



THE CENTER FOR
CLIMATE STRATEGIES

Climate Change Policies: Designing for Win-Win Results

REMI Washington Policy Conference May 5-6,
2016

About CCS

Better Safer World

Working Together



Activities

Leadership commitments, partnership formation, information and education, consensus building, action planning and analysis, policy and mechanism design, implementation authority and financing, training and capacity building, in kind and donor support

United States

Alaska, Arizona, Arkansas, Colorado, Connecticut, Florida, Kentucky, Iowa, Maine, Maryland, Michigan, Minnesota, Montana, Oregon, Pennsylvania, New Mexico, North Carolina, New York, South Carolina, Southern California, Vermont, Washington

Global

British Columbia, China, DR Congo, Eastern Europe, European Union, Guatemala, Macedonia, Mexico, Philippines, Ukraine

Non profit, non advocacy 501(c)3 since 2004

Focus Today:

- Minnesota State-Level Climate Strategies
 - 2-Year study, policy & analysis process
 - 20 policies screened, designed, assessed, modeled
 - 14 of 20 were win-wins (but 6 had issues)
- Pennsylvania State-Level Efficiency Strategies
 - Shorter study – Macro only - in late 2015
 - 12 policies assessed, modeled in REMI
 - Efficiency focus meant mixed economic-impact results
 - Incomes & jobs positive, GDP less so
- *Identify Predictive Drivers of Positive and Negative Outcomes*

Minnesota CSEO Study

- 20 Policies Selected & Custom-Designed for MN
 - Energy Supply, Buildings, Industry, Transportation, Agro, Forestry & Waste
- Reduce greenhouse gas (GHG) emissions related to state and federal goals
 - 34 percent reduction below BAU forecasted emissions in 2030
 - 33 percent reduction in comparison to 2015 base year emissions by 2030
 - Exceeds Clean Power Plan Section 111(d) anticipated requirements
- Expand Minnesota's economy and create jobs (in most cases)
 - 24,630 newly created jobs per year by 2030
 - \$2.38 billion in additional economic activity per year (a 0.5% increase)
 - Personal income expands by \$2.3 billion, or 0.6 percent per year

CCS Methodology - Minnesota

Policy Designs

- New Designs for Policies – not existing/proposed policies
- Multi-Criteria Design – climate change never the only policy concern
- Collaboration with MN State Agencies (including DEED)

Policy Analysis

- Direct Impacts and GHG-reduction effectiveness quantified
- Costs & Savings, other financial flows quantified

REMI Analysis

- Mapping costs & savings to REMI, balancing financial flows
- Engagement with DEED, methodology review with SMEs

Pennsylvania Climate Policy Study

Task: Analysis of Economic Impacts of 12 Policies (Work Plans)

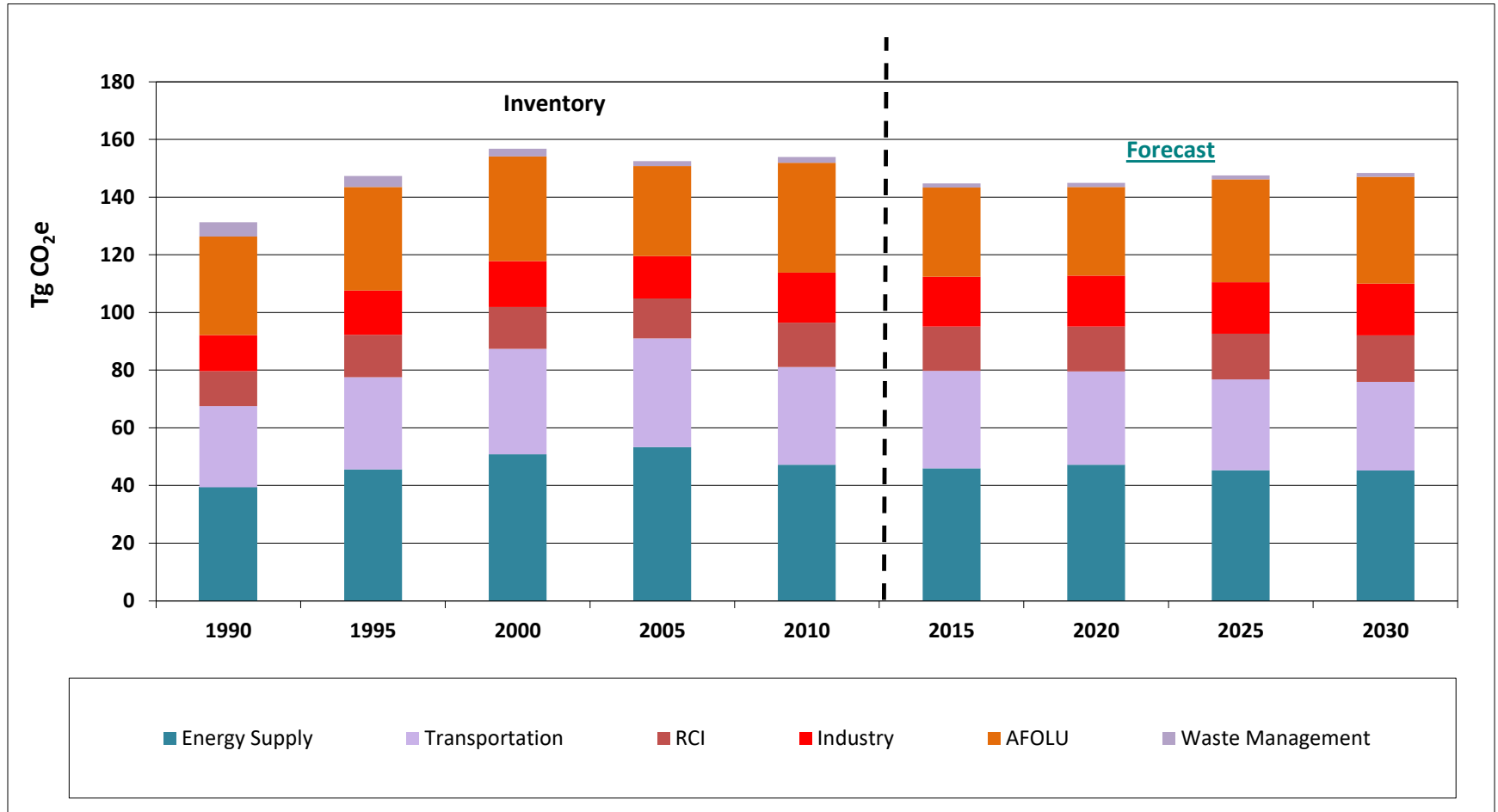
- Measure changes to major indicators of economic health
- GDP, Jobs, Incomes
- Primary focus: energy efficiency (buildings, electricity supply)
- Analysis included in 2015 update of PA Climate Action Plan

Simpler Scope: Start with Existing Analysis of Policies

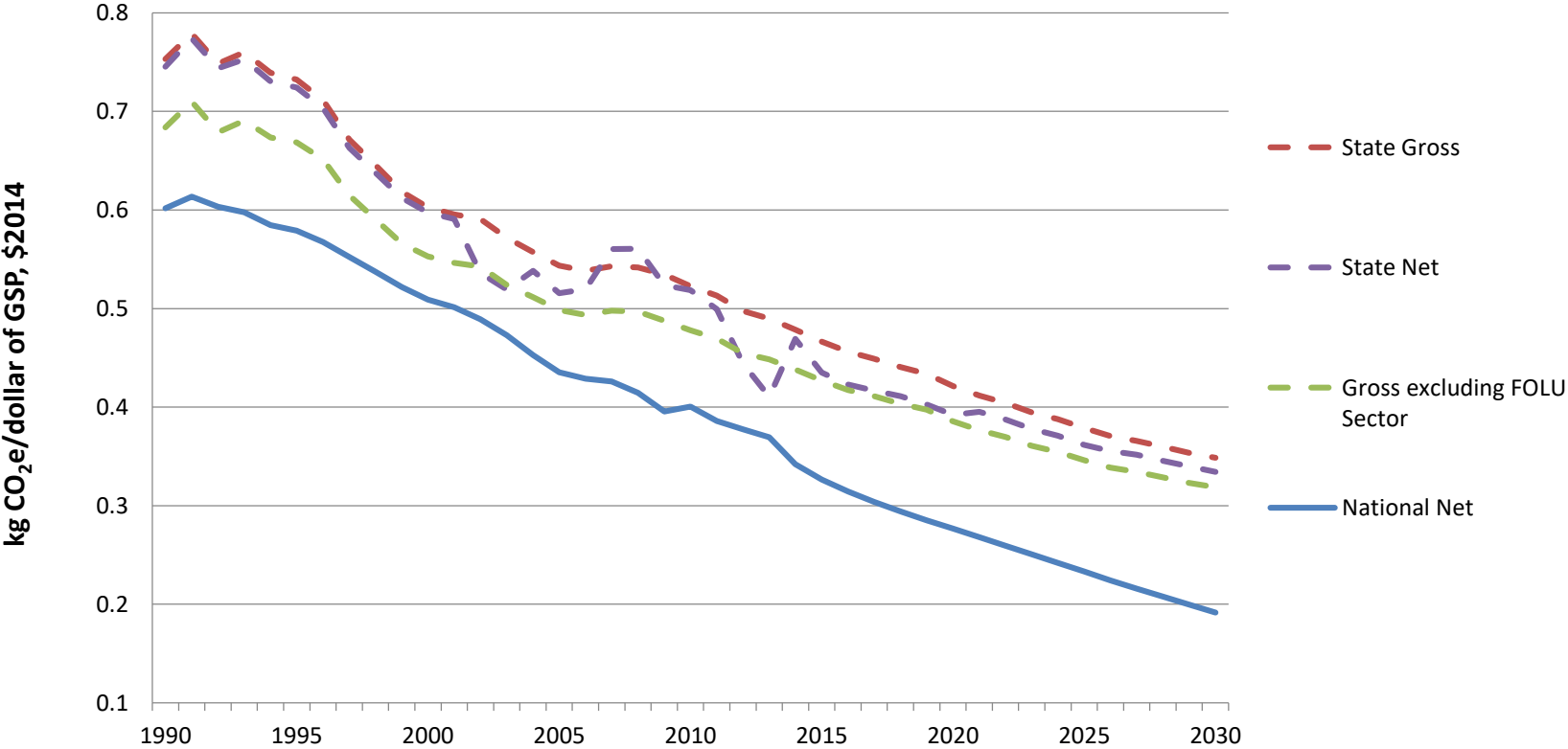
- Spending Changes – public, commercial, household changes in how much of goods/services are consumed
- Cost/Price Changes – changes in amount received per dollar spent

