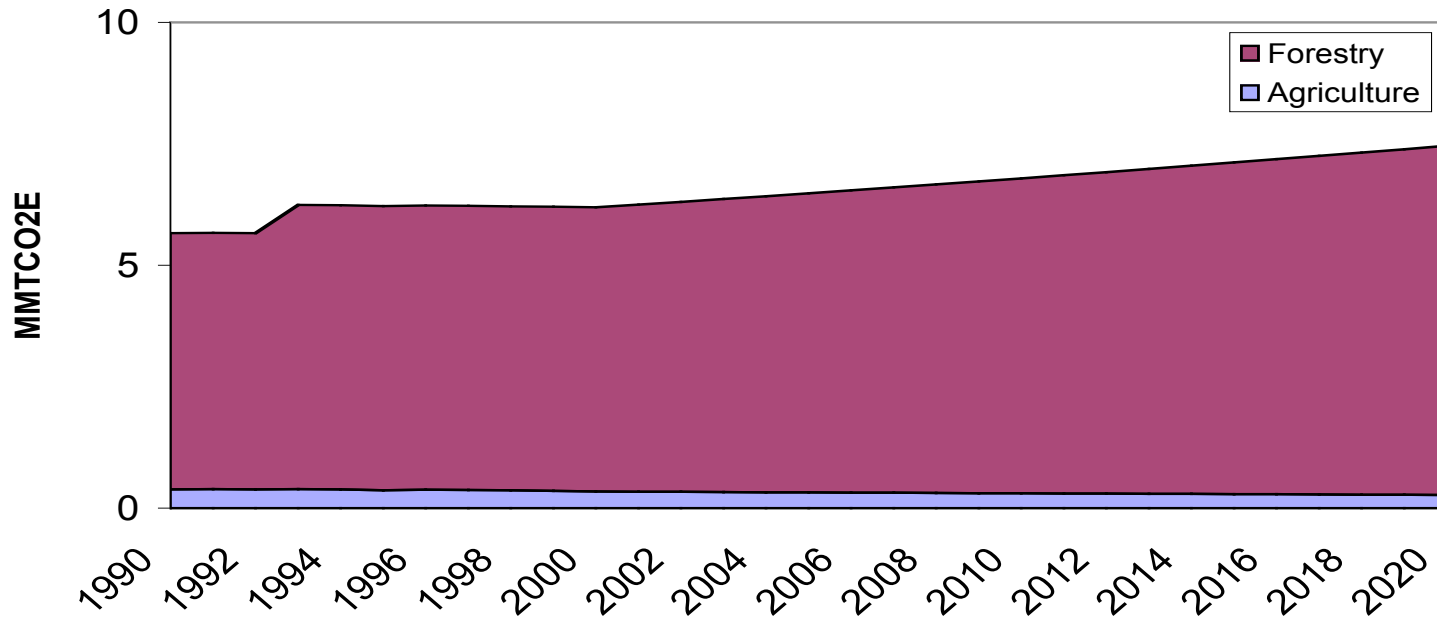
Agriculture & Forestry

GHG Emissions from Maine's Agriculture & Forestry Sector





Agriculture & Forestry





Agriculture & Forestry

- Sources for initial baseline
 - **US Environmental Protection Agency (EPA) GHG Emissions Inventory tool**
 - **US Department of Agriculture (USDA) Forest Service provided information on Forest Cover and land use**
- Methods for initial baseline
 - **Initially use default EPA data, projected linearly**



Agriculture

- Key initial baseline assumptions
 - **No change in land use or land cover trends from 1990-2000 period**
 - **No significant change in technology**
 - **No new federal policies**
 - **No change in management practices**
 - **No change in productivity from climate impacts**



