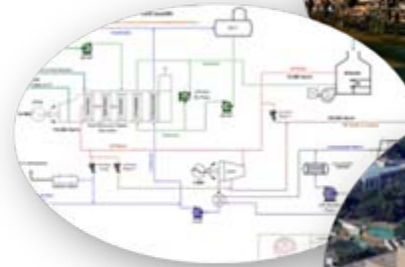




The University of Texas CHP and District Energy System

Juan Ontiveros, P.E.
Executive Director



Utilities & Energy Management



CHP & District Energy Points of Discussion

- Sited in Highly Populated Areas
- CHP & District Energy Efficiency Offsets Grid Inefficiency
- Improves Energy Security
- Is Cost Effective
- Improves the Environment

Background

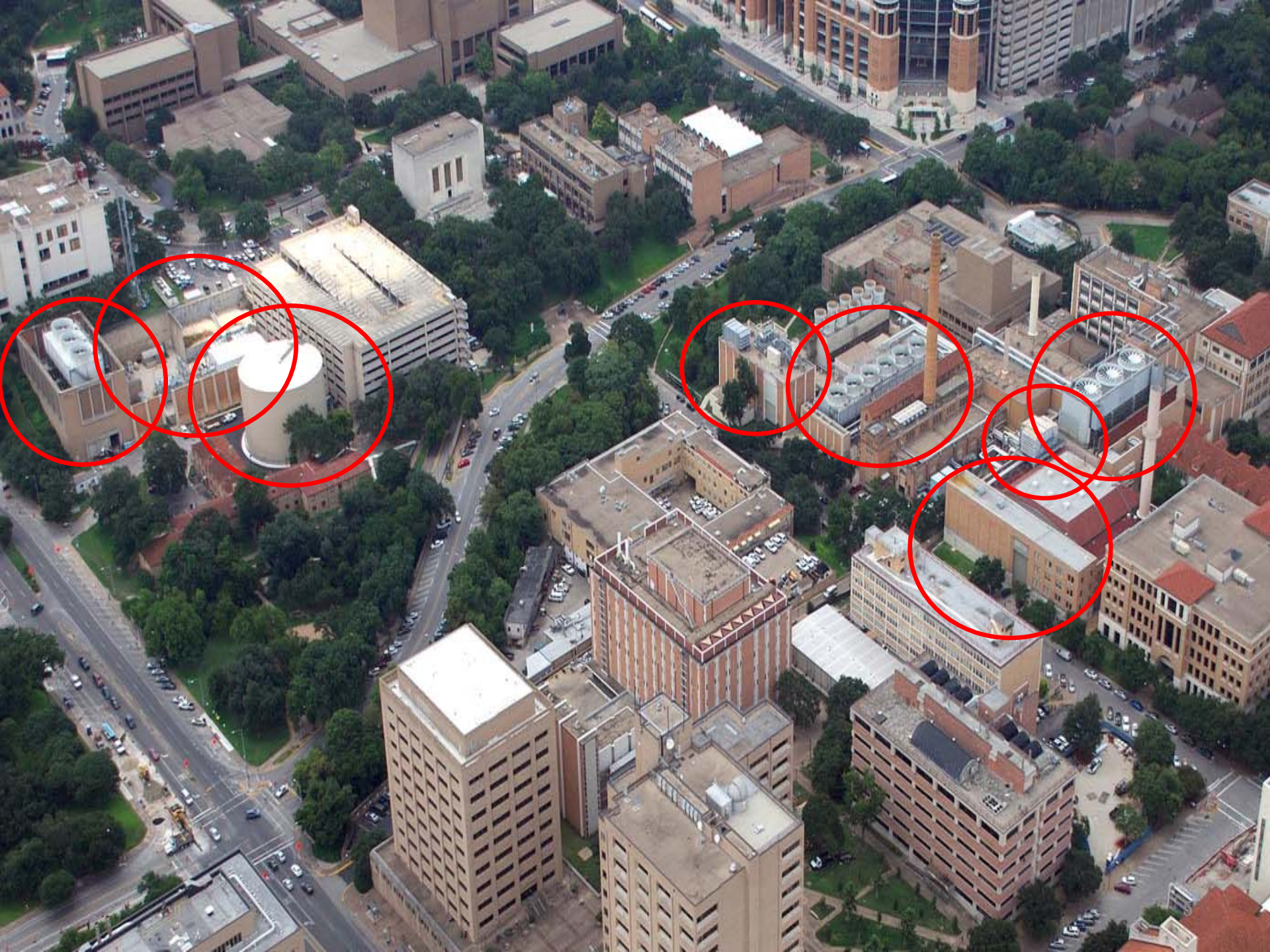
- Total Budget of \$2.076 billion
- Contracts and Grants of \$511 million
 - Federal Contracts and Grants of \$281 million
- 19.1 million square feet
- Student enrollment of 50,000
- Staff of 20,000