Similar REMI process; less agency engagement

GHG Baseline: Minnesota



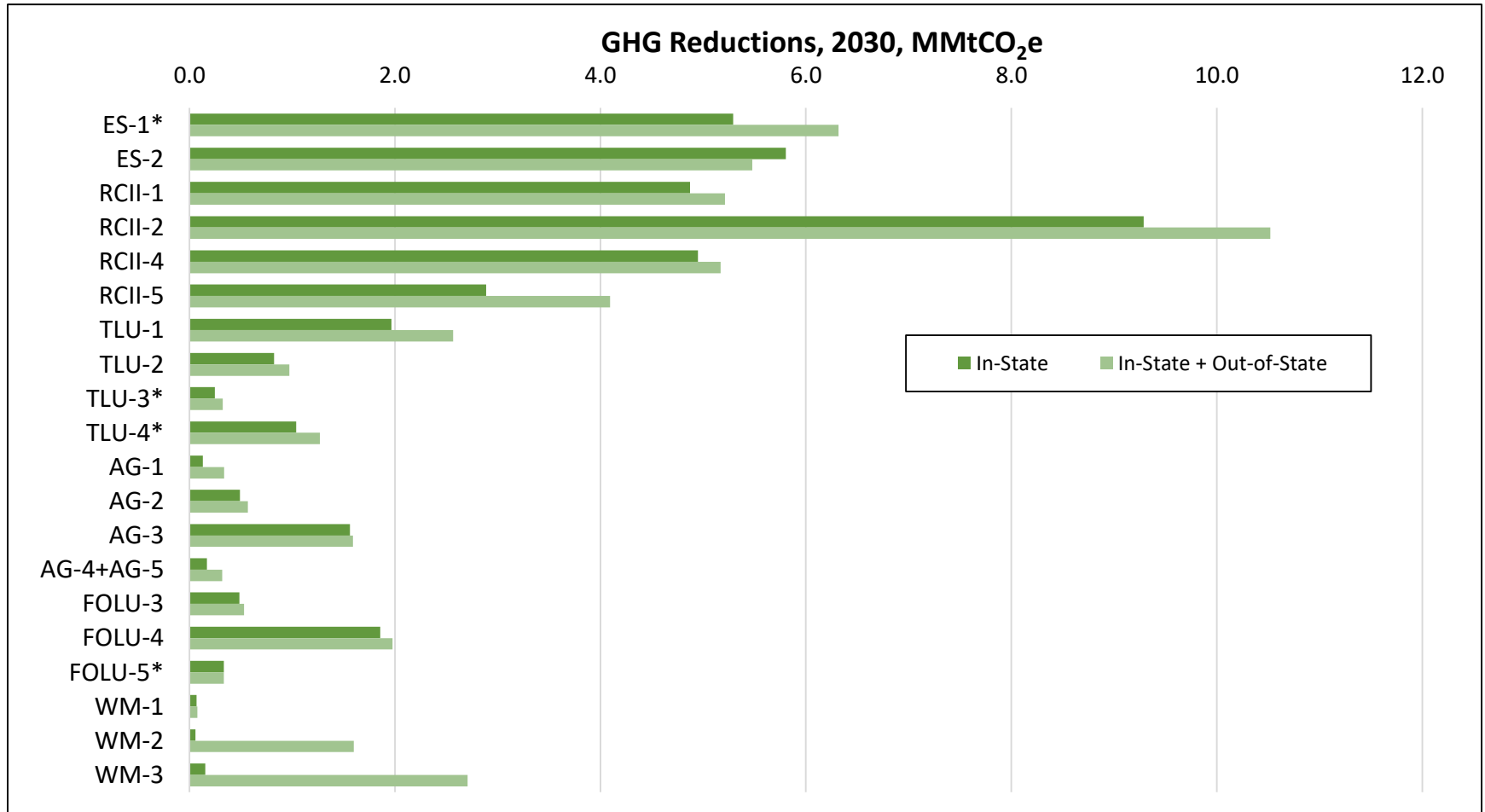
Baseline Carbon Intensity (GSP)



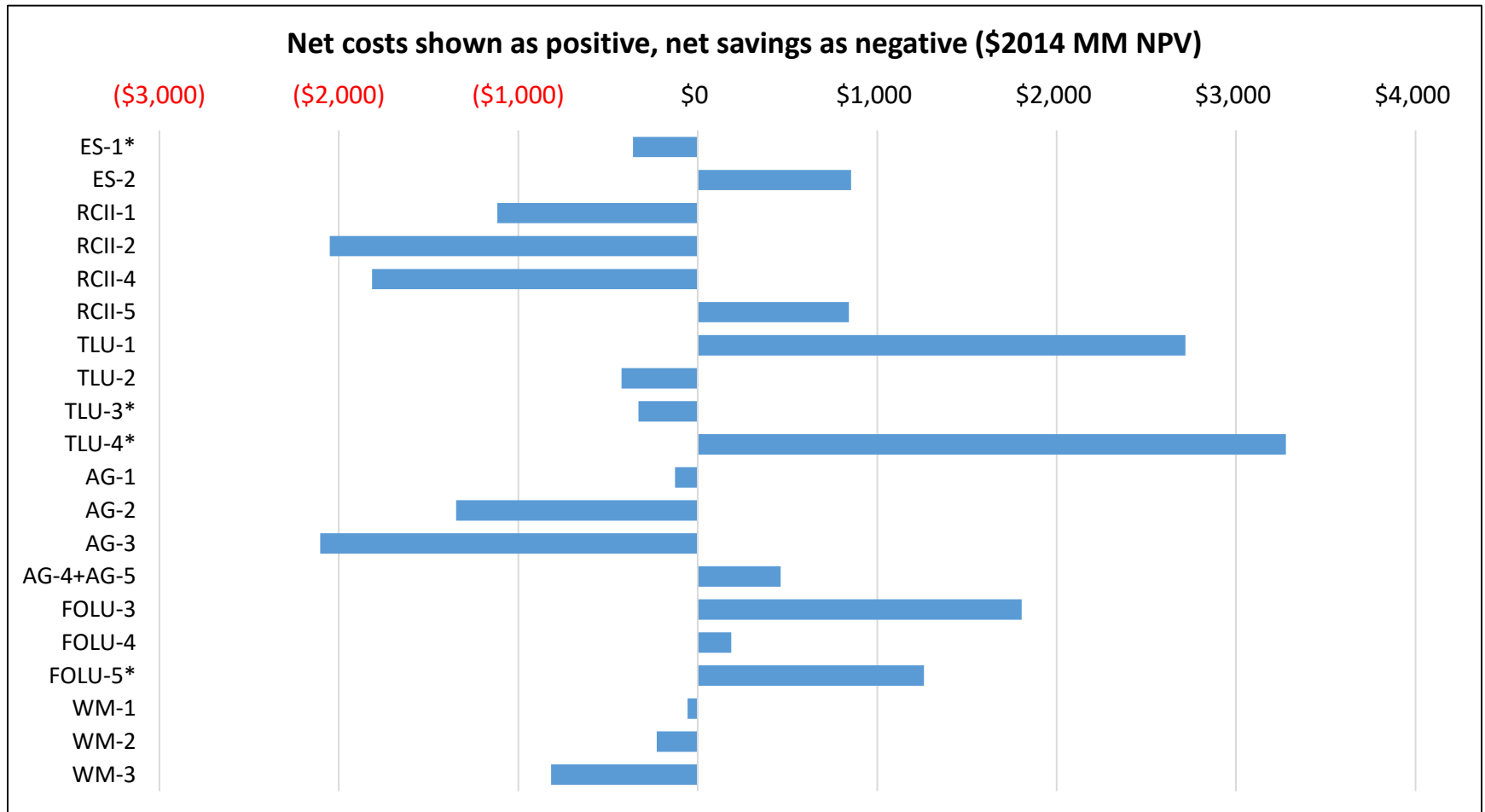
MN CSEO: Policy Options

Policy ID	Policy Title	Policy ID	Policy Title
ES-1	Increase the Minnesota Renewable Energy Standard	A-2	Soil Carbon Management: Cover Crops
ES-2	Efficiency Improvements, Repowering, Retirement, and Upgrades to Existing Plants	A-3	Soil Carbon Management: Row to Perennial Crops Conversion
RCII-1	Incentives and Resources for Combined Heat & Power for Biomass and Natural Gas	A-4	Advanced Biofuels Production
RCII-2	Zero Energy Transition/Codes (SB2030)	A-5	Biofuels Consumption (Existing Biofuels Statute)
RCII-4	Increase Energy Efficiency Requirements	FOLU-3	Community Forests
RCII-5	Incentives and Resources to Promote Thermal Renewables	FOLU-4	Tree Planting: Forest Ecosystems
TLU-1	Transportation Pricing	FOLU-5	Conservation on Private Lands
TLU-2	Improve Land Development and Urban Form	WM-1	Wastewater Treatment: Energy Efficiency
TLU-3	Metropolitan Council Transportation Policy Plan	WM-2	Front-End Waste Management: Source Reduction
TLU-4	Zero Emission Vehicle Standard	WM-3	Front-End Waste Management: Re-Use, Recycling & Composting
A-1	Nutrient Management		

