Centro Clima
CENTRO DE ESTUDOS INTEGRADOS SOBRE MEIO AMBIENTE E MUDANÇAS CLIMÁTICAS

Brazil Baseline and Mitigation Scenarios

The 12th AIM International Workshop

William Wills
ww@ufrj.br

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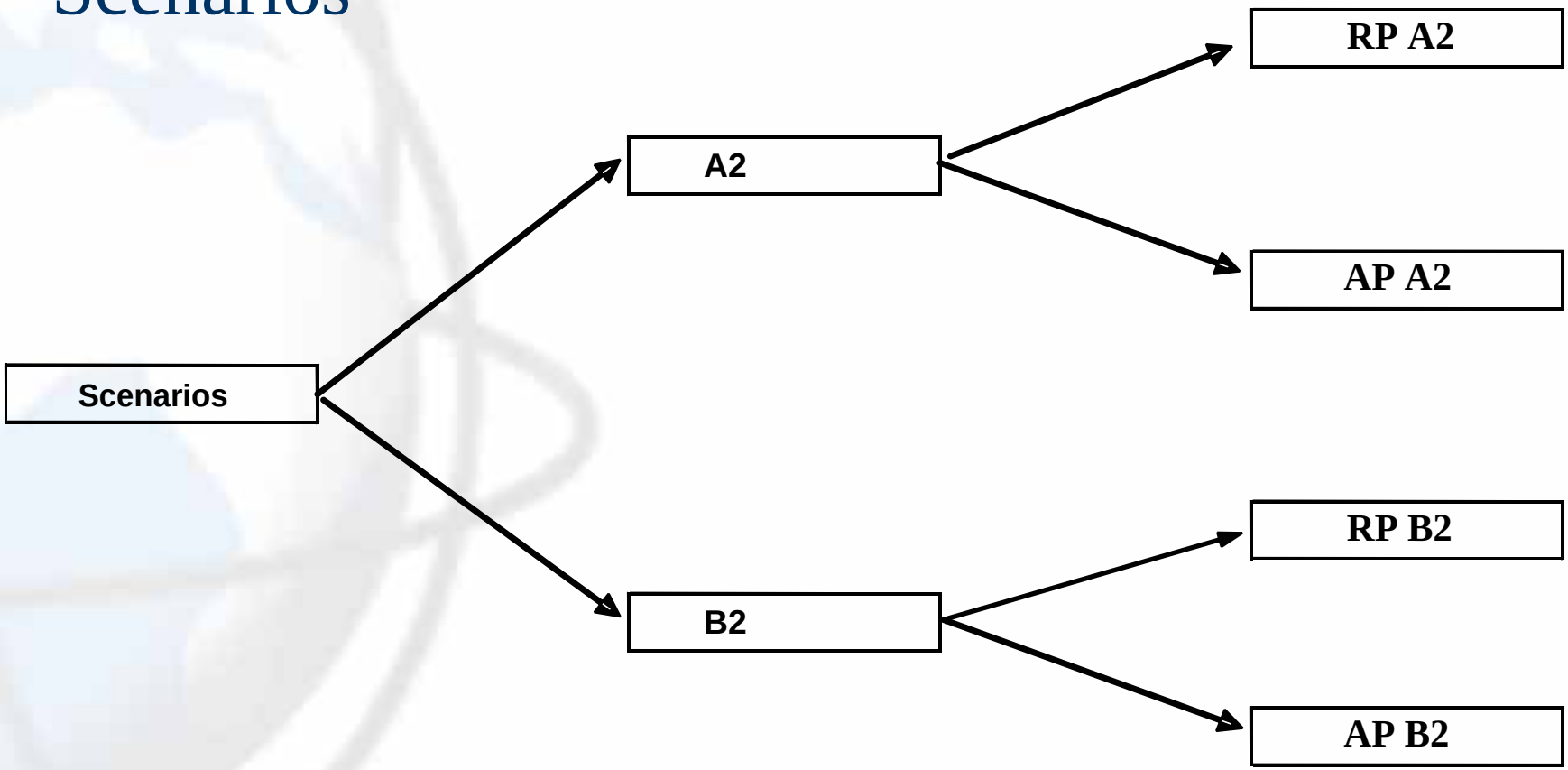
CCAP (Center for Clean Air Policy): Dialogue on Future International Actions to Address Global Climate Change (FAD)

- Four key developing countries: Brazil, China, India, and Mexico
- Informal, off-the-record forum to discuss options for future international climate framework
- Two Phases:
  - GHG Mitigation Options
  - Policy and Implementation Strategy
- Financial support: United Kingdom's Department for International Development, the Tinker Foundation and the Hewlett Foundation
- For all presentations and working papers from the process, see: http://www.ccap.org/international/future.htm