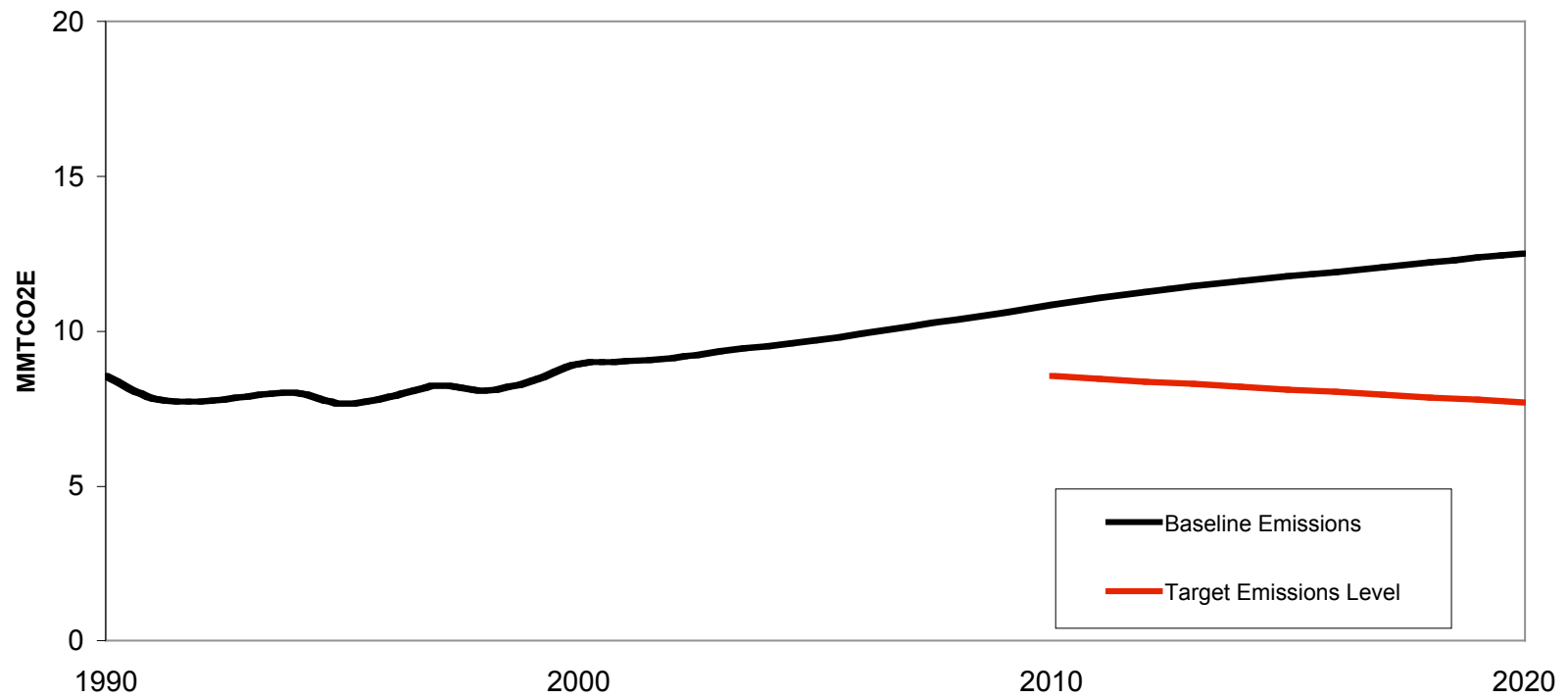
Forestry

- Key initial baseline assumptions
 - **Land use and land cover (species, age class) trends from 1990-2000 do not change**
 - Forests do not recover from storm and disease damages during 1990's; rates of storm and disease damage remain constant
 - **Land ownership and land management practices do not change from the 1990's**
 - **Wood products use and their long term carbon storage rates do not change from 1990's**
 - **No change in productivity from climate change**



Transportation

GHG Emissions from Maine's Transportation Sector





Transportation

- Sources for initial baseline
 - **U.S. Department of Energy's (DOE) EIA data**
 - State Energy Data Reports—fuel use (fuel sales with adjustments)
 - Federal Highway Administration Statistics Series
 - VMT levels and breakdowns
 - **Maine Department of Transportation (DOT) reports**
 - VMT forecasts, VMT growth projections
 - **EPA GHG Inventory Tool**



Transportation

- Methods for initial baseline
 - **For CO₂:**
 - Use Maine-specific fuel use data for year 2000 (from EIA's State Data Reports) as starting point
 - Apply Northeast annual fuel use growth rates (from EIA's AEO 2003) to estimate for 2000 – 2020
 - **For N₂O and CH₄:**
 - Use EPA Inventory tool to estimate emissions for mobile sources