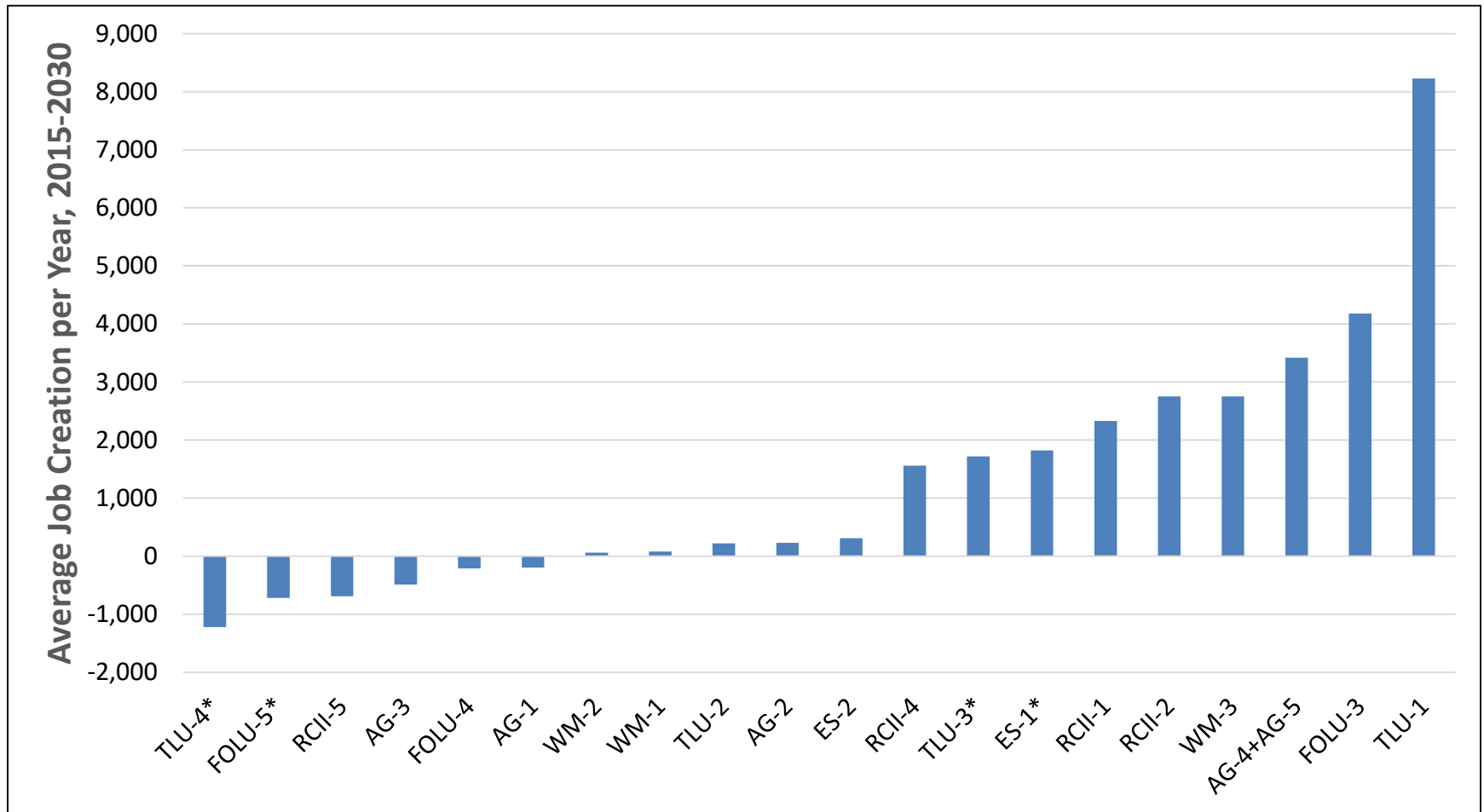
GHG Emissions Reductions



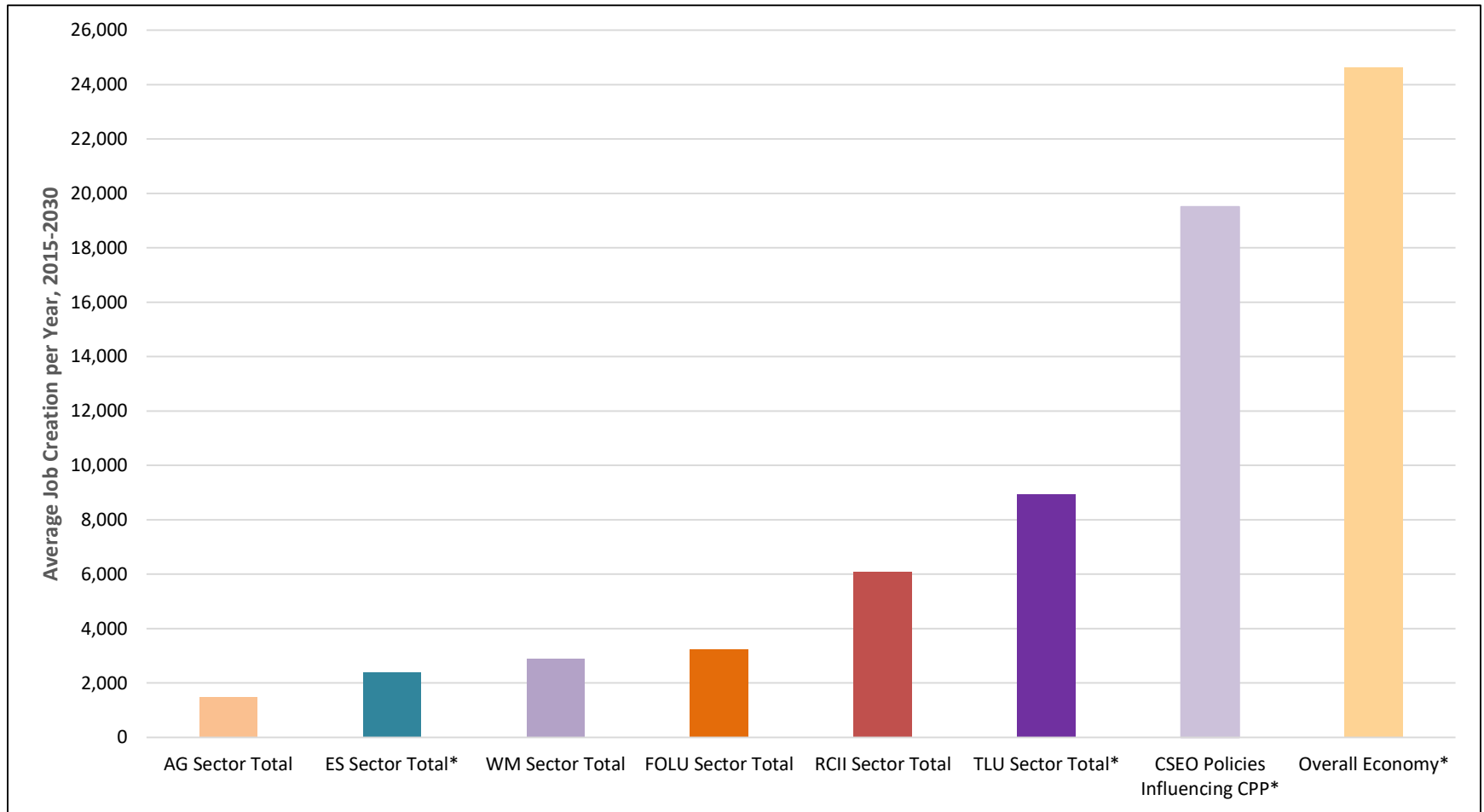
Direct Costs/Savings (Cumulative 2015-2030, Net Totals)