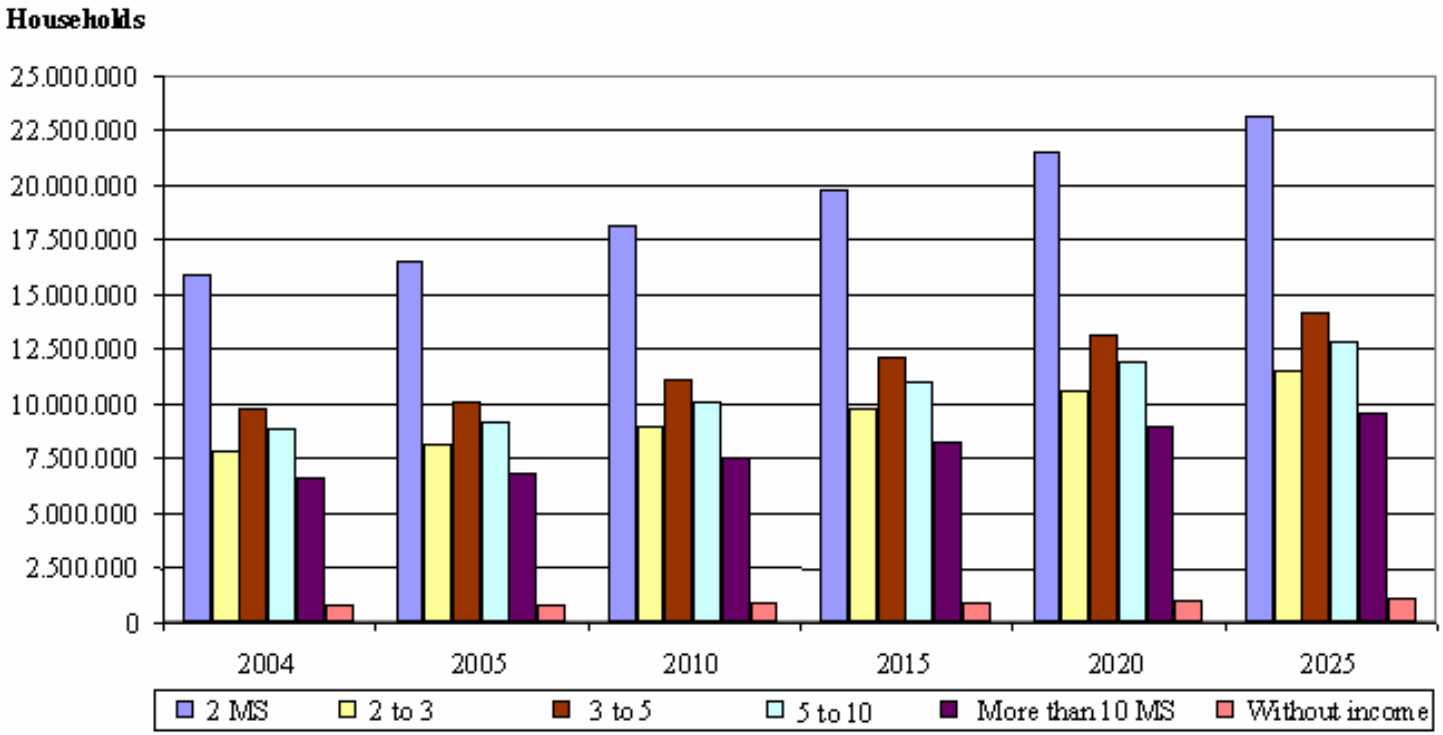
Scenarios



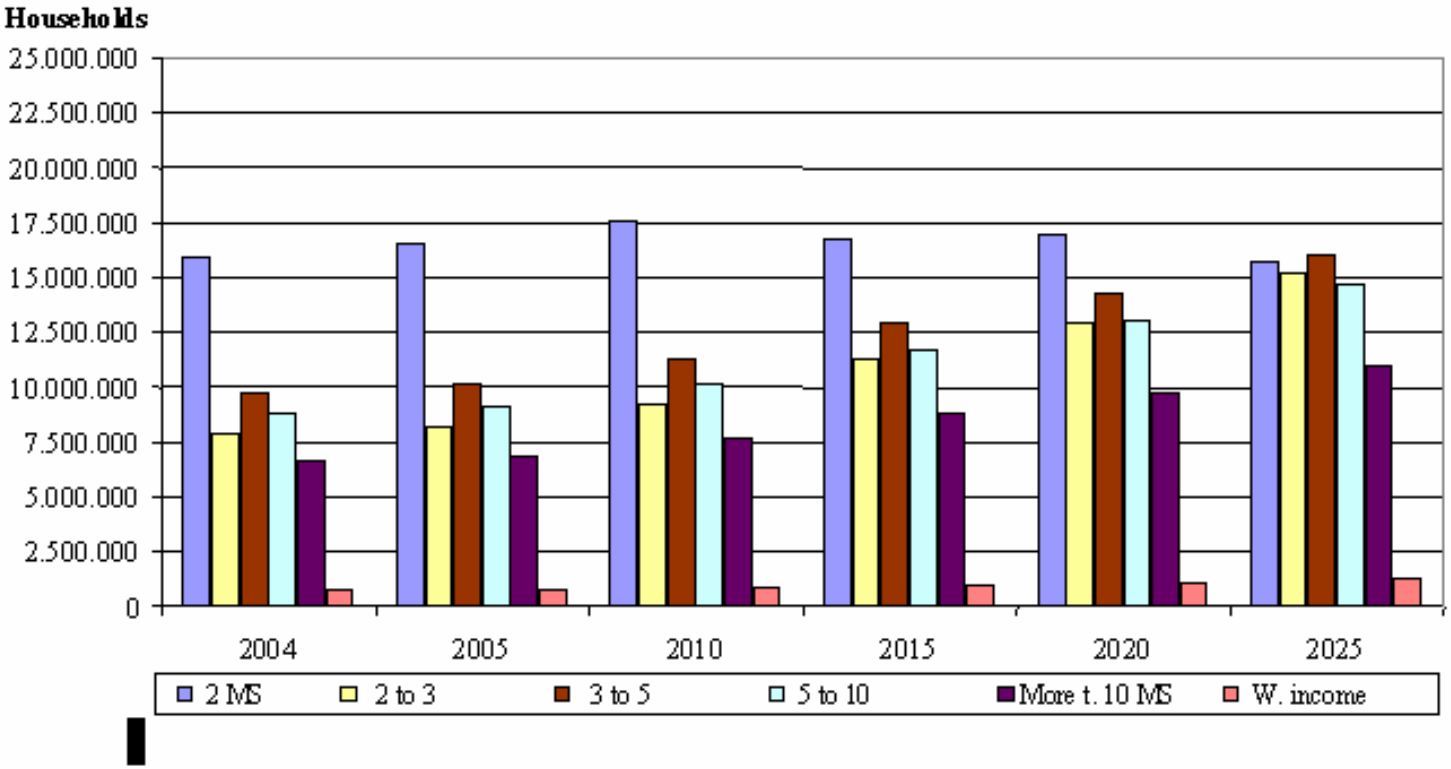
Driving Forces

- Demography
- Economy
- International Oil Price
- Technology
- Energy Policy

Income Distribution in A2



Income Distribution in B2



Structure of the economy in A2

	2000 US$	2000	2005	2010	2015	2020	2025
GDP	10^6 ppp	1,150.78	1,365.08	1,682.02	2,057.47	2,509.24	3,060.23
GDP/cap	10^6 ppp	6.72	7.35	8.48	9.79	11.36	13.26
Agriculture	10^6 ppp	88.16	105.15	124.93	148.14	173.99	202.66
Industry	10^6 ppp	328.92	396.95	521.44	675.88	869.17	1,112.87
Energy	10^6 ppp	82.36	109.7	136.09	166.67	202.66	245.12
Services	10^6 ppp	651.34	753.3	899.55	1,066.77	1,263.43	1,499.58

Structure of the economy in B2

	2000 US$	2000	2005	2010	2015	2020	2025
GDP	10^6 ppp	1,150.78	1,365.08	1,682.02	2,057.47	2,509.24	3,060.23
GDP/cap	10^6 ppp	6.72	7.35	8.48	9.79	11.36	13.26
Agriculture	10^6 ppp	88.16	115.29	143.05	167.86	189.46	209.19
Industry	10^6 ppp	328.92	371.03	472.69	607.83	736	865.83
Energy	10^6 ppp	82.36	110.18	140.16	173.76	197.42	213.38
Services	10^6 ppp	651.34	768.59	926.12	1,108.03	1,386.36	1,771.83

Methodological Tools: Economy

Name	Input variables / Exogenous parameters	Output variables	Type of model/ Internal calculations	Level of Aggregation
IMACLIM-R	- input-output coefficients - production capacities - saving rate - public policies (debt, public investment, fiscal system) - capital intensity - labor productivity - growth parameters (increasing returns to scale, productivity growth, autonomous and endogenous technical change)	- prices - quantities of output - exports/imports - allocation and level of investments - income - final demands - evolution of public debt	recursive general equilibrium (including static equilibrium and dynamic relations for capital growth, technical change, demography, etc.)	flexible in number of sectors and countries.