Background

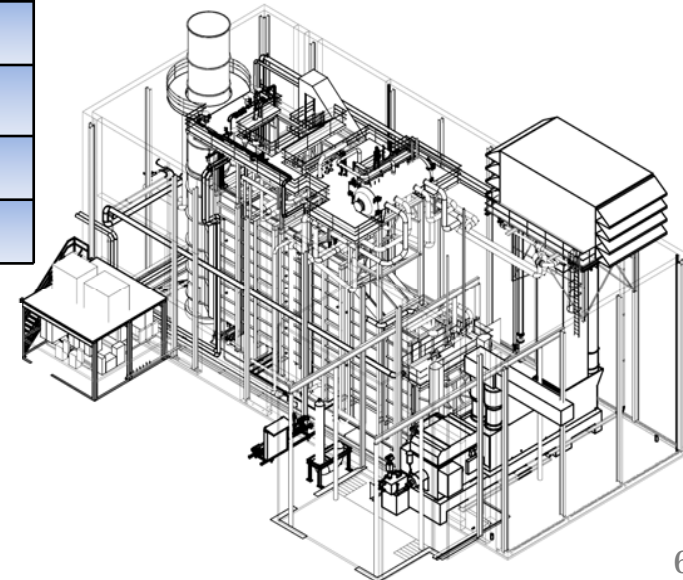
- 100% power, heating and cooling requirements for 16 million sf and 150+ buildings - \$70 million budget
- Power Plant
 - 137MW of on-site CHP (65 MW Peak)
 - 1.2 million lb/hr of steam generation (200K Peak)
- Chilled Water
 - 46,000 tons capacity in 4 plants (35K Peak)
 - 4 Million Gallon/36,000 ton-hr TES Tank (on-line in December)
- 6 miles of distribution tunnels
- 99.9998% reliability over last 35 Years