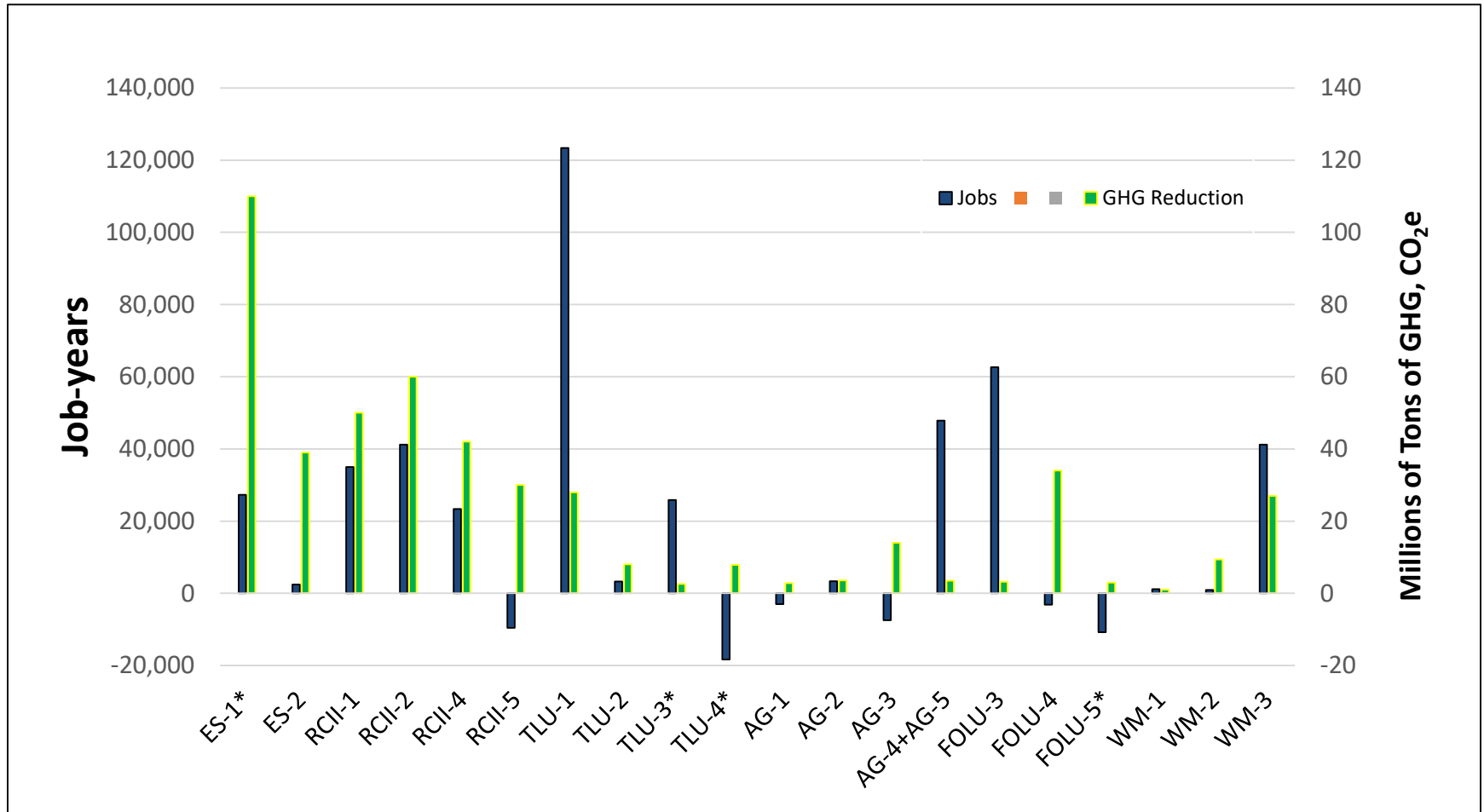
MN: Jobs by Policy Option



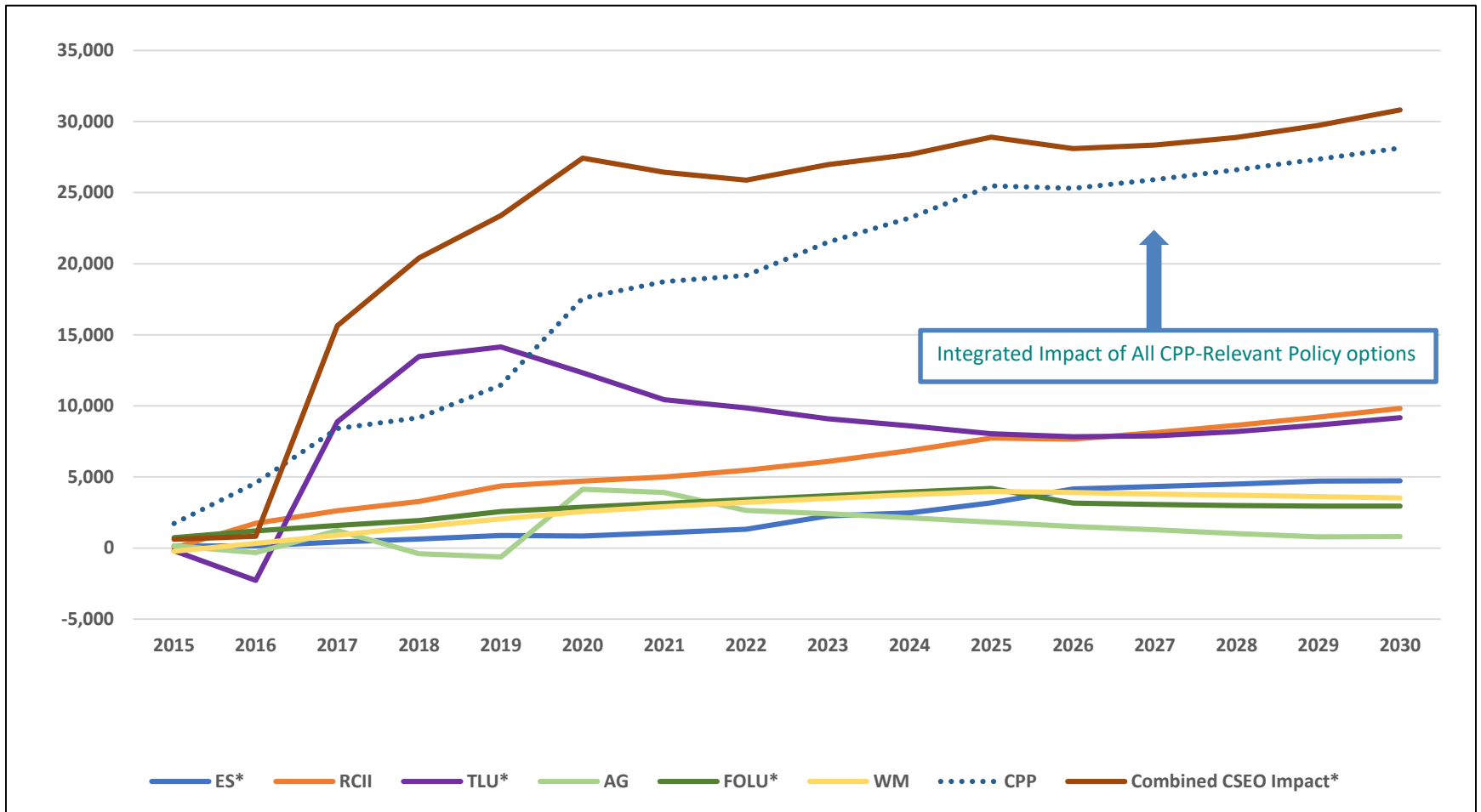
Jobs by Sector



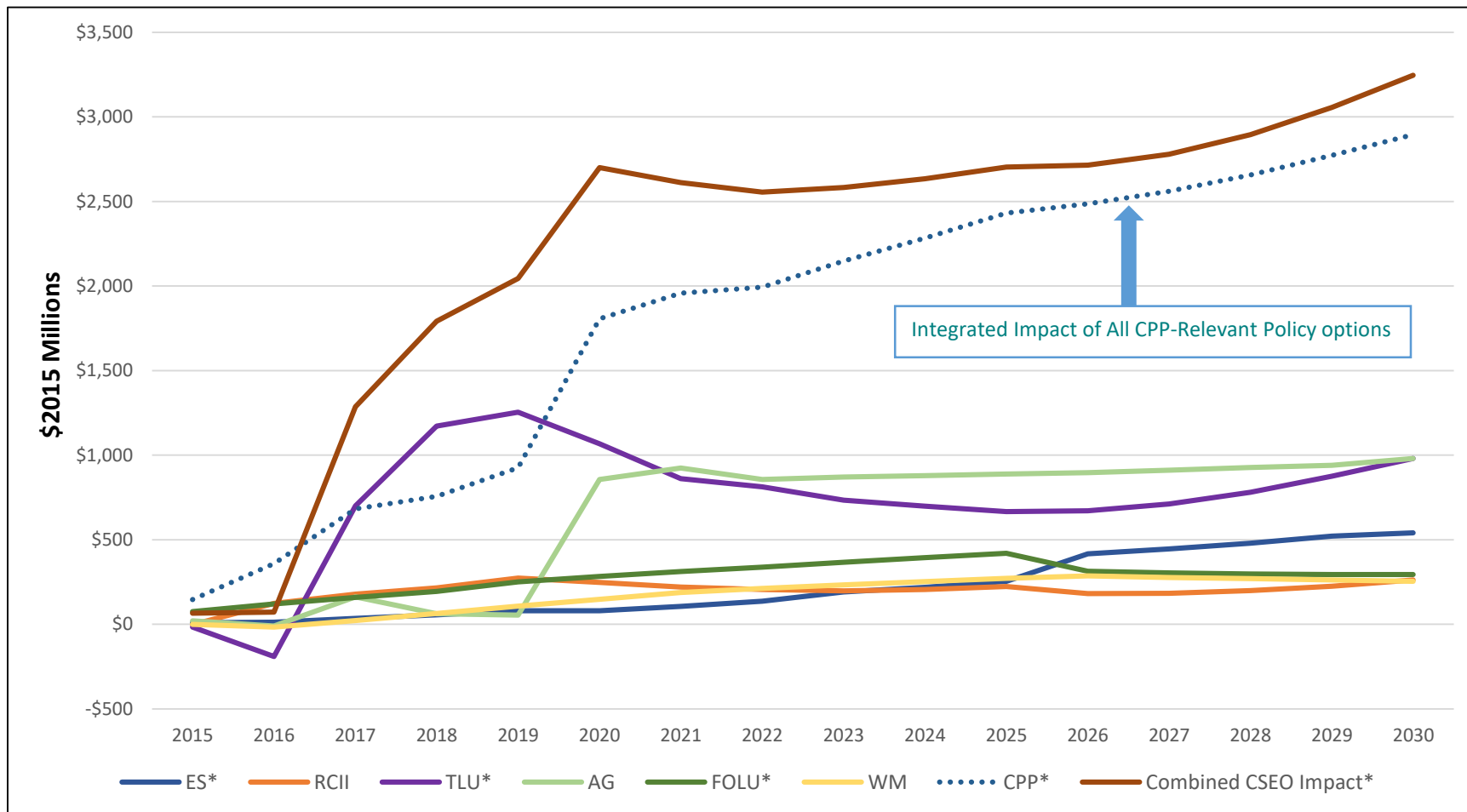
Jobs & Emissions Reductions



Jobs

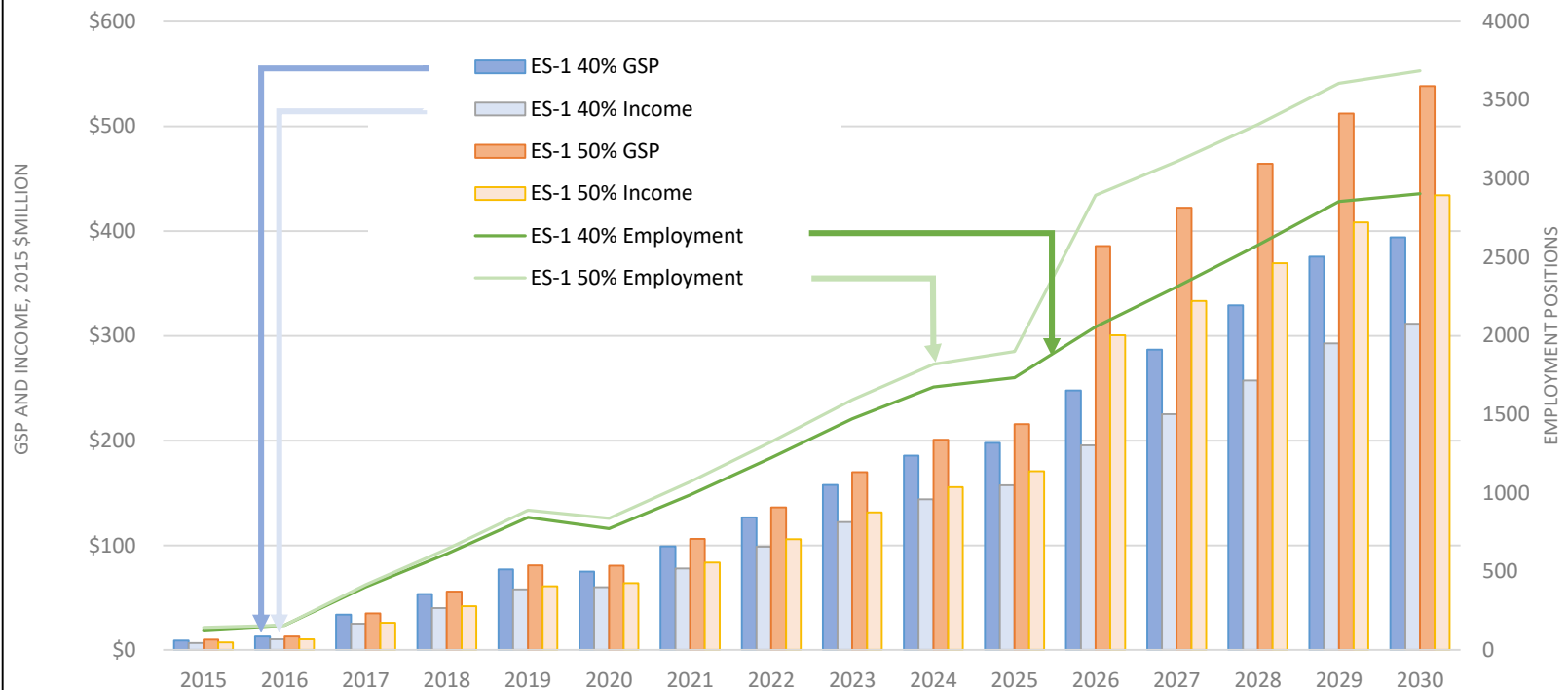