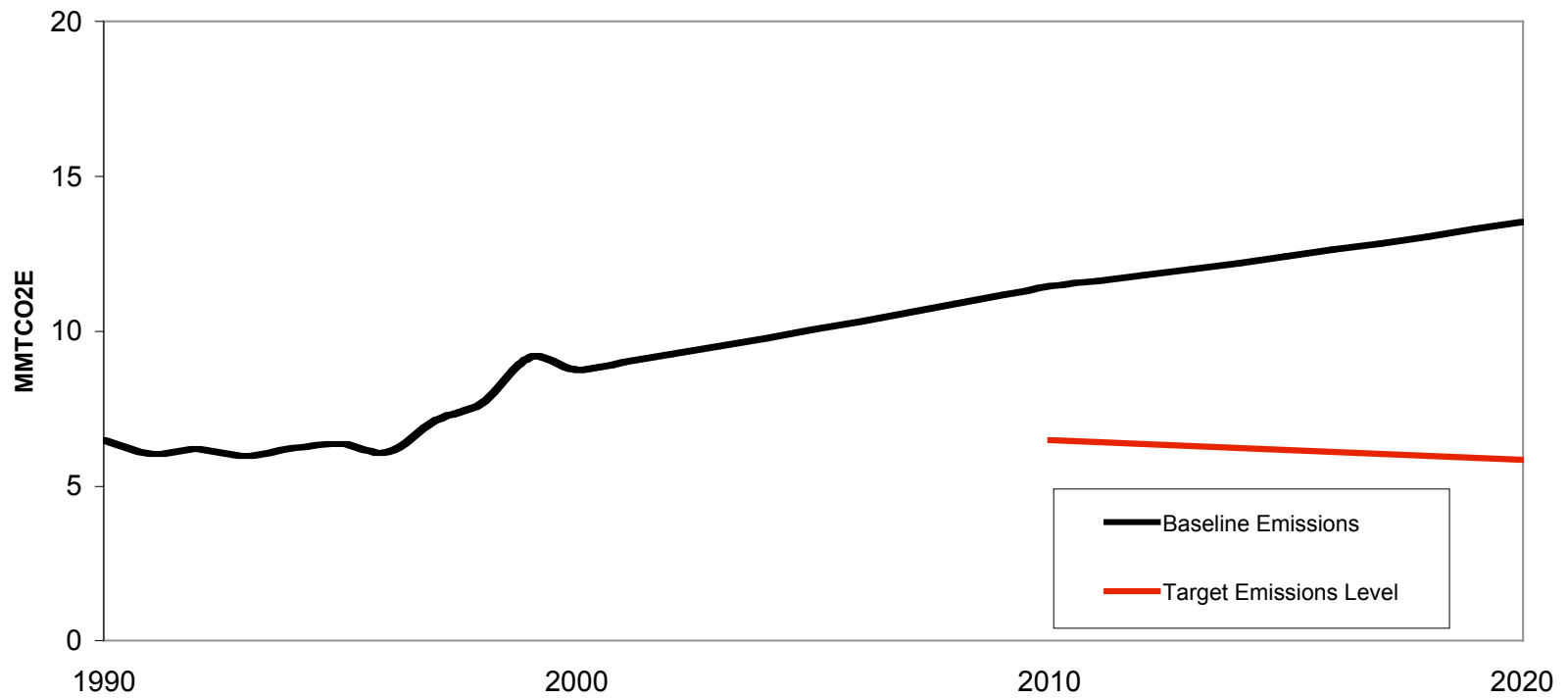
Transportation

- Key initial baseline assumptions:
 - **Fuel use: NE Regional fuel use is similar to Maine**
 - **Vehicle Miles Traveled (VMT): ME VMT rates similar to NE regional rates**
 - **State fuel use and fuel sales are consistent**
 - ME drivers do not buy significant amounts of fuel in other states that is used for in state driving
 - **Technology: ME light-duty vehicle fleet efficiency is similar to NE region (vehicle type & fuel use)**
 - **Black Carbon not included**



Electricity & Waste

GHG Emissions from Maine's Electricity & Waste Sector





Electricity & Waste

- Sources for initial baseline
 - **EIA Electric Power Annual for years 2004-2010**
 - **Clear Skies Initiative (CSI) results from the Integrated Planning Model (IPM) by ICF Consulting for years 2010-2020**
- Methods for initial baseline
 - **Electric Power Annual data projected to CSI results to year 2010, then CSI projections used to 2020**
 - Regional modeling results applied to Maine