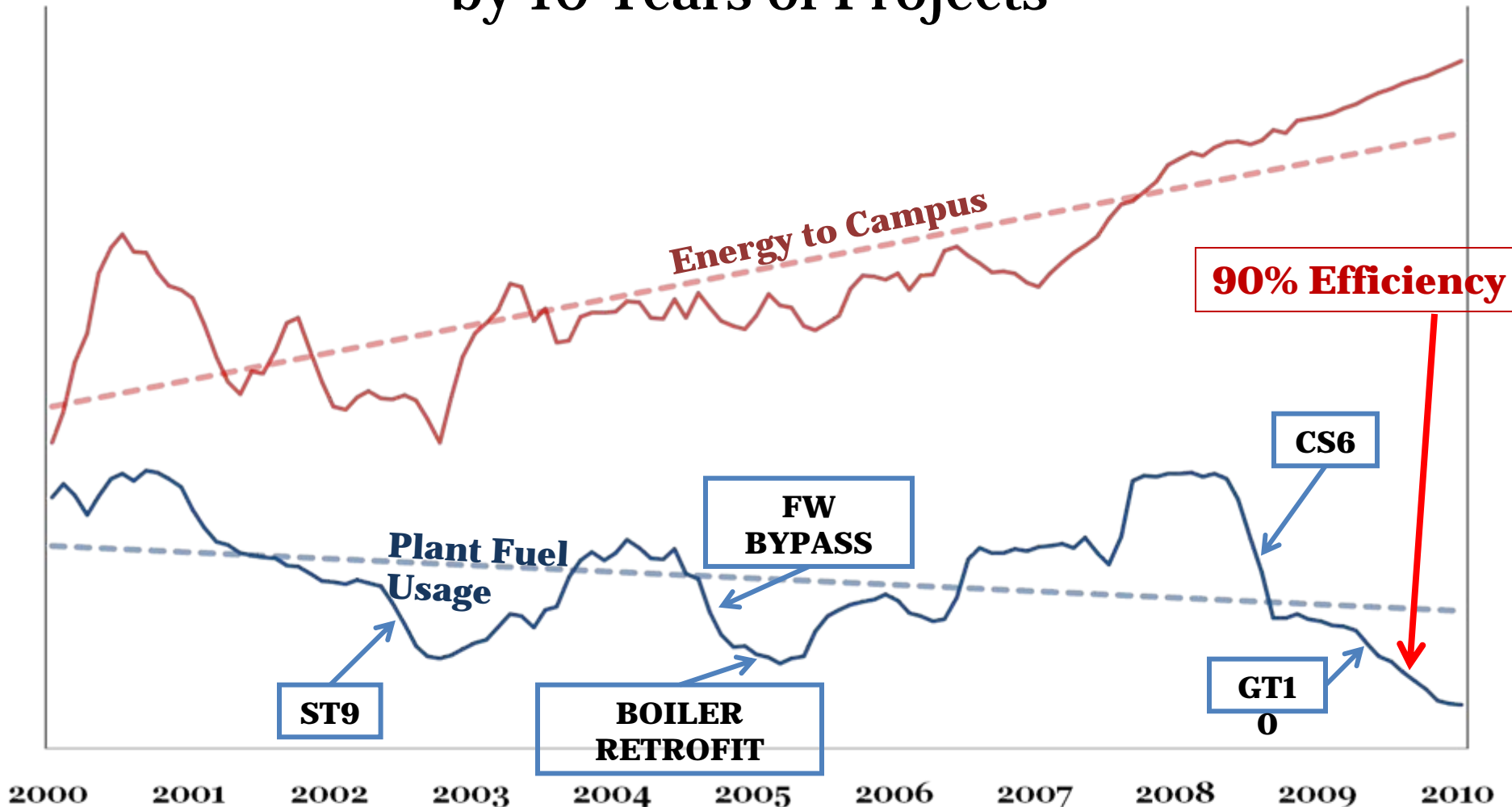
Major Plant Improvements

Project Description	Resulting Gas Savings (MMBTU/Year)	Resulting Emissions Reduction (Tons/CO ₂ /Year)
Steam Turbine #9	200,000	11,000
Cooling Tower #1	50,000	2,750
Boiler FGR/NOx Retrofit	200,000	11,000
Steam/Feed Water By-Pass	500,000	27,500
Chilling Station 6	140,000	7,700
Inlet Air Chilling	135,000	7,425
Thermal Energy Storage	40,000	2,200
Chilling Station Modernization	20,000	1,100
Gas Turbine # 10	425,000	23,375
TOTAL	1,710,000	94,050

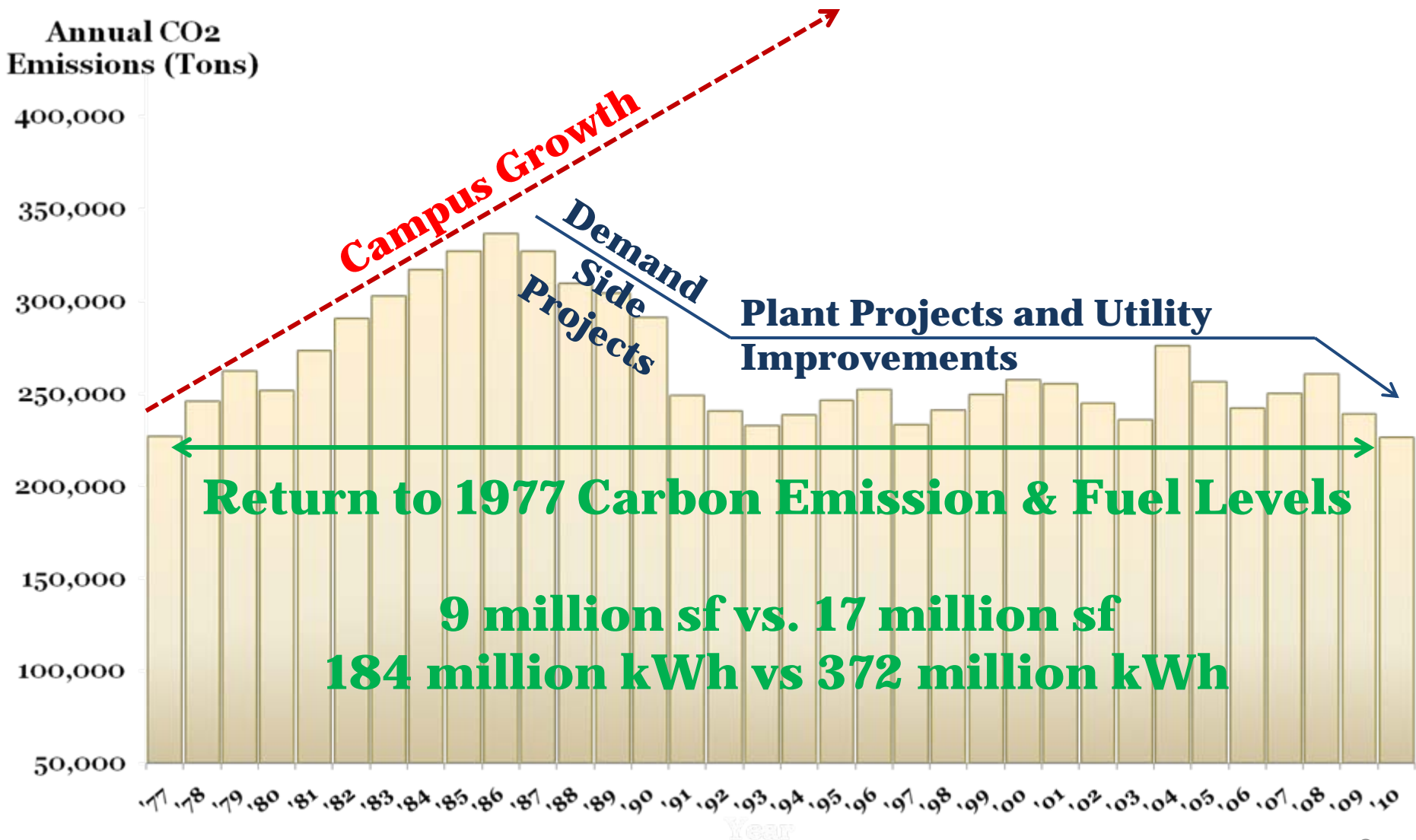


Plus Use of Proven Technology such as Digital Controls, Plant Optimization Software & Plant and Distribution System Modeling