GSP (Economic Growth)

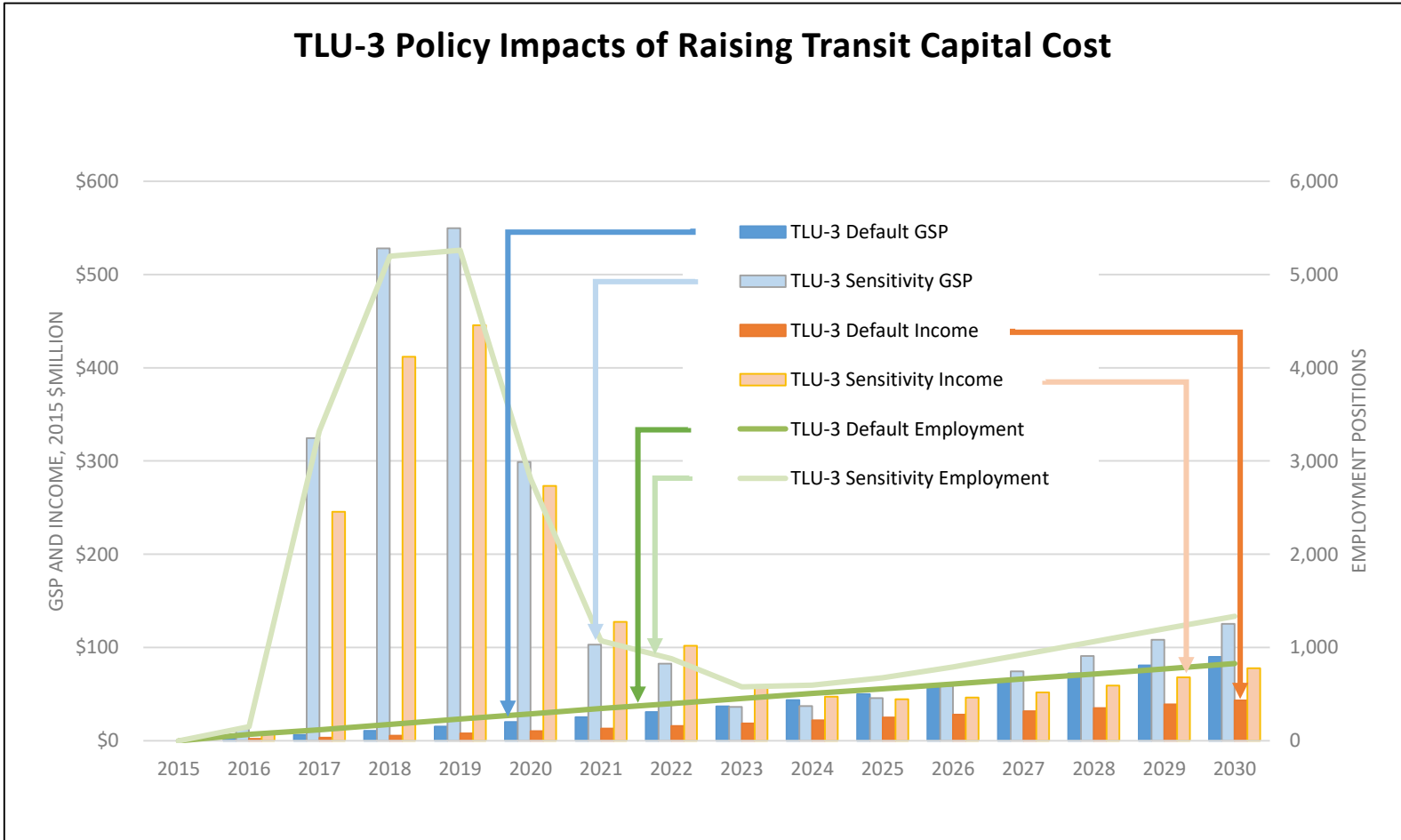


ES-1 Renewable-Energy Goals: Comparing 40% & 50% Targets

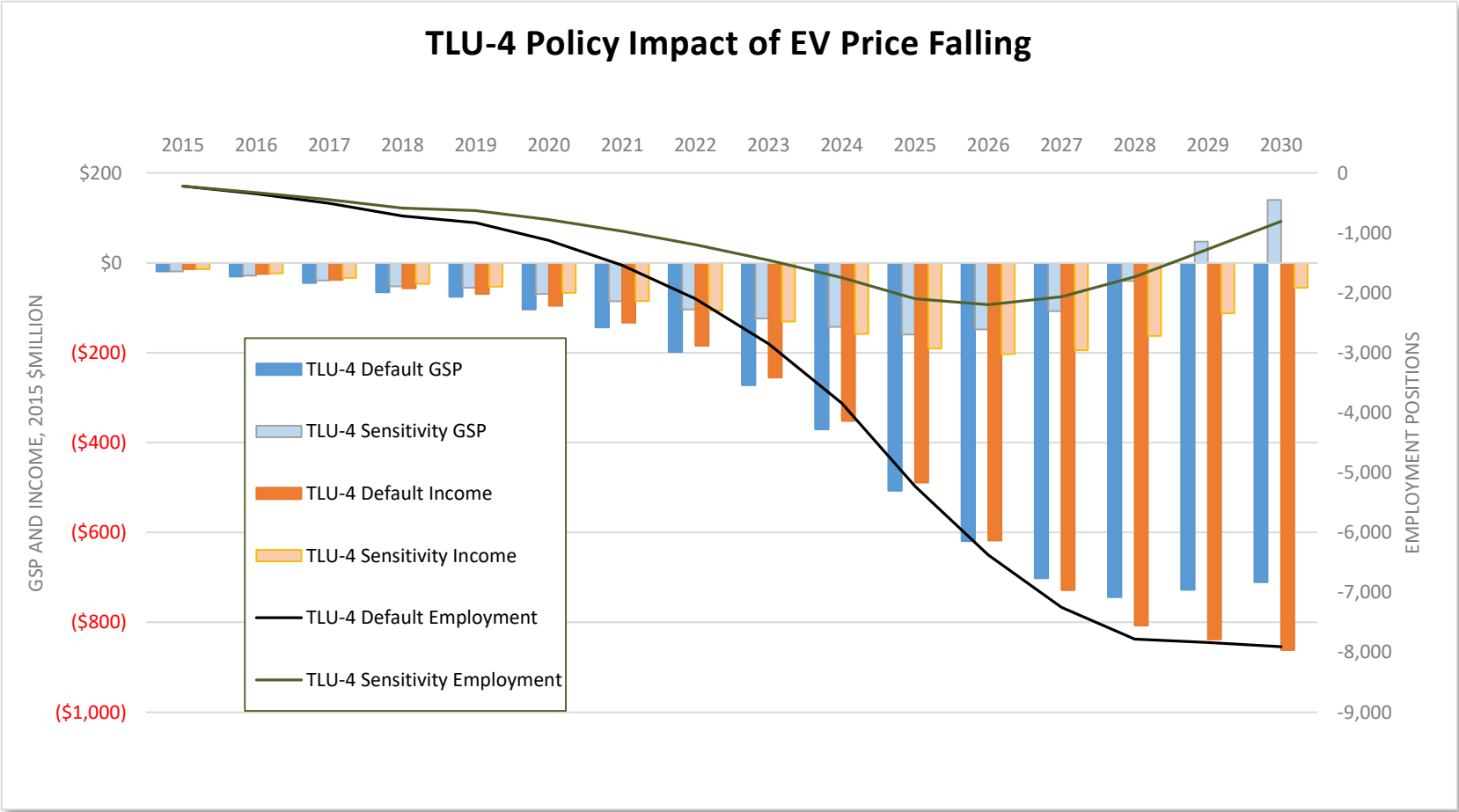
ES Policies Macroeconomic Impacts of Raising ES-1 Target to 50%