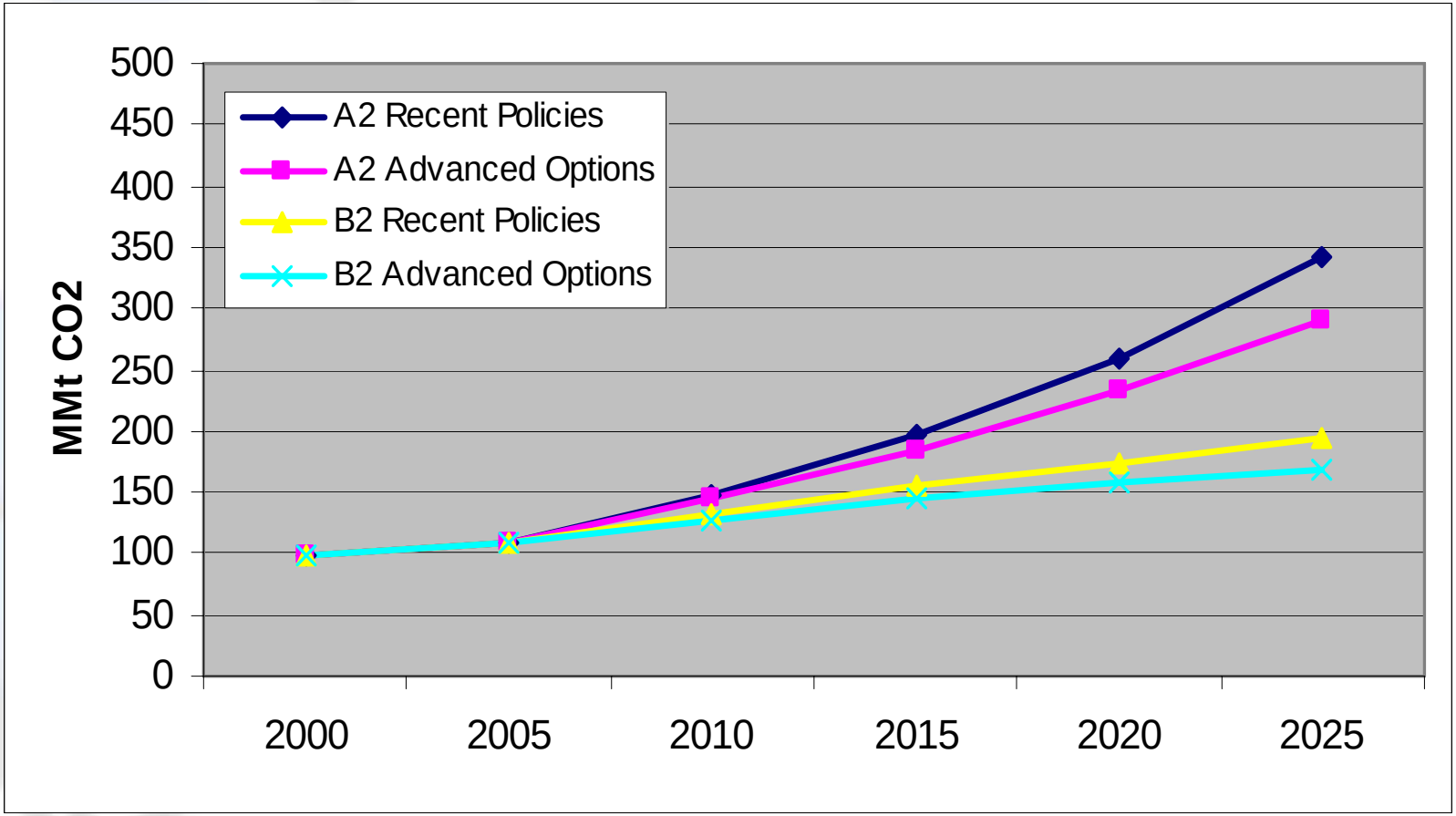
Methodological Tools: Energy Demand

Name	Input variables / Exogenous parameters	Output variables	Type of model/ Internal calculations	Level of Aggregation
MAED	- social factors: demography (pop), - equipments: energy efficiency, - energy forms - prices	useful energy demand	parametric model	useful energy: - specific use of - thermo uses: ind, res, - fuels for transport: - fuels for motors - non-energet. Use - coke

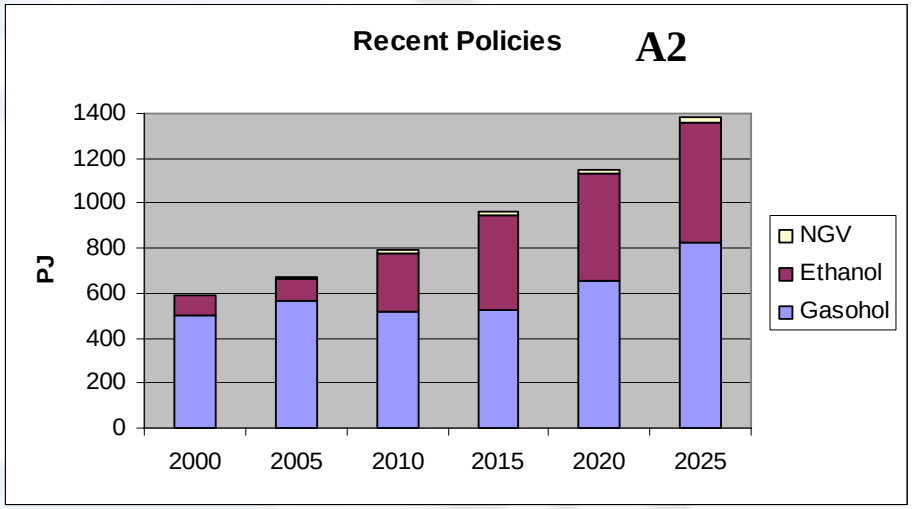
Methodological Tools: Energy Supply

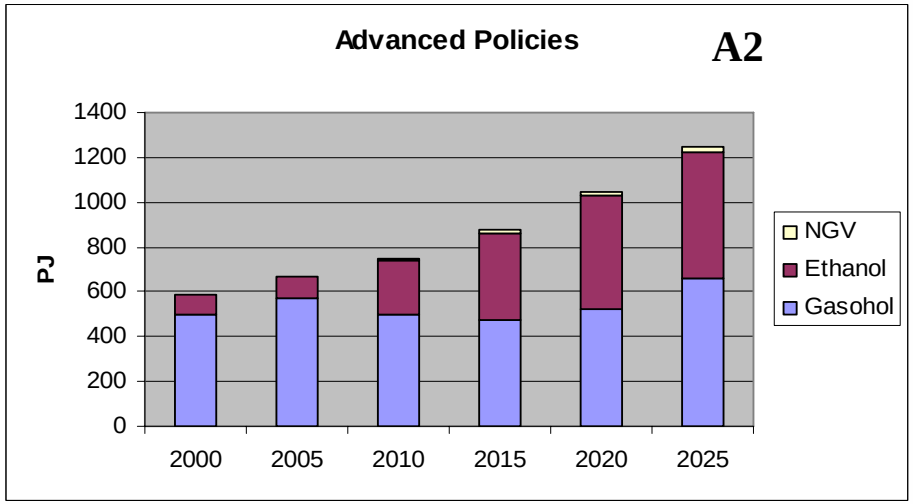
Name	Input variables / Exogenous parameters	Output variables	Type of model/ Internal calculations	Level of Aggregation
MESSAGE	- useful energy - prices: primary energy and final energy, technology, operation costs	- consumption of resources, primary, secondary, final energy, imports, exports, stocks - needs for investment - emissions, environmental	- inter-temporal optimization model	- electricity - gas - biomass - coal - oil and derivates - sugar cane, - alcohol,