Campus Energy Growth & Fuel Needs Addressed by 10 Years of Projects

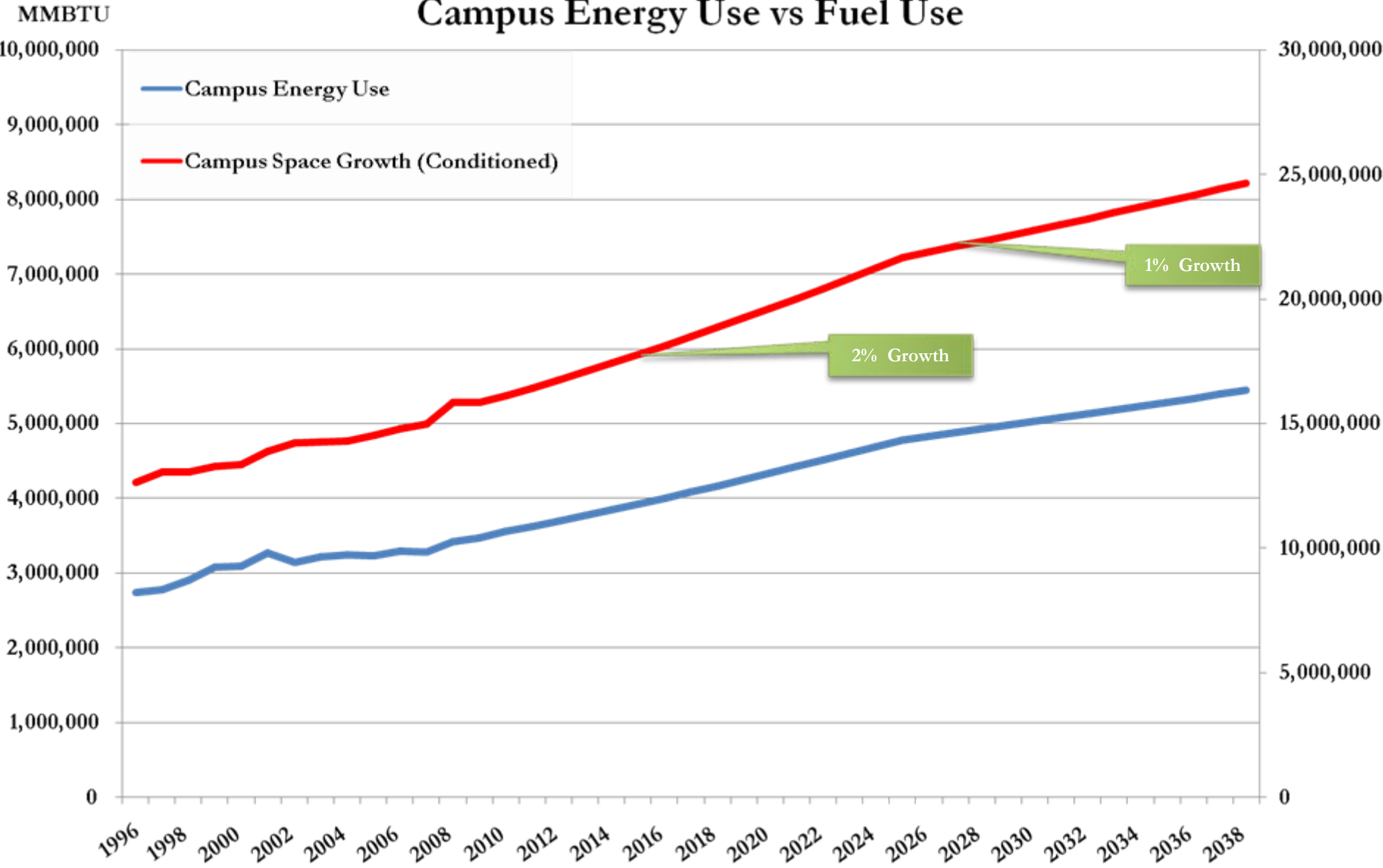


Effects of Utility