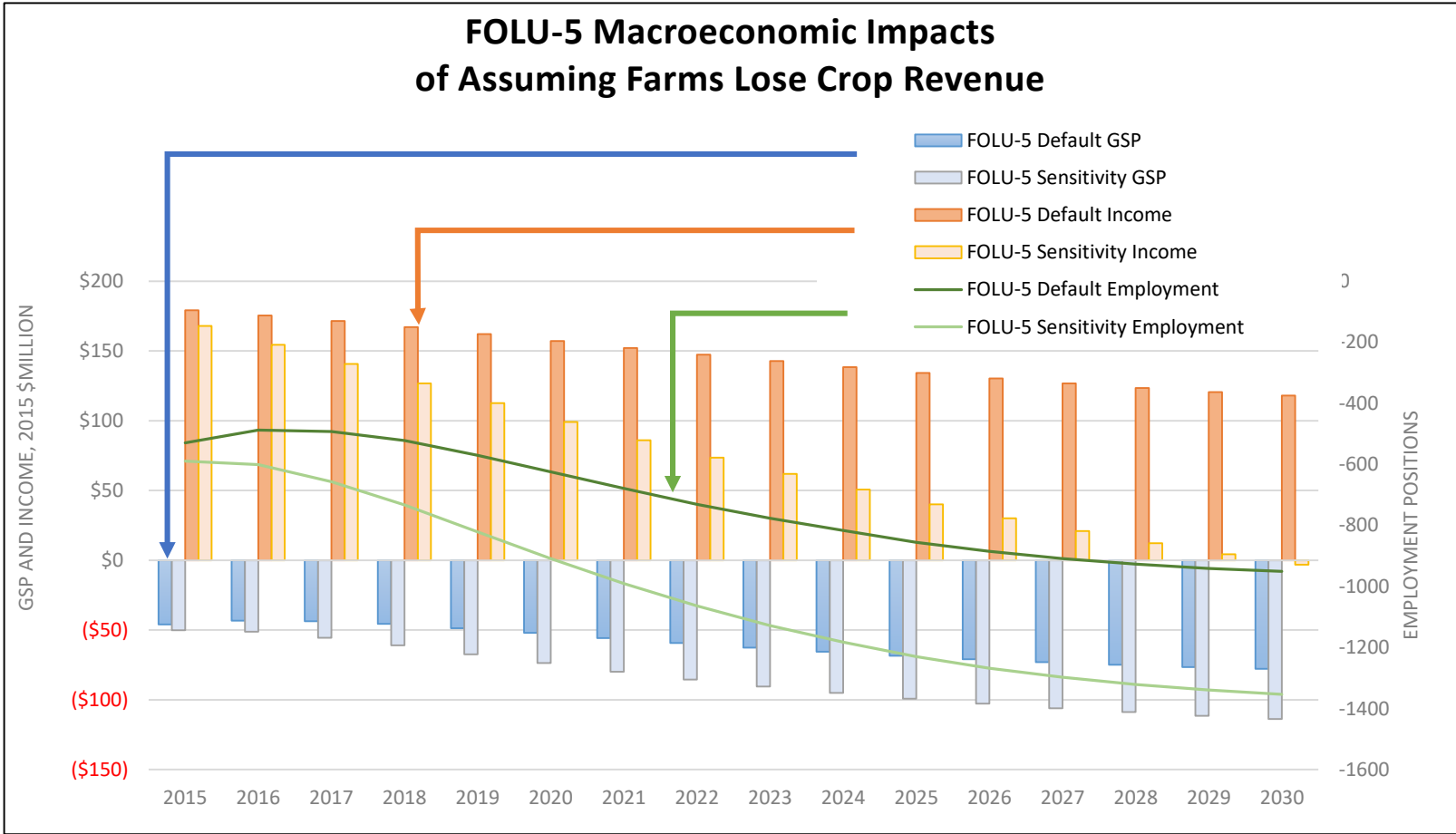
Transit Expansion: Comparing Capital-Cost Assumptions



Electric Vehicles: Comparing High vs. Low Vehicle Price Assumptions



Conservation Easements



Pennsylvania: Policies Analyzed

High-Performance Buildings (HPB)

Act 129 (Direct employment to promote efficiency)

Heavy-Duty Truck Efficiency

ReLight Lighting Efficiency

Coalbed Methane Capture

Heating Oil/Fuel Switching

Manufacturing Energy Tech Assistance (META)

Building Code Improvement

Manure Digesters

Geo-Exchange Systems

Urban/Community Forestry

Combined Heat & Power (CHP)

PA 12 policies: Results Overview

Size of Impacts (in 2030)

- Four big-impact policies
- Eight smaller-impact policies
- <50 jobs to >9,000 jobs
- <\$10M to >\$750M GDP impact

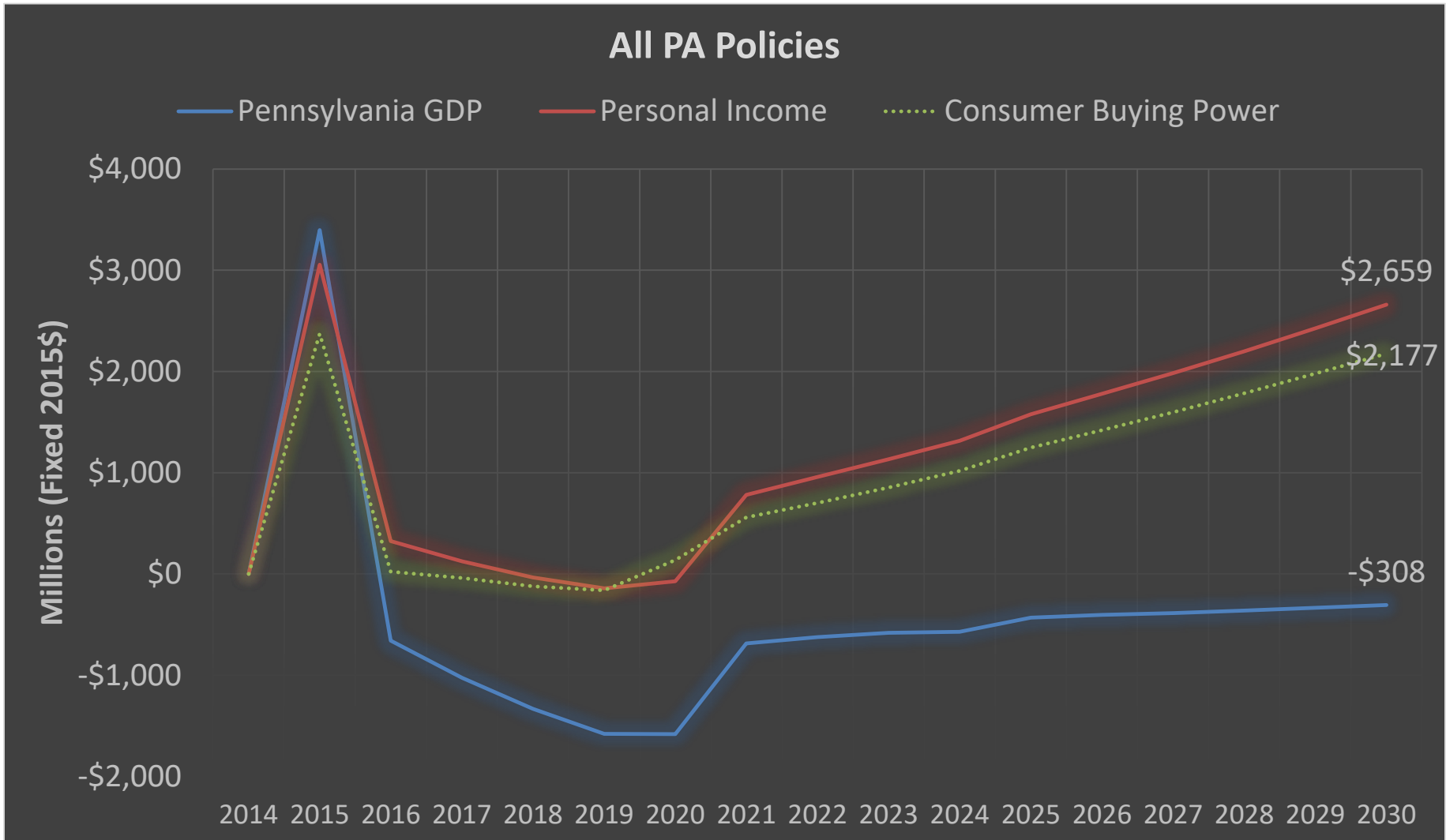
Direction of Impacts

- 10 of 12 policies boost jobs
- 9 of 12 policies boost income
- 4 of 12 policies boost GDP
- Reason: Efficiencies! Cost-effectiveness gains, but energy-industry losses