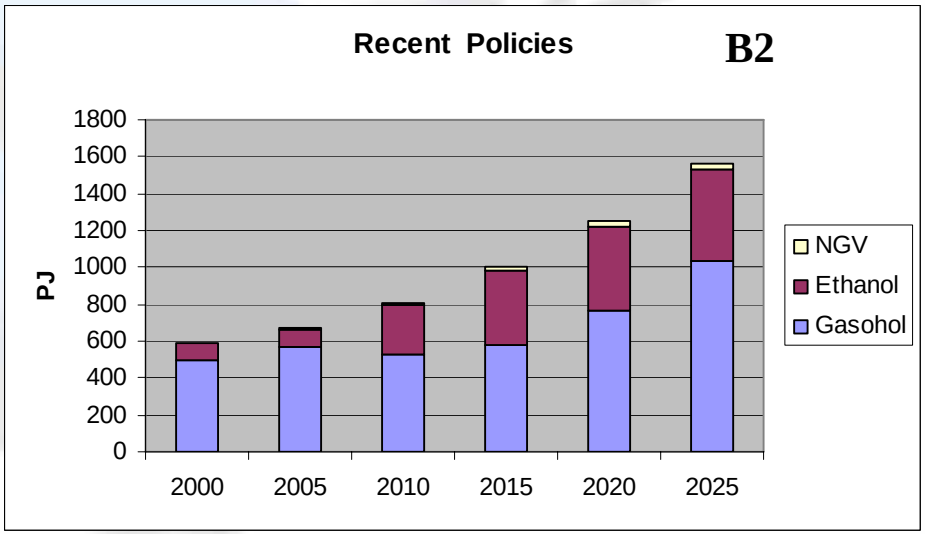
CO2 Emissions in Industry

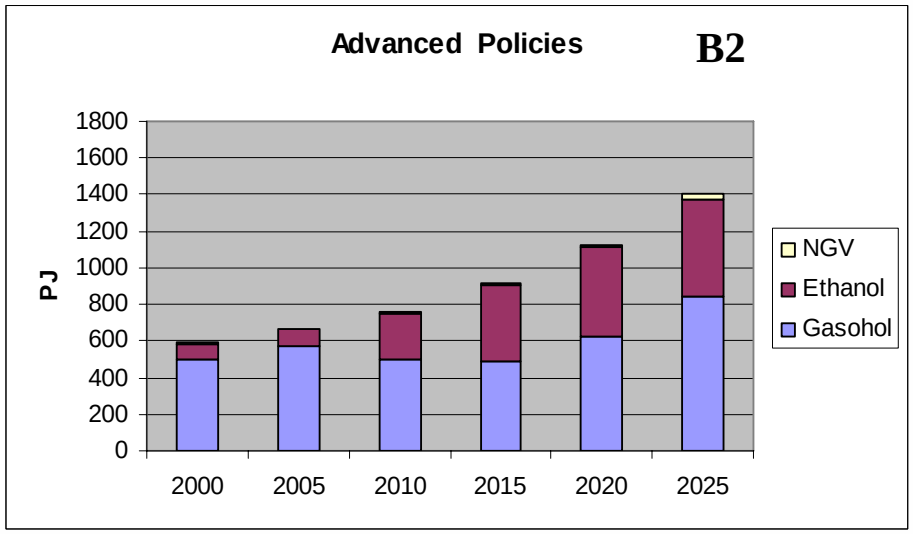


A2 and B2 Scenarios – Light Vehicles
Energy Consumption (PJ)