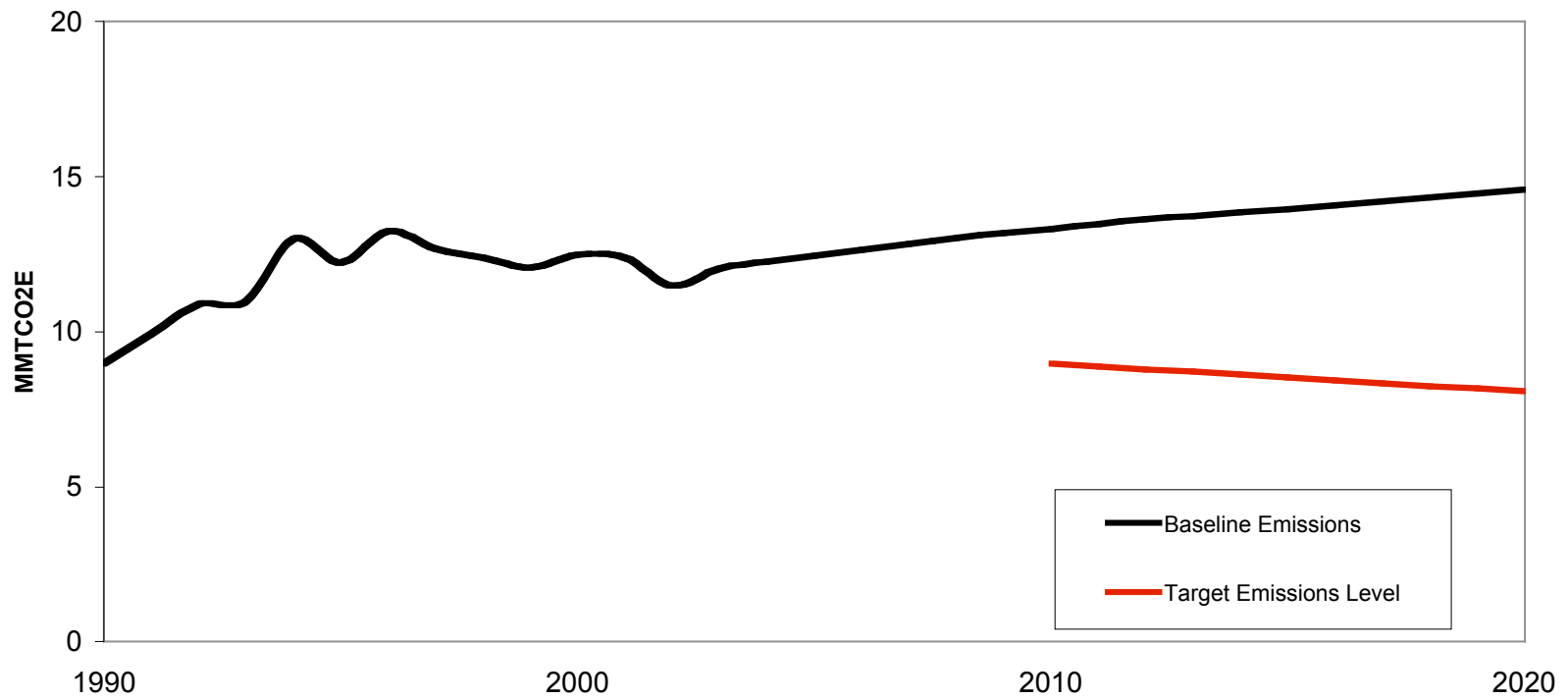
Electricity & Waste

- Key initial baseline assumptions
 - **No new federal legislation on electric utilities prior to 2010; CSI assumed thereafter**
 - **EIA gas price forecasts; lower than market at present**
 - **EIA renewable energy supply/demand forecasts - regional, no new policy**
 - **EIA economic growth forecasts are regional**
 - **Nuclear plants in the power pool are relicensed but not uprated**
 - **EIA demand response function in response to price changes**