Scale of Overall Impact:

- Jobs:
 - All policies: 12,500-17,500 gained
- GDP:
 - \$2B to \$3B below BAU combined effect

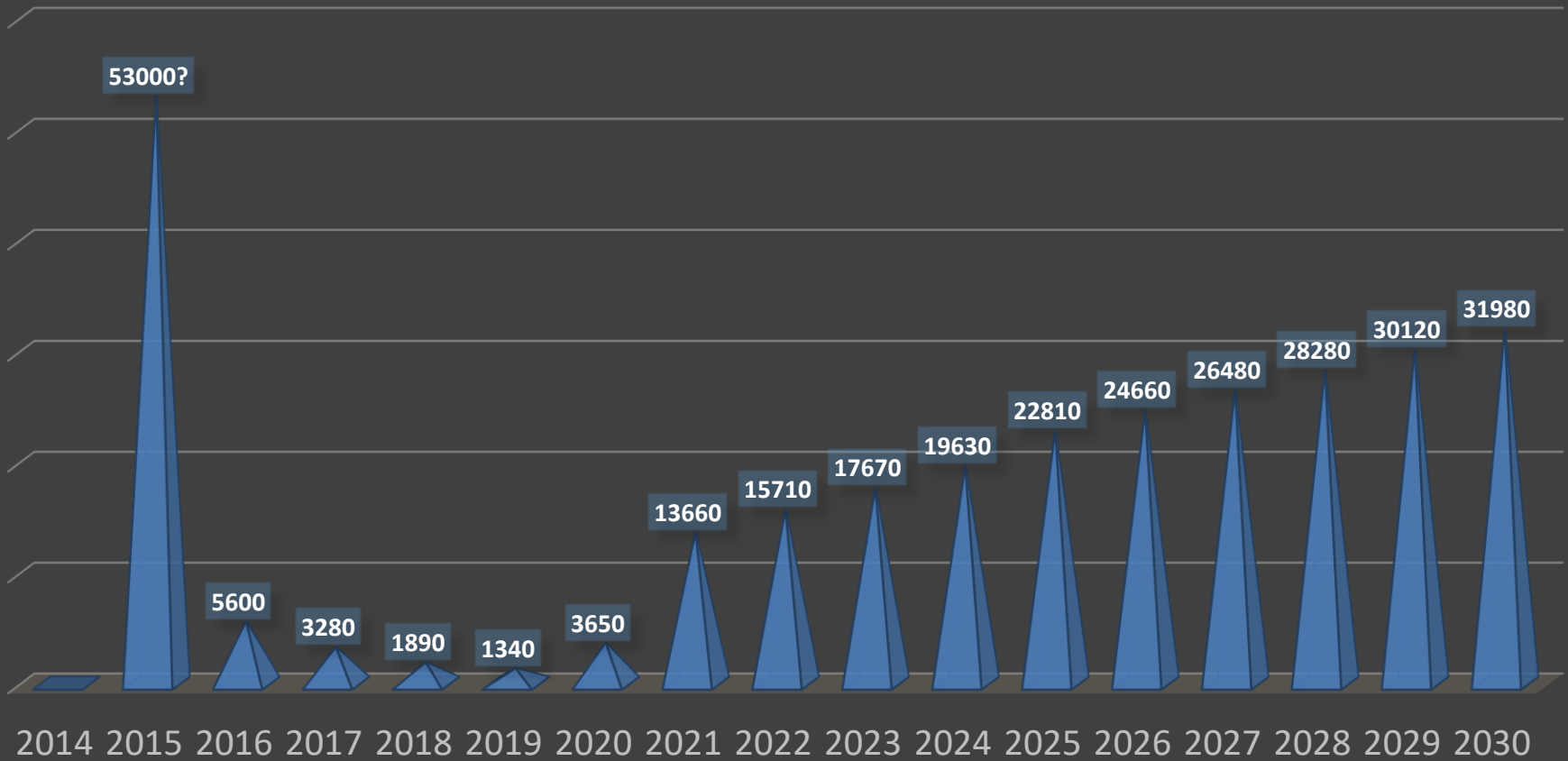
PA Policies: GDP Falls Slightly - But People Are Better Off