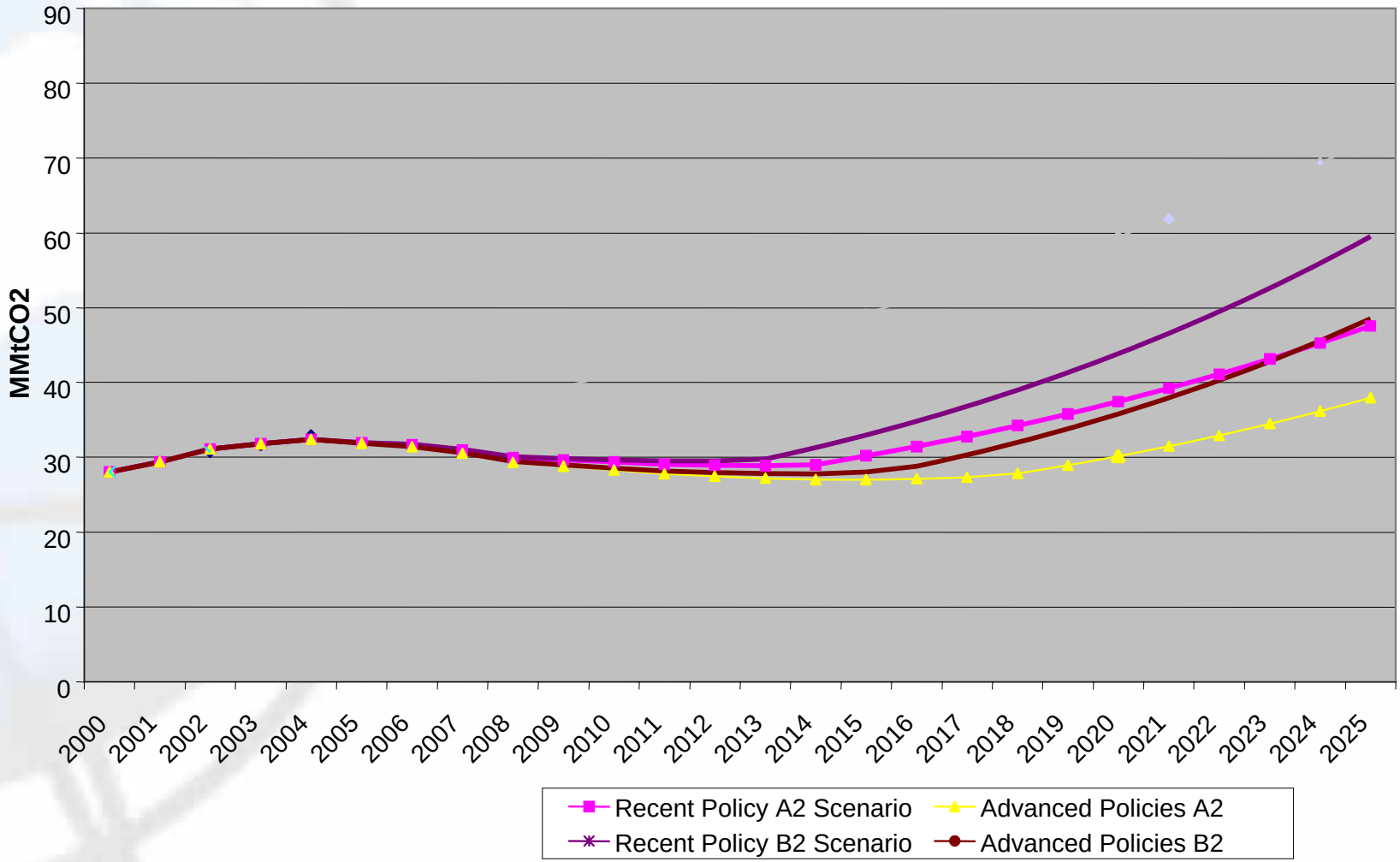




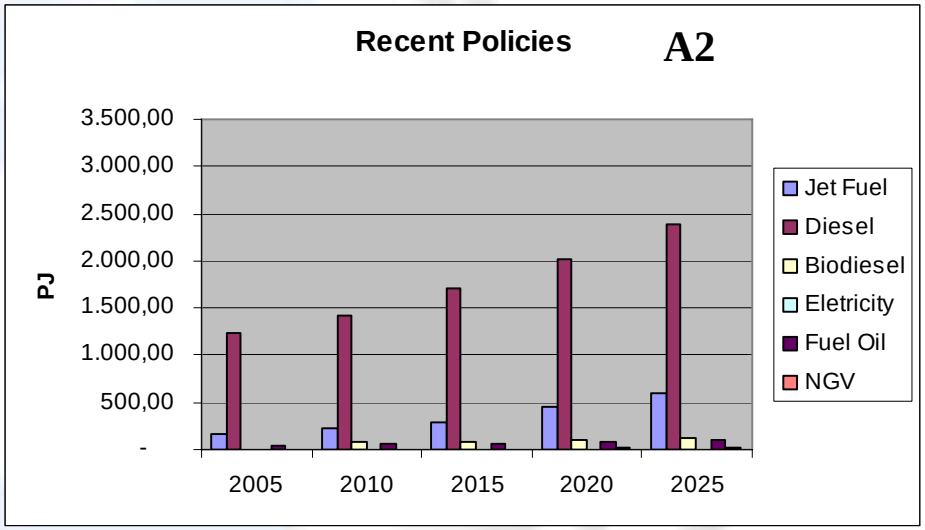


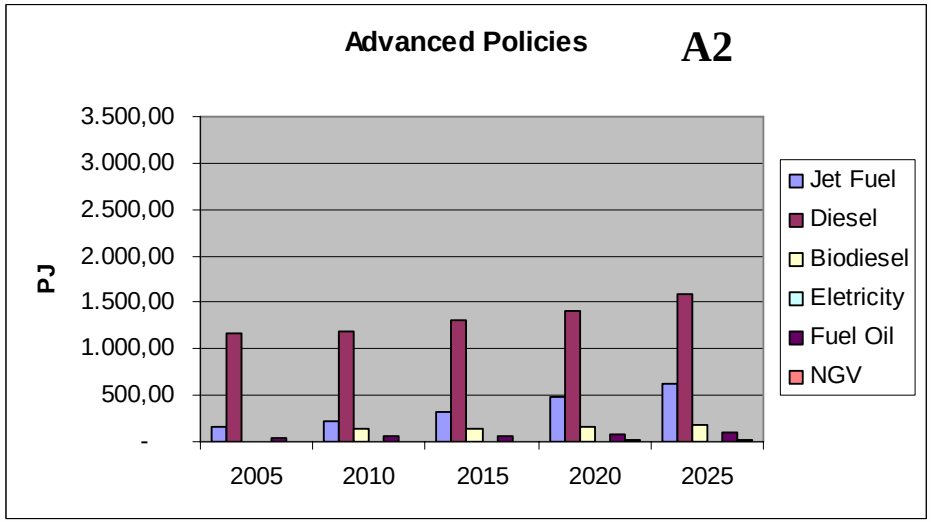


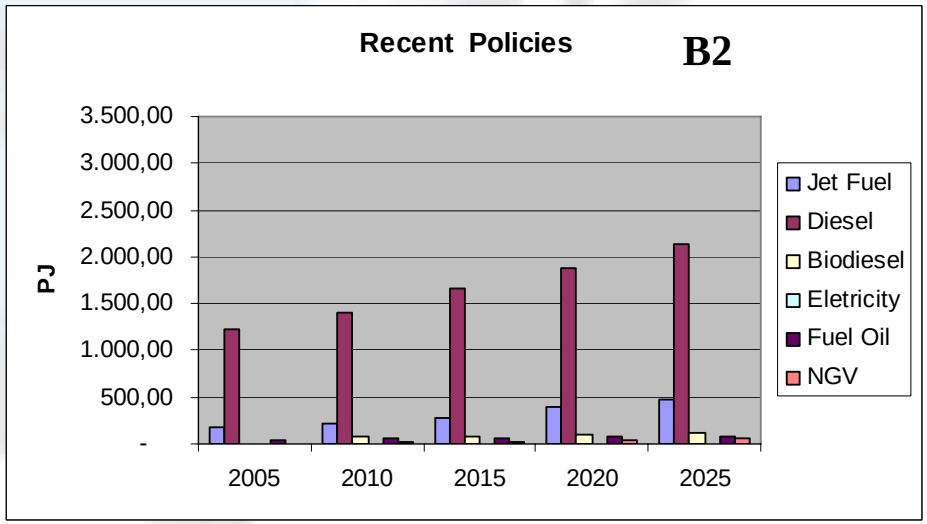
CO2 Emissions from Light Vehicles

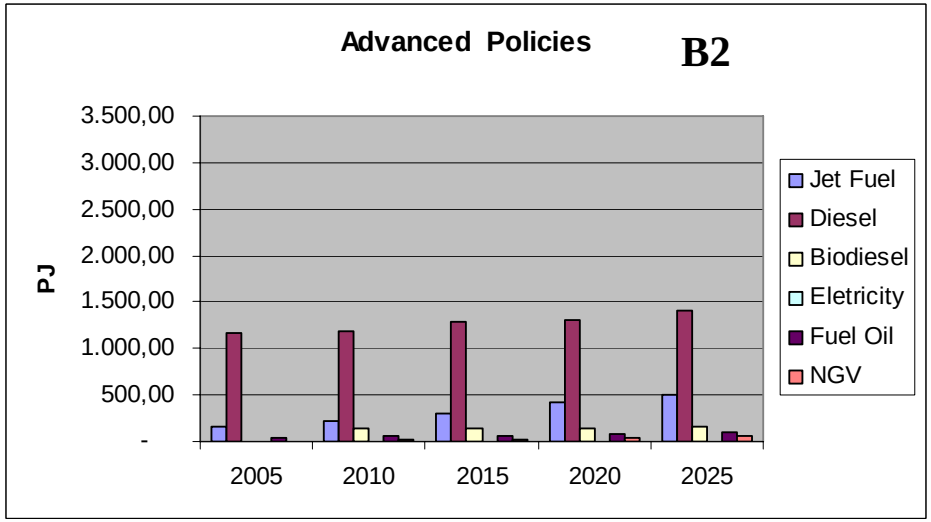


A2 and B2 Scenarios – Heavy Vehicles

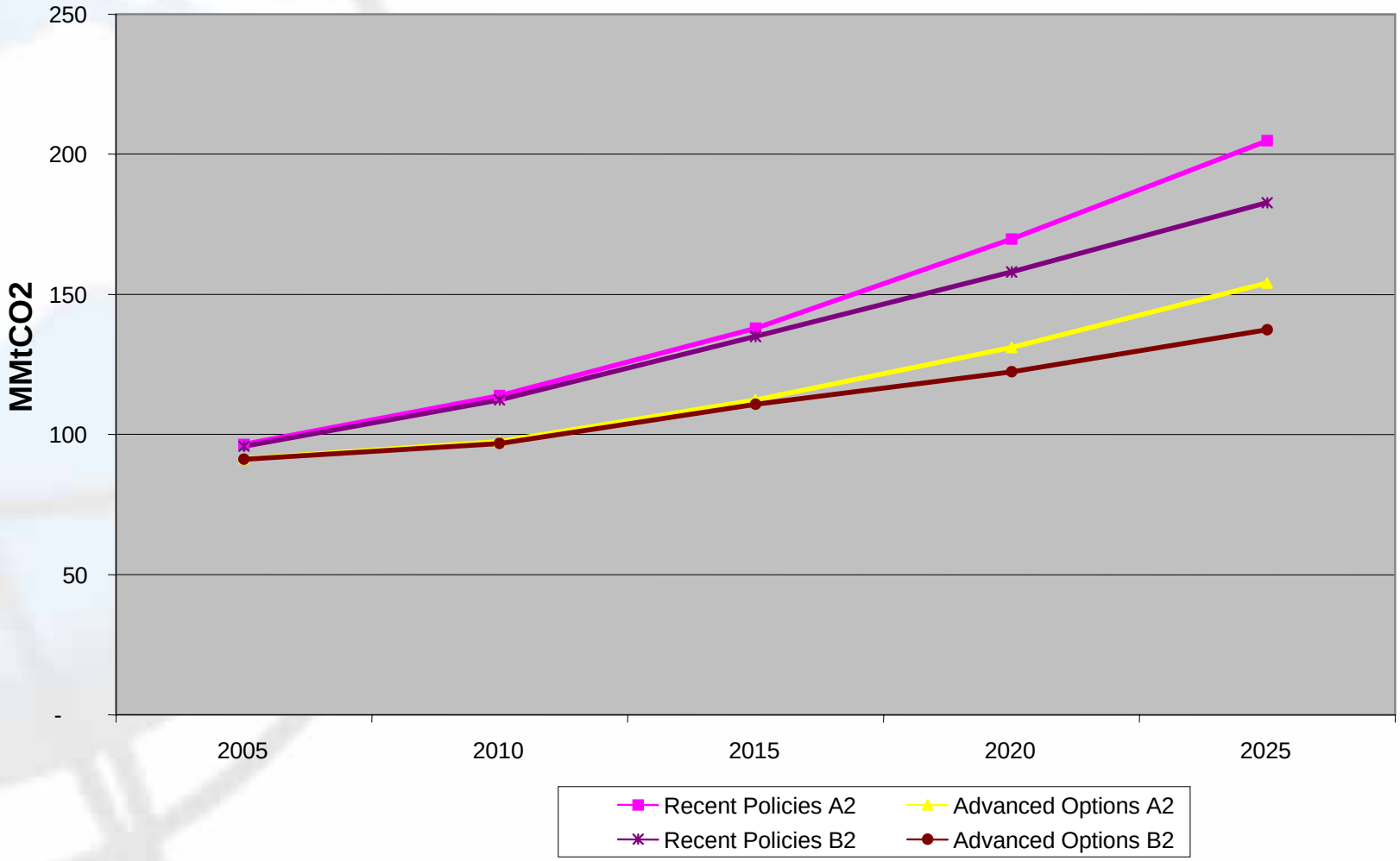