Improvements on Carbon Emissions





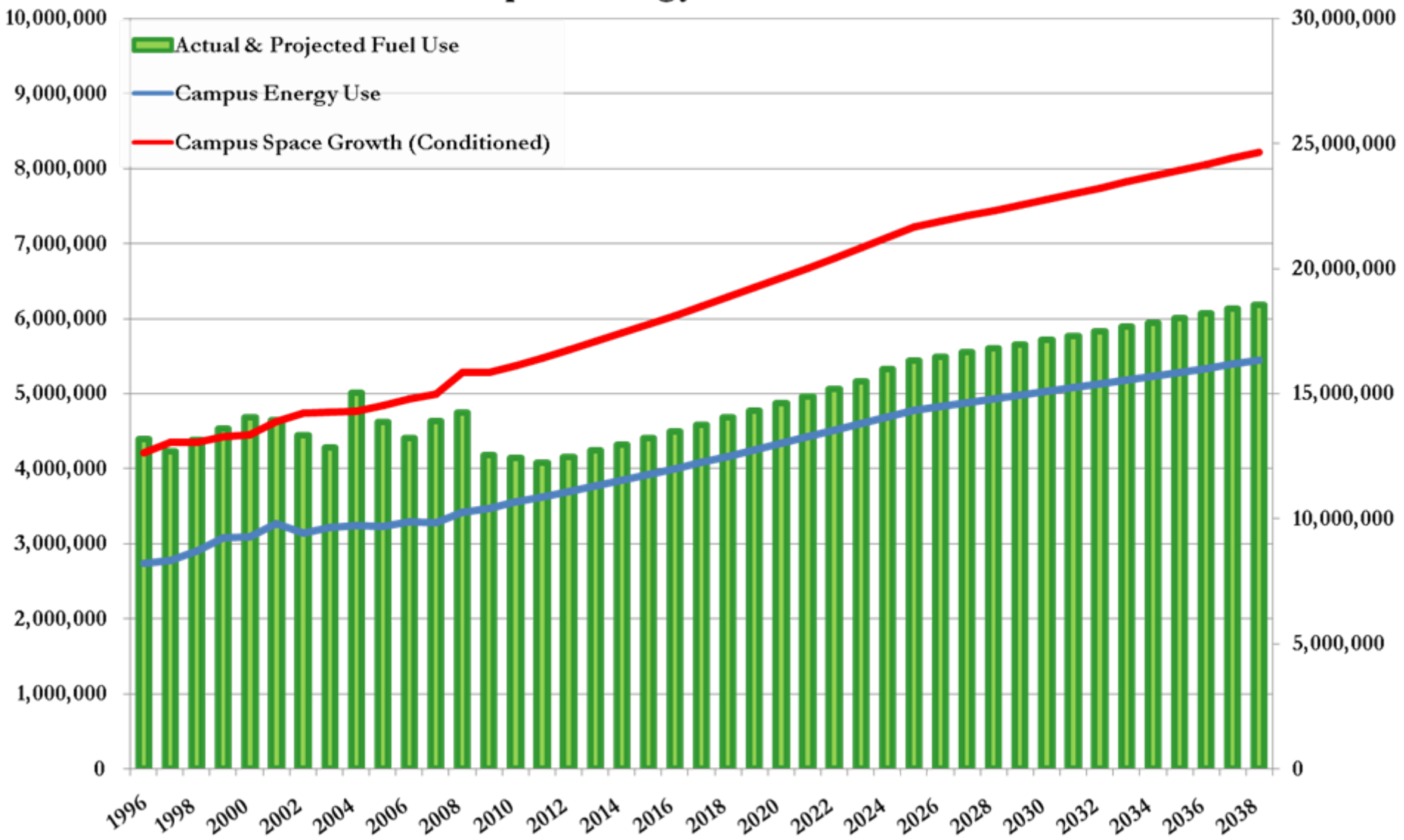
Campus Energy Use vs Fuel Use





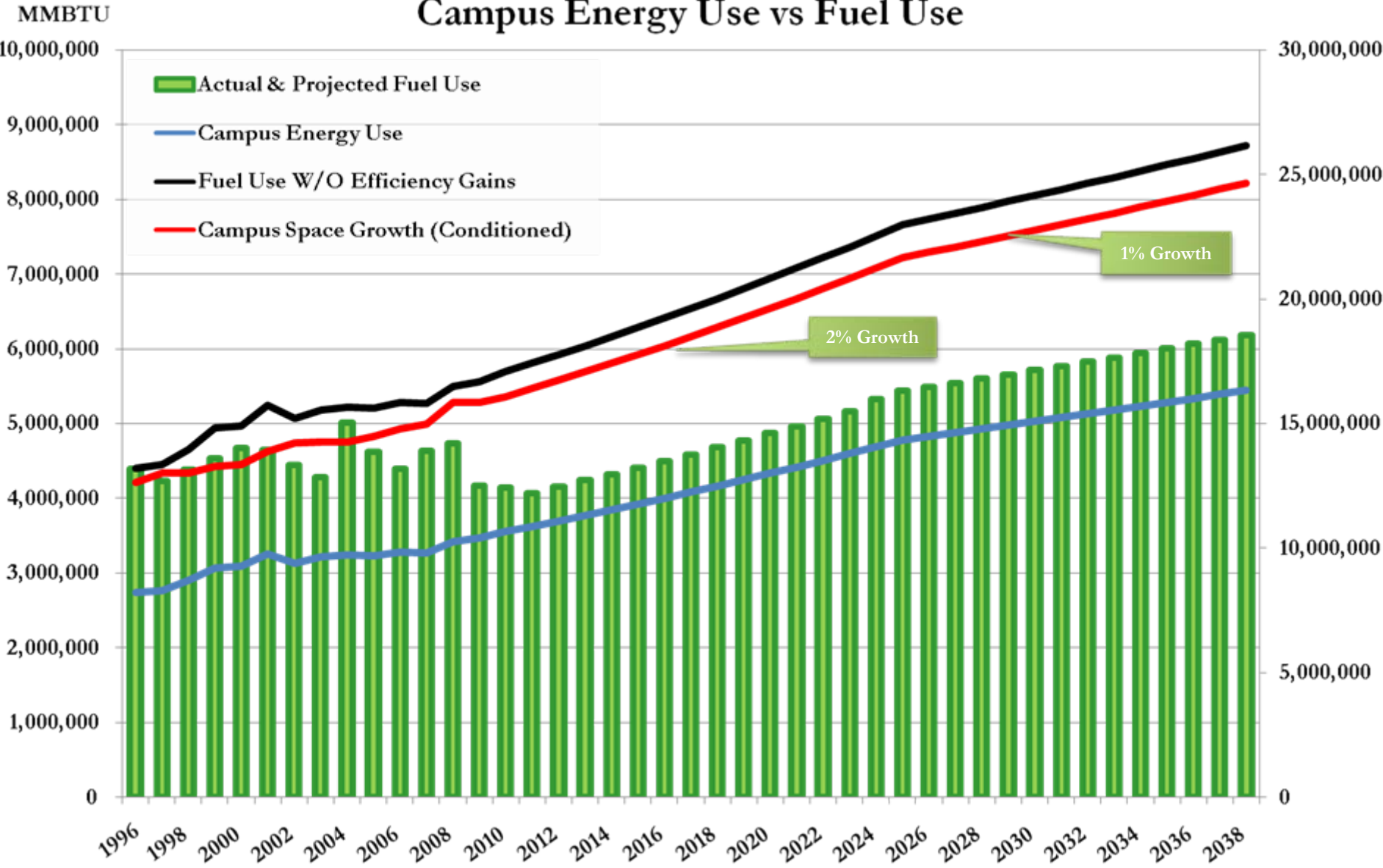