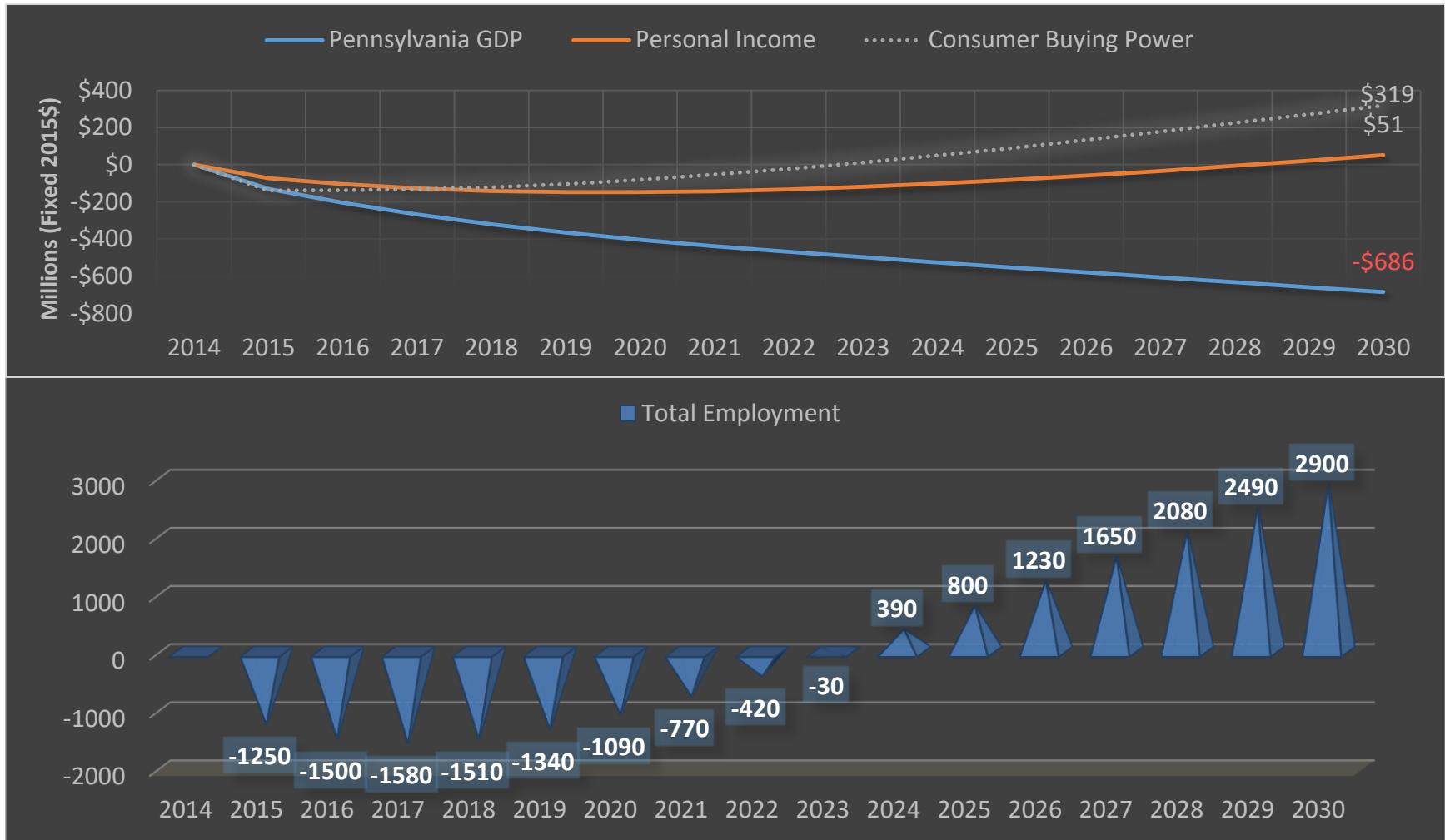
PA Policies: Driving Employment Gains

ALL PA POLICIES

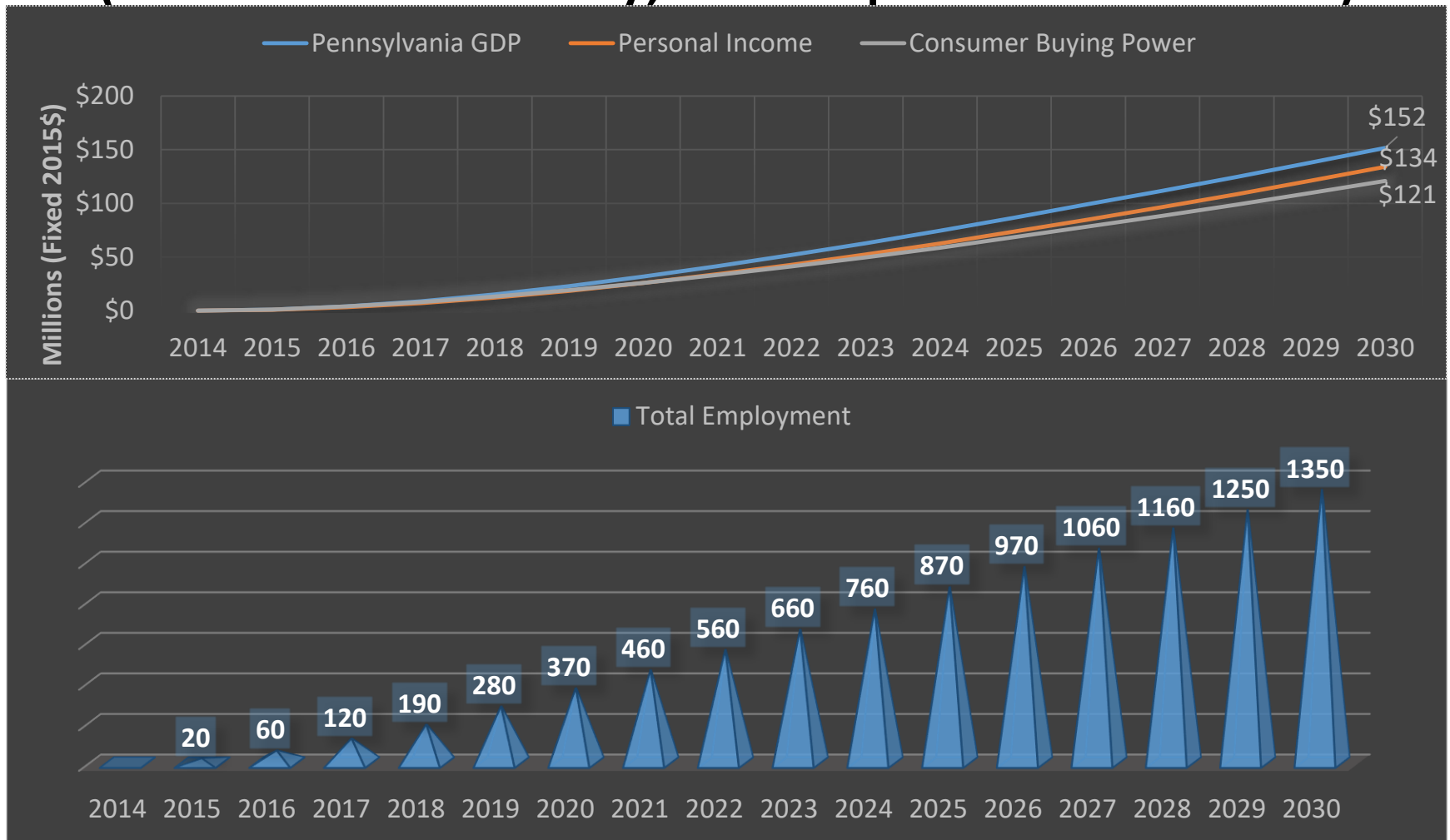
■ Total Employment



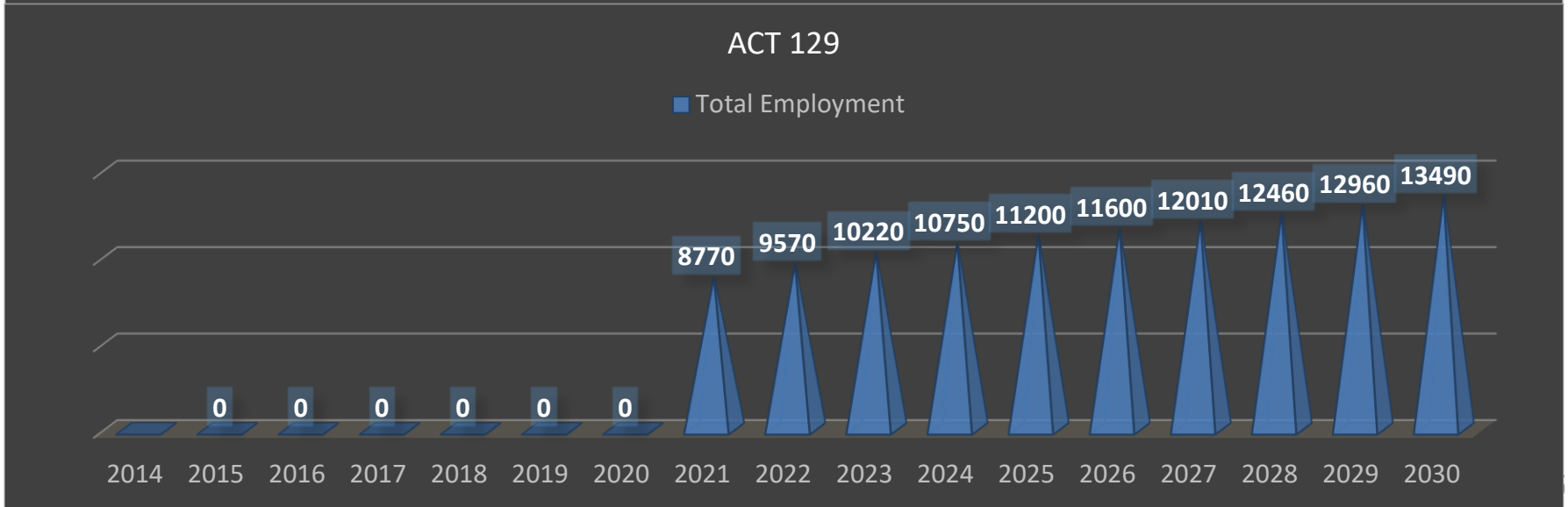
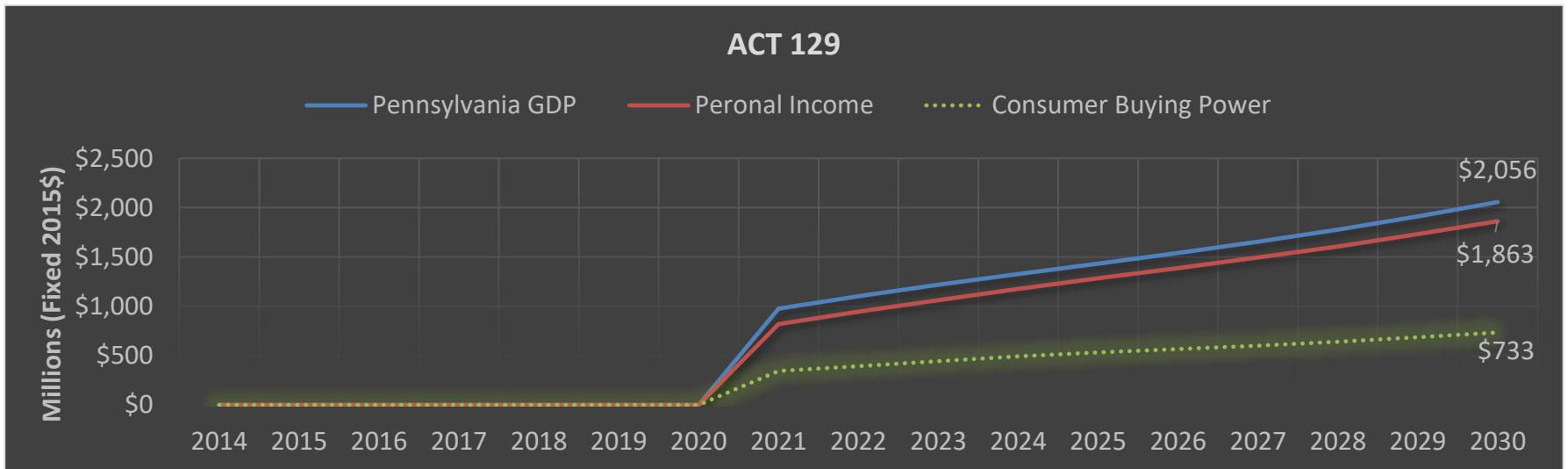
Re-Light PA: Typical Energy-Efficiency Result Pattern (Similar for Building codes, CHP, Geo-exchangers)



Truck Aerodynamics: No Utility Trade-off (unlike electricity, PA imports its diesel)



“Act 129” – Utility Tax Funds Direct Hiring



Economic Losers: Why the Losses?

- PA's Manufacturing Energy Technical Assistance Program
 - Small benefits overwhelmed by displacement of government spending to fund the effort
- PA's Urban & Community Forestry
 - Utility-sector GDP and job losses pull economic activity down
 - Spending by governments goes to sectors that don't drive enough indirect growth to match losses
 - Ironically, plan to use volunteer labor reduces program cost but also eliminates benefit of direct hiring, resulting consumption gains

Key Caveats & Uncertainties

Many assumptions (infinite, really) drive these results, but a few are salient and especially worth sensitivity testing:

- Costs and prices – especially relative within policy
 - Price of financing major expenditures is another variable
- Policy *effectiveness* – will a small effort really yield big results?
 - Do projected economic gains depend on unrealistic policy impacts?
- Sources of funds/financing, and payback requirements
- Political risk around controversial policies
 - Policy effectiveness vulnerable
 - Policy termination, reversal, change

Next Frontier: Refined (2nd order) GHG Analysis

Policies that change the economy also change the following:

- energy consumption
- Scale of activities in energy-intensive sectors
- Consumption of goods and services, which require energy

Policies indirectly drive changes in emissions!

Policies that drive contraction of the economy, however, likely drive down emissions

Goal: Understand responsive emissions change due to the policy-driven economic impact.

Q&A, and Thank You!

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