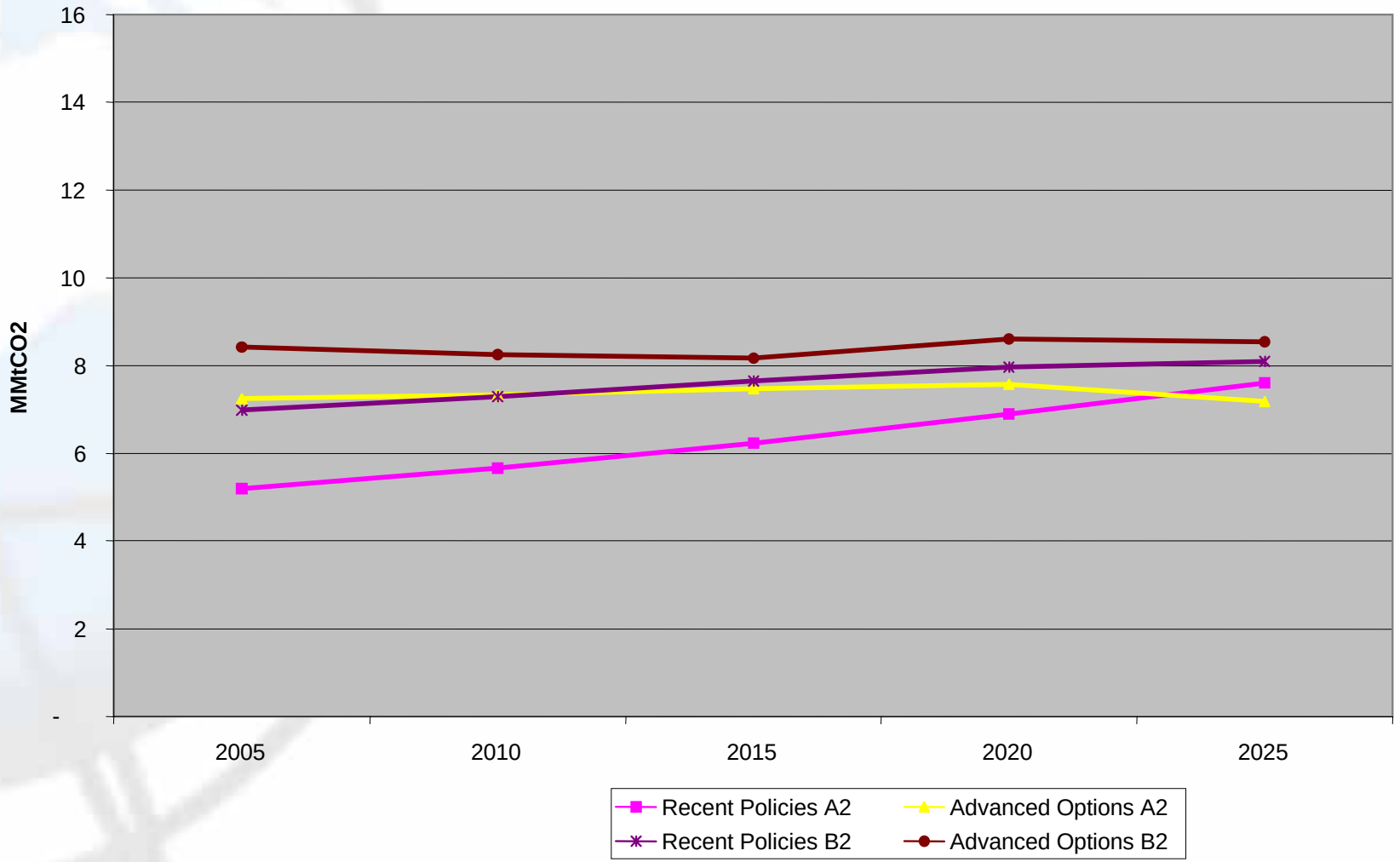




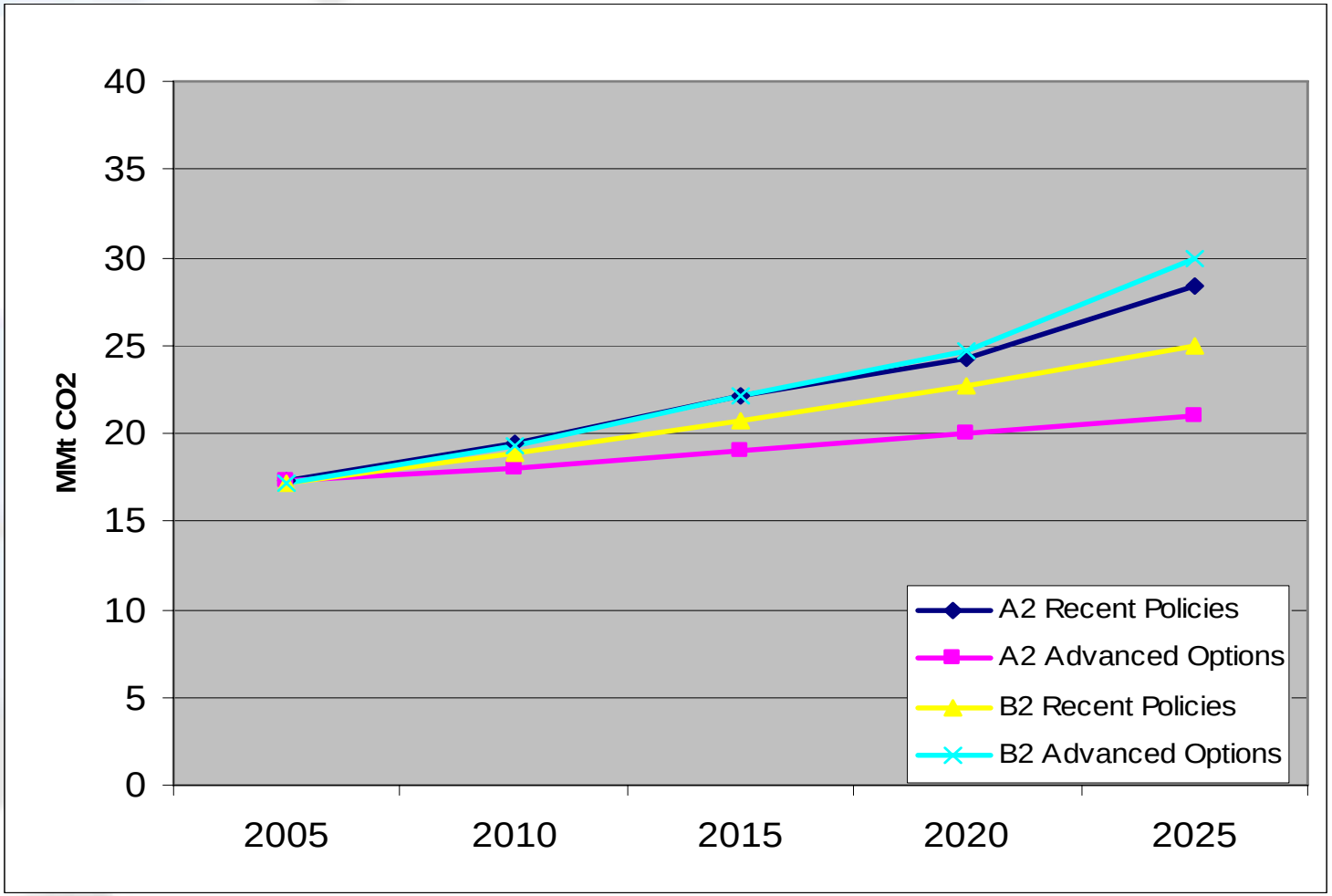
CO2 Emissions from Heavy Vehicles



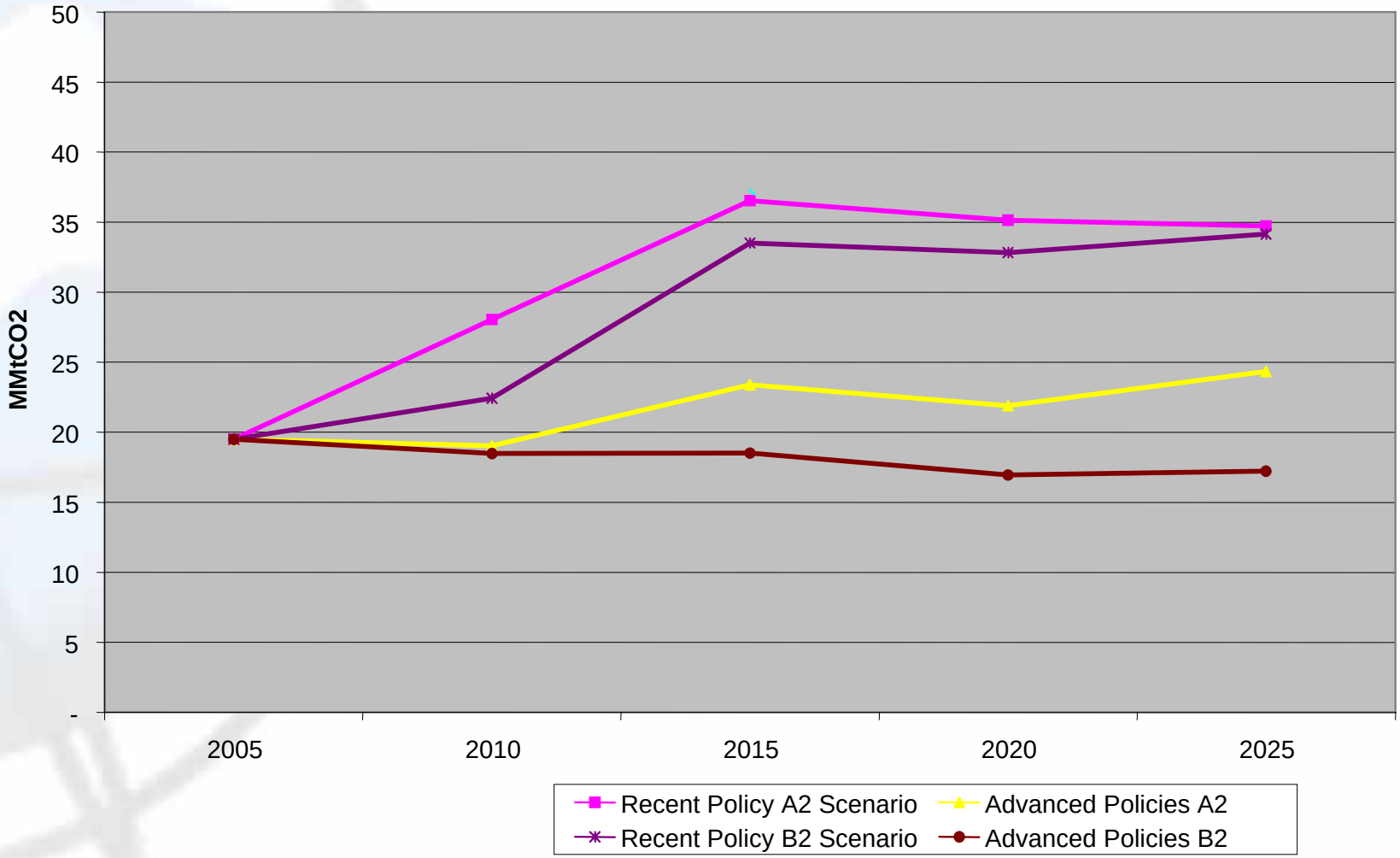
CO2 Emissions from the Services Sector



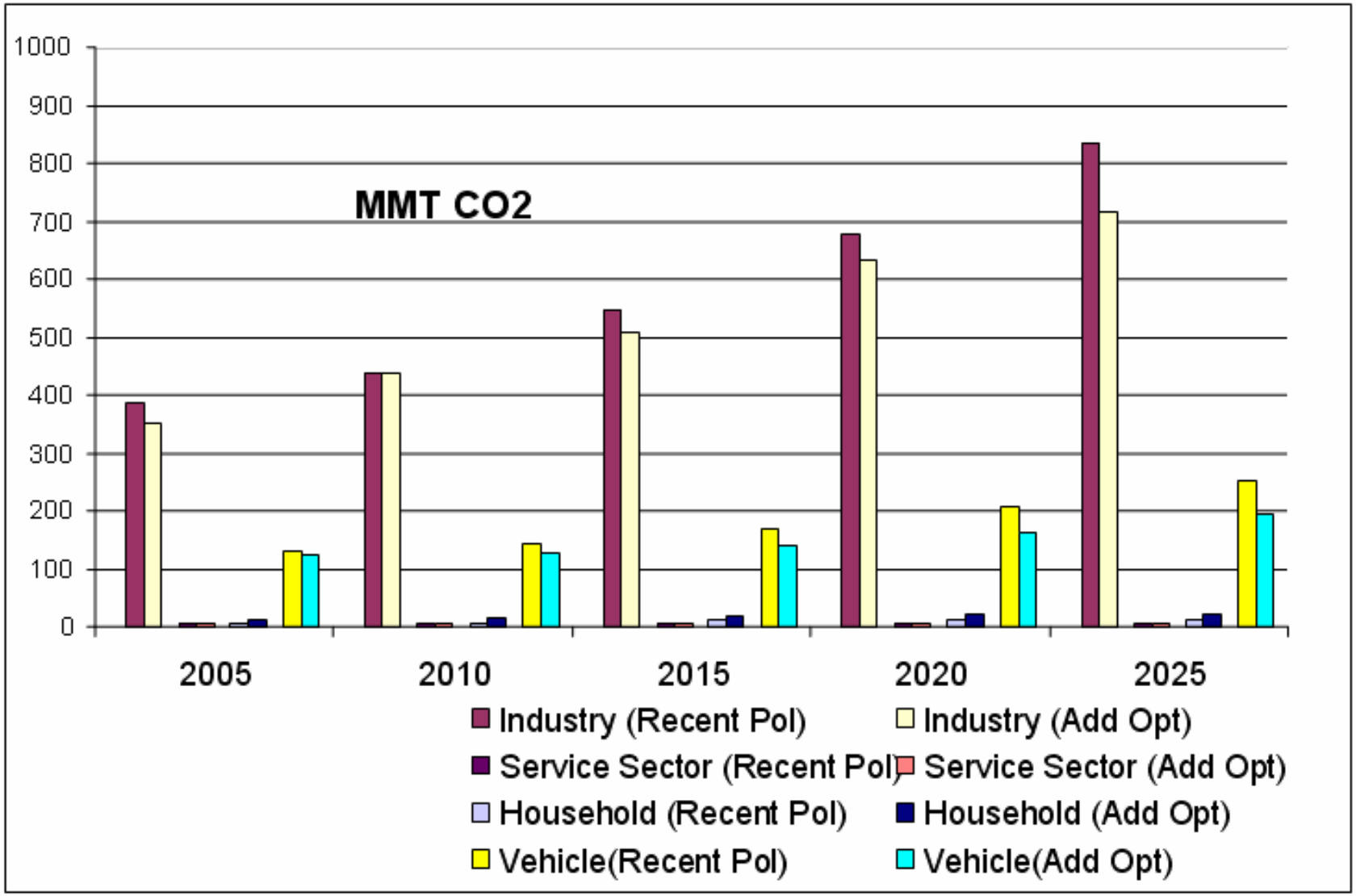
CO2 Emissions from Households



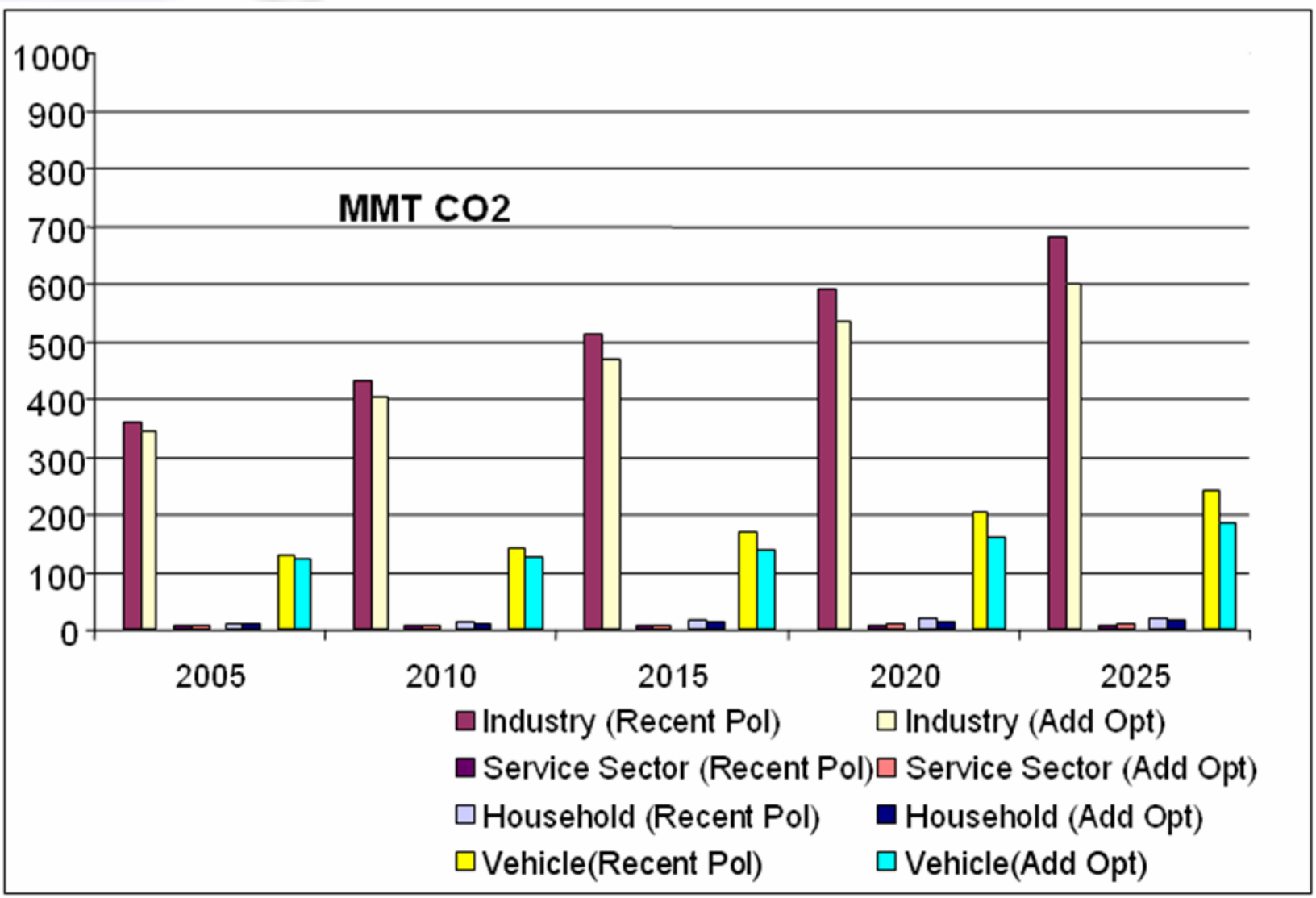
CO2 Emissions from Power Sector