Campus Energy Use vs Fuel Use

MMBTU

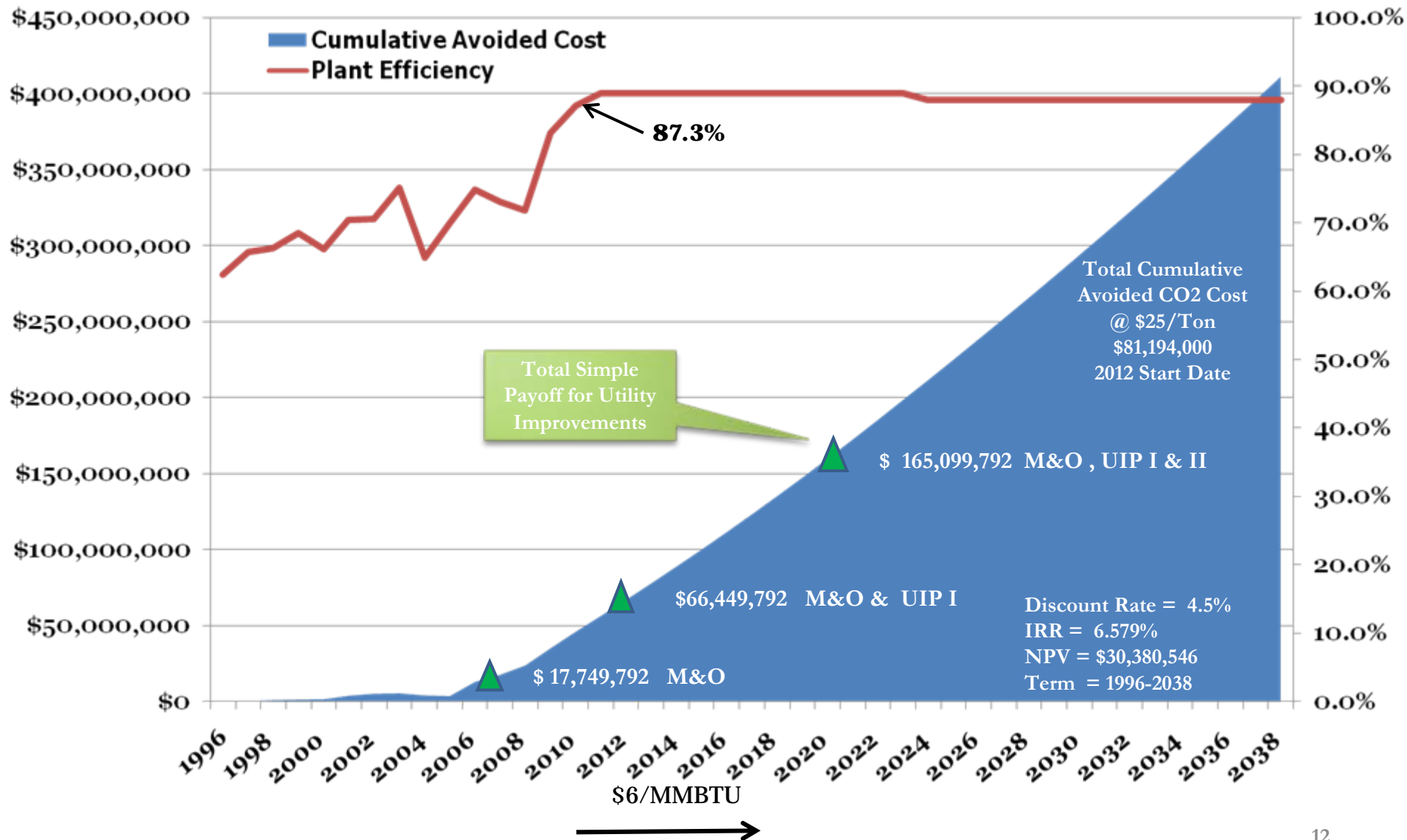




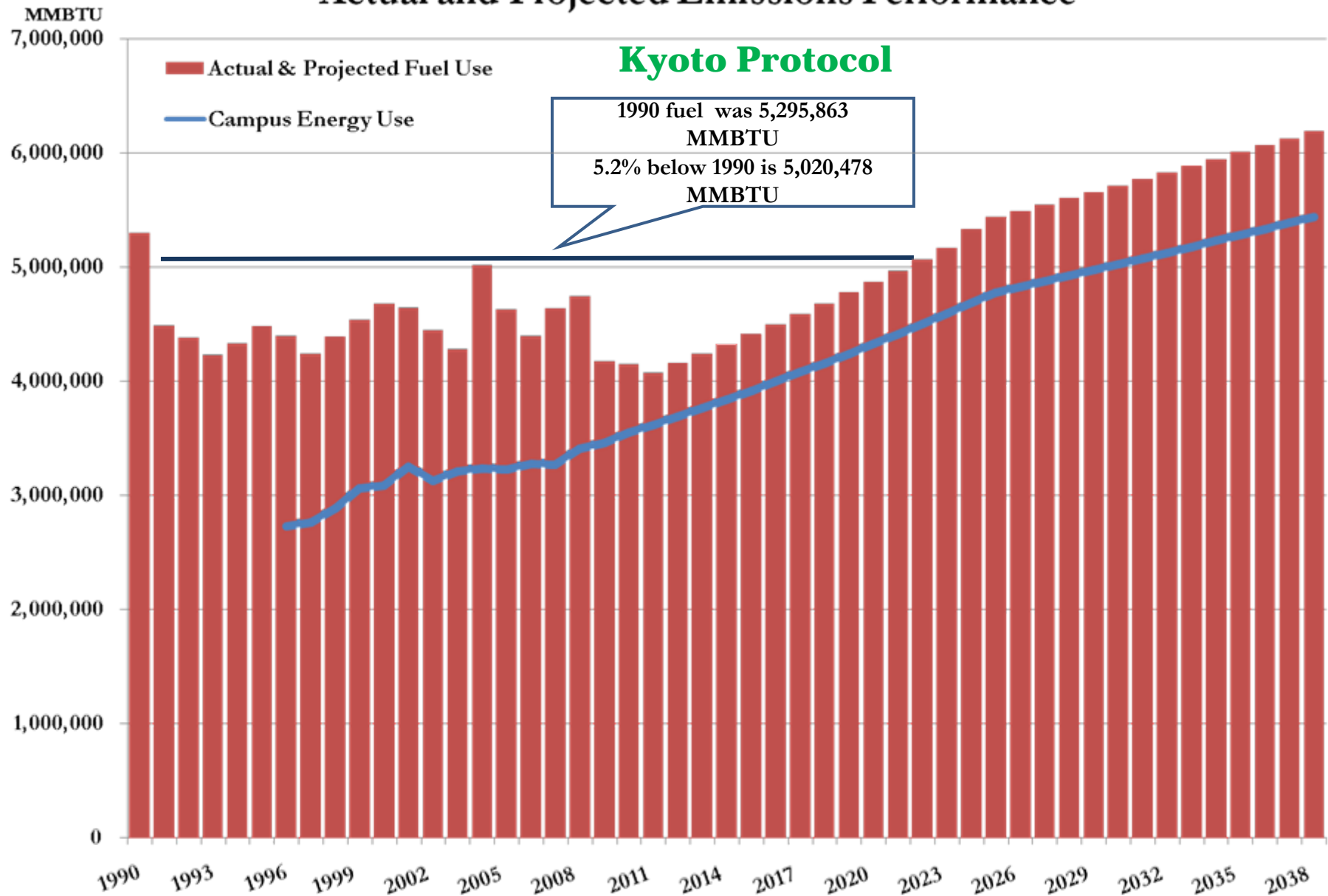
