



**pennsylvania**  
DEPARTMENT OF ENVIRONMENTAL  
PROTECTION

# Macroeconomic Impacts Analysis: PA DEP Climate Change Work Plans

*Presented to Pennsylvania Department of Environmental  
Protection*

*November 3, 2015*

*Presenters: Scott Williamson & Tom Peterson*

*Center for Climate Strategies*



THE CENTER FOR  
**CLIMATE STRATEGIES**

# Overview

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

- Measure changes to major indicators of economic health
- GDP, Jobs, Incomes

## Starting Point: Existing Analysis of *Direct* Policy impacts

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

## Discussion of Results & Optimizing Economic Impacts

# Policies Analyzed

High-Performance  
Buildings (HPB)

Act 129

Heavy-Duty Truck  
Efficiency

ReLight PA

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)

# Methodology: Overview of Steps

- ID all spending/price changes expected *as a result of policy*
- Ascertain the who's:
  - *Who* will spend this money? *Who* will receive it?
- Determine Key Characteristics:
  - Is this a change in demand for something, or change in its price?
  - What is the timing of the spending?
  - Is there any financing/spreading of costs over time?
- Determine Induced Changes:
  - If someone spends more in this scenario, what must they cut back?
  - If someone saves in this scenario, what is done with the extra \$?
- Run through REMI PI+ software, analyze & present results

# Results!

## 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
- But only 4 of 12 policies boost GDP
- Reason: Efficiencies!  
Production costs down, disposable incomes up

## Scale of Overall Impact:

- Jobs:
  - 4C group of options: 10,000-15,000 gained
  - All 12 options: 12,500-17,500 gained
- GDP:
  - \$2B to \$3B below BAU in both cases
- Integration → Refined Results

# Spotlight on High Performance Buildings Policy

## Households:

Spend more on construction and appliances

(Less \$ available for other consumer spending)

Spend less on energy

(More \$ freed up for consumer spending)