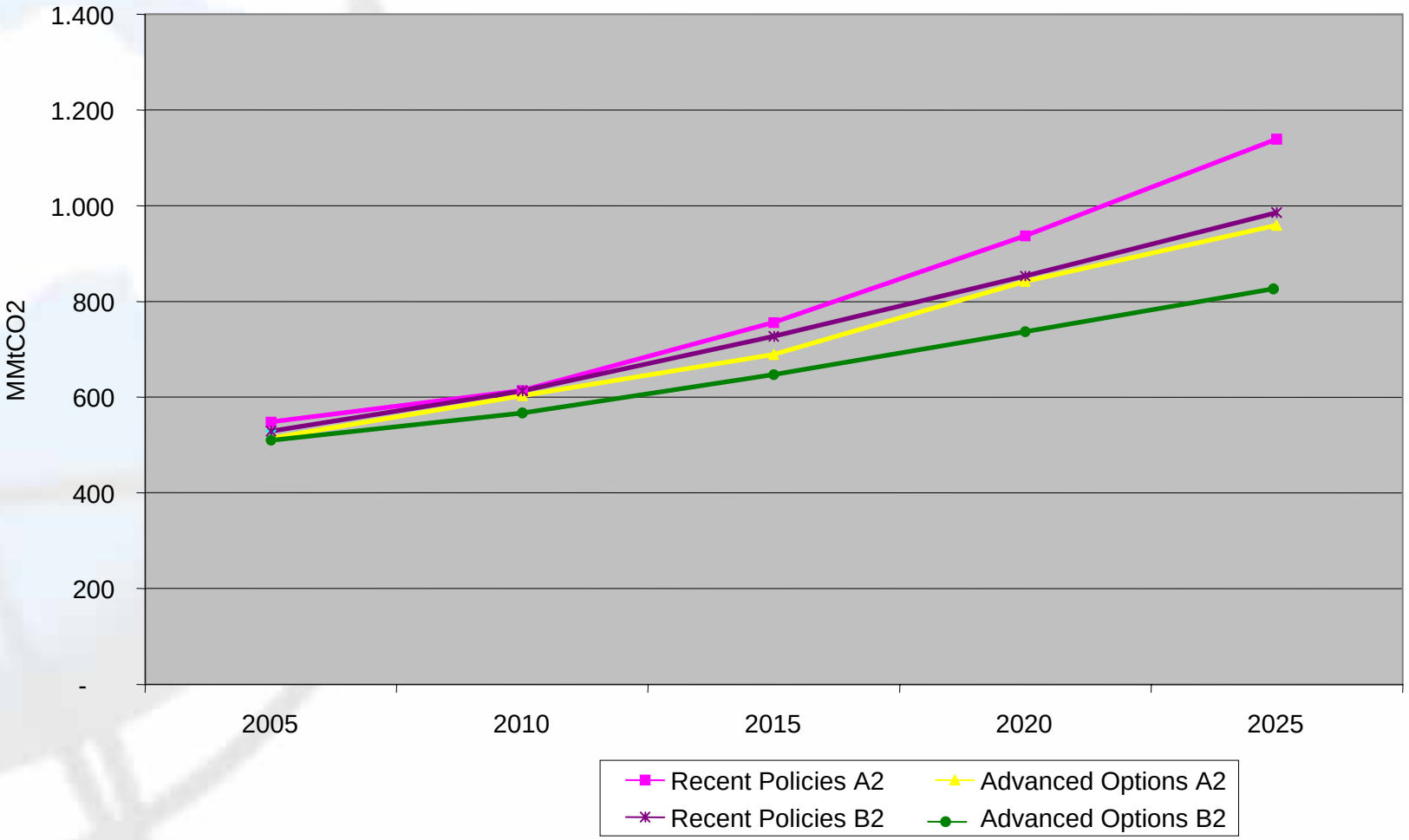
Total CO2 Emissions – A2 Group of Scenarios



Total CO2 Emissions – B2 Group of Scenarios



Total CO2 Emissions - Energy



Conclusion: Additional Policies

- Energy efficiency in industry and transport
- Natural gas in industry + residential and commercial sectors
- Hydropower potential to be tapped
- Ethanol: domestic production + exports
- Biodiesel in transport sector
- Renewable power generation in remote areas (access to electricity for rural population)
- No major negative impacts are expected, instead, employment generation associated to biofuels and energy efficiency are the main positive macroeconomic impacts anticipated in this scenario.

Thank You!