Campus Energy Use vs Fuel Use



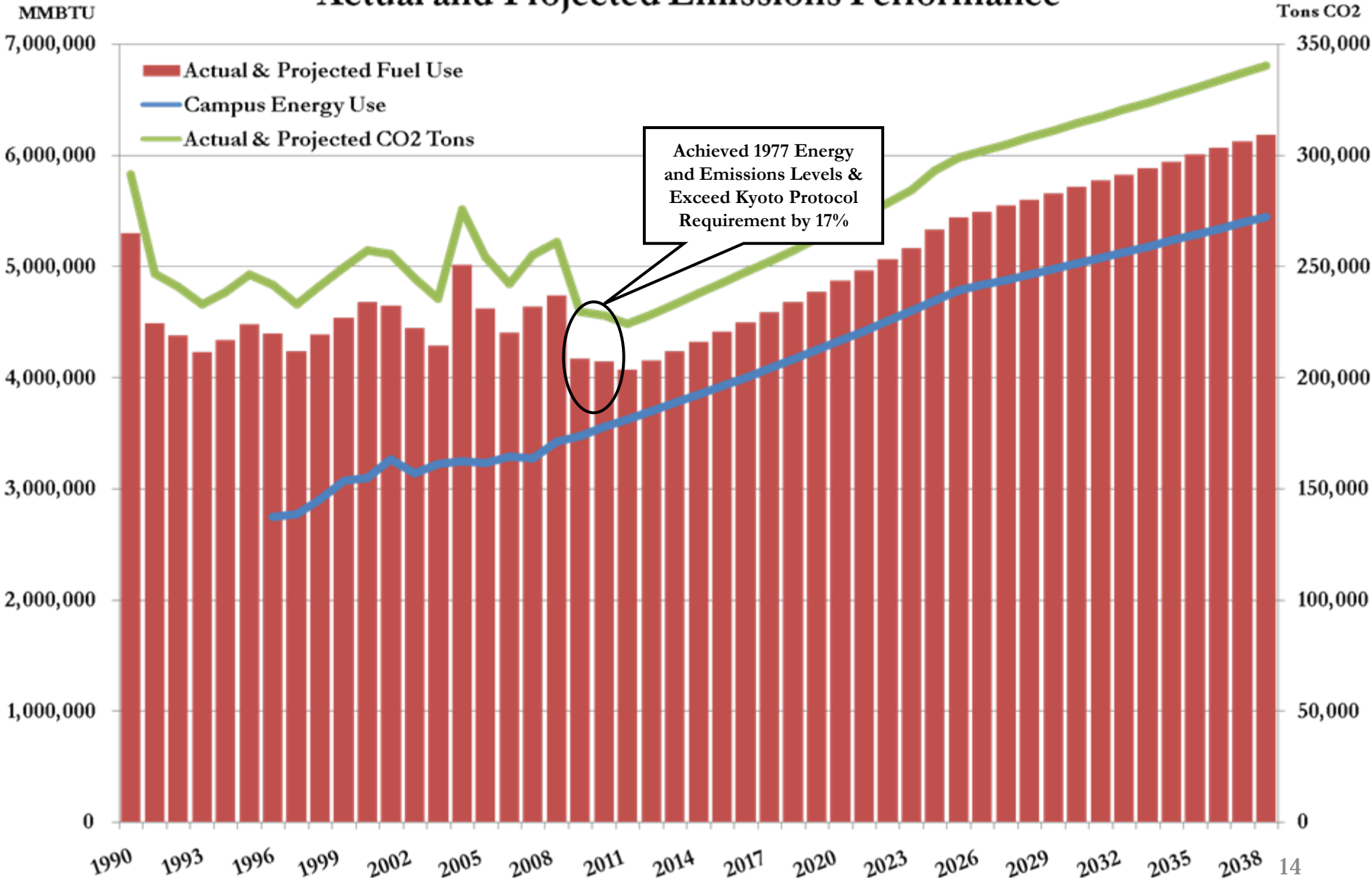
Total Utility Plant Performance



Actual and Projected Emissions Performance



Actual and Projected Emissions Performance



Utility Infrastructure Project Debt vs Avoided Fuel Cost