Net savings to households most years

## Commercial Sector:

Spends more on construction, HVAC equipment

Spends far less on energy

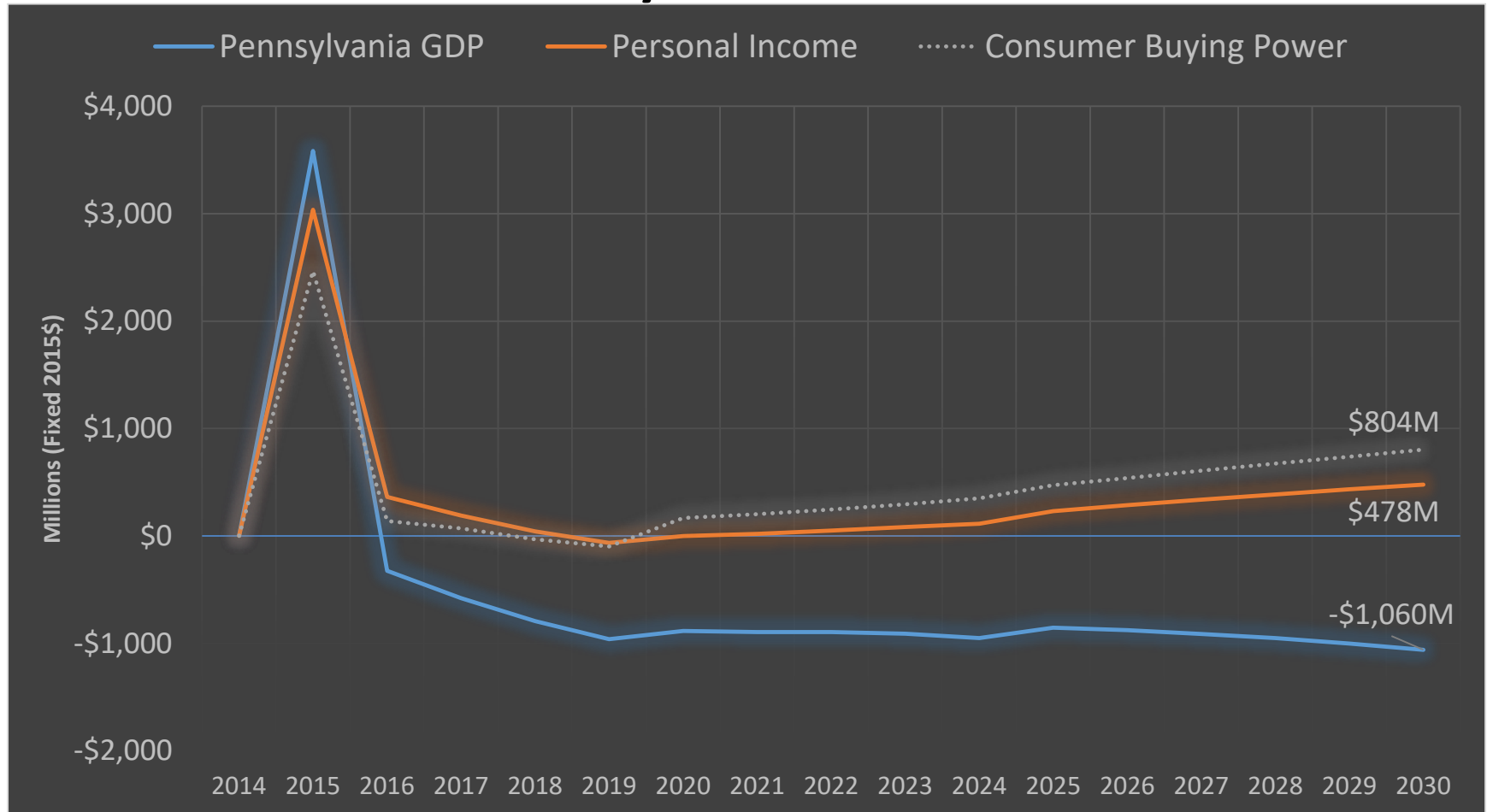
Net savings = lower cost of production

## Financing:

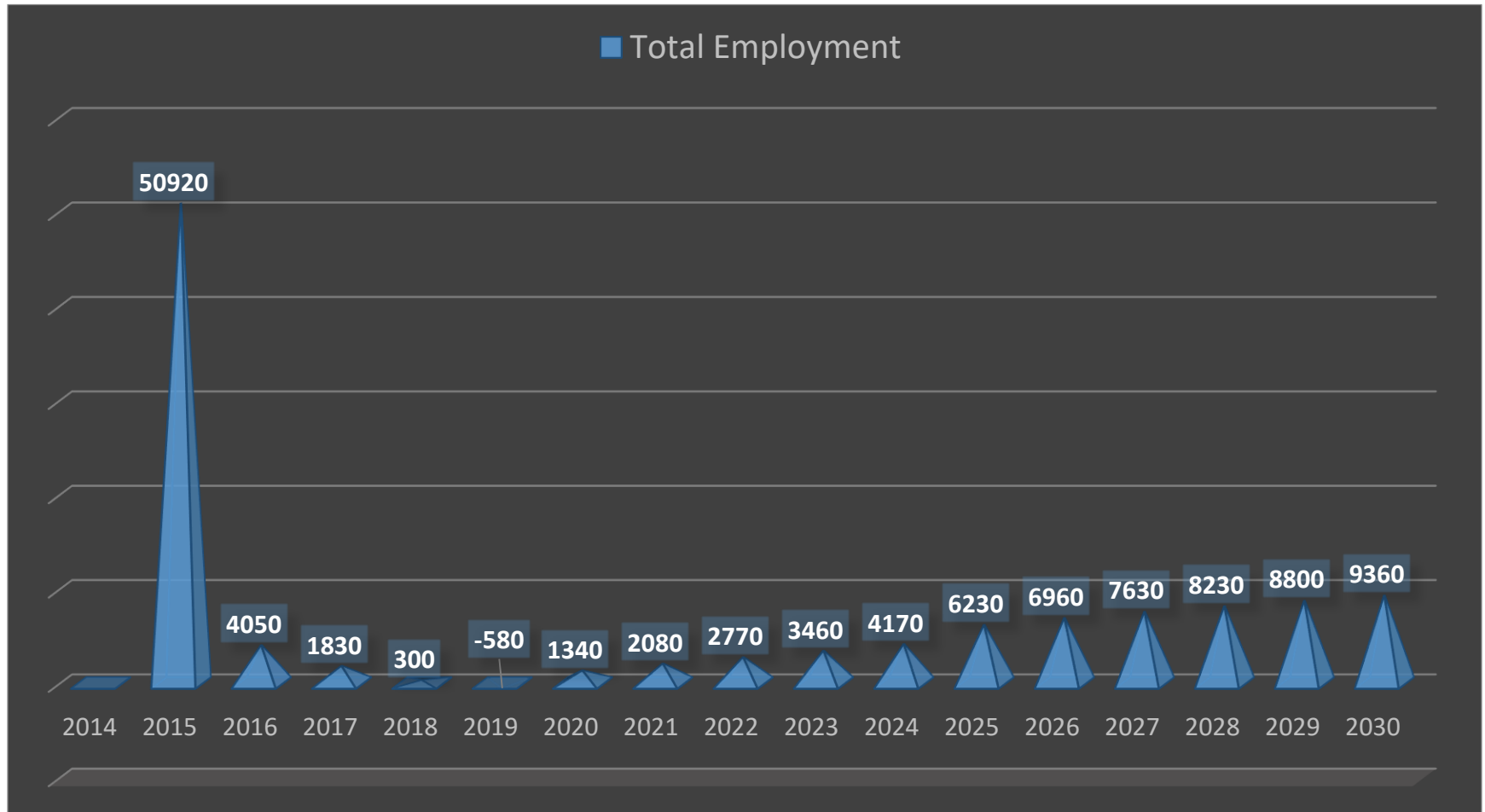
Households: costs absorbed into mortgages/H.E. Loans

Businesses: costs financed over shorter period

# High-Performance Buildings: Key Results