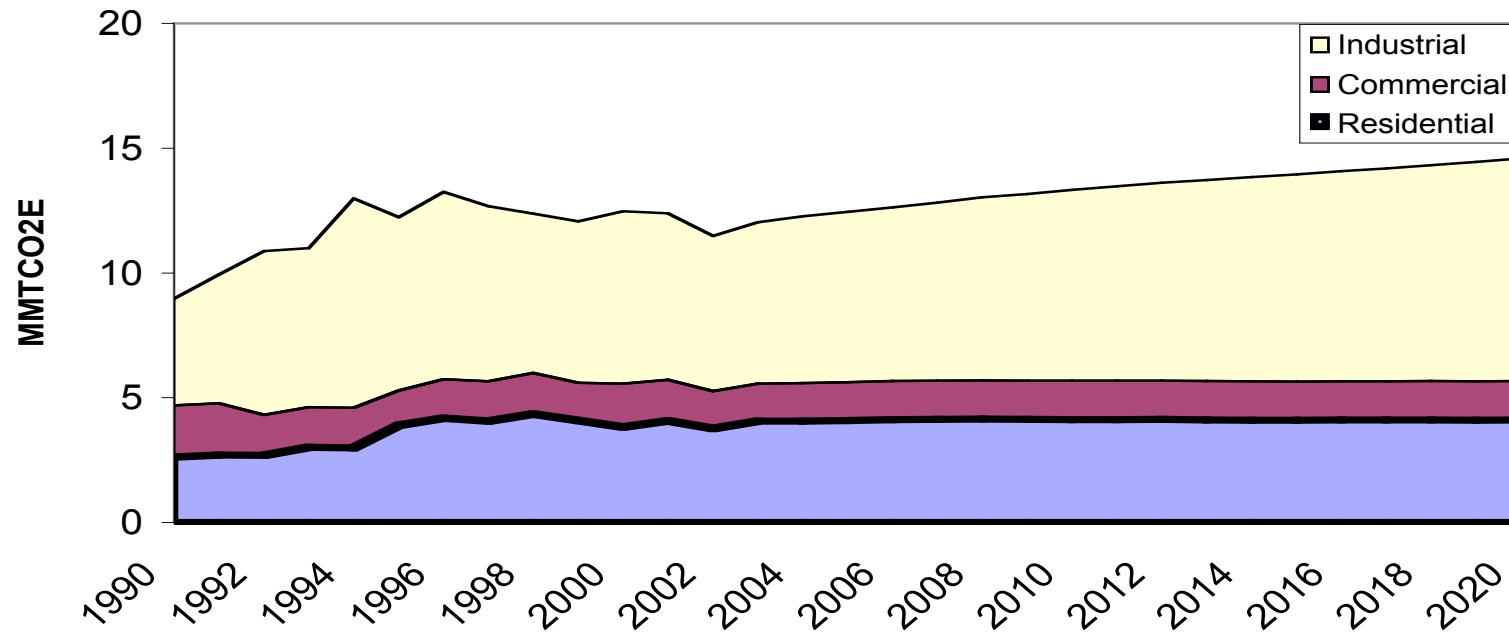
Residential, Comm'l, Industrial

GHG Emissions from Maine's RCI Sector





Residential, Comm'l, Industrial





Residential, Comm'l, Industrial

- Emissions included in Inventory (1990-2000) and Baseline (2000-2020)
 - **CO2 from fuel consumption, Methane from oil & natural gas systems**
 - **High GWP gases from ODS substitutes & industrial processes**
- Inventory Sources (1990-2000)
 - **EIA State Energy Reports, EPA Electric Power Annual**
 - **EPA GHG Inventory Tool**
- Baseline Sources (2000-2020)
 - **EIA Annual Energy Outlook (AEO) 2003**
 - **EPA Forecast High Global Warming Potential (GWP) Gases**



Residential, Comm'l, Industrial

- Methods for initial inventory and baselines
 - **CO2 Emissions from Fuel Consumption**
 - Inventory: EIA State Data Reports for fuel use estimates, apply EPA emission factors
 - Baseline: Grow fuel use based on EIA's AEO2003 report by applying regional growth rate, apply EPA emission factors
 - **Methane Emissions from Natural Gas and Oil Systems**
 - Inventory: EPA GHG Inventory Tool for estimates
 - Baseline: Assume historical growth rate
 - **High GWP Gas Emissions**
 - Inventory: EPA GHG Inventory Tool for estimates
 - Baseline: Grow Industrial Process Gases emissions using High GWP Gas Report



Residential, Comm'l, Industrial

- Key initial baseline assumptions:
 - **EIA regional energy demand and economic growth forecasts, which accounts for**
 - Delivered price of energy
 - Availability of renewable energy
 - Changes in efficiency of energy use due to advanced technology
 - No new federal programs or spending
 - **The share of high GWP gases in ME compared to the US remains constant (at 2000 ratio) over time**
 - **Black Carbon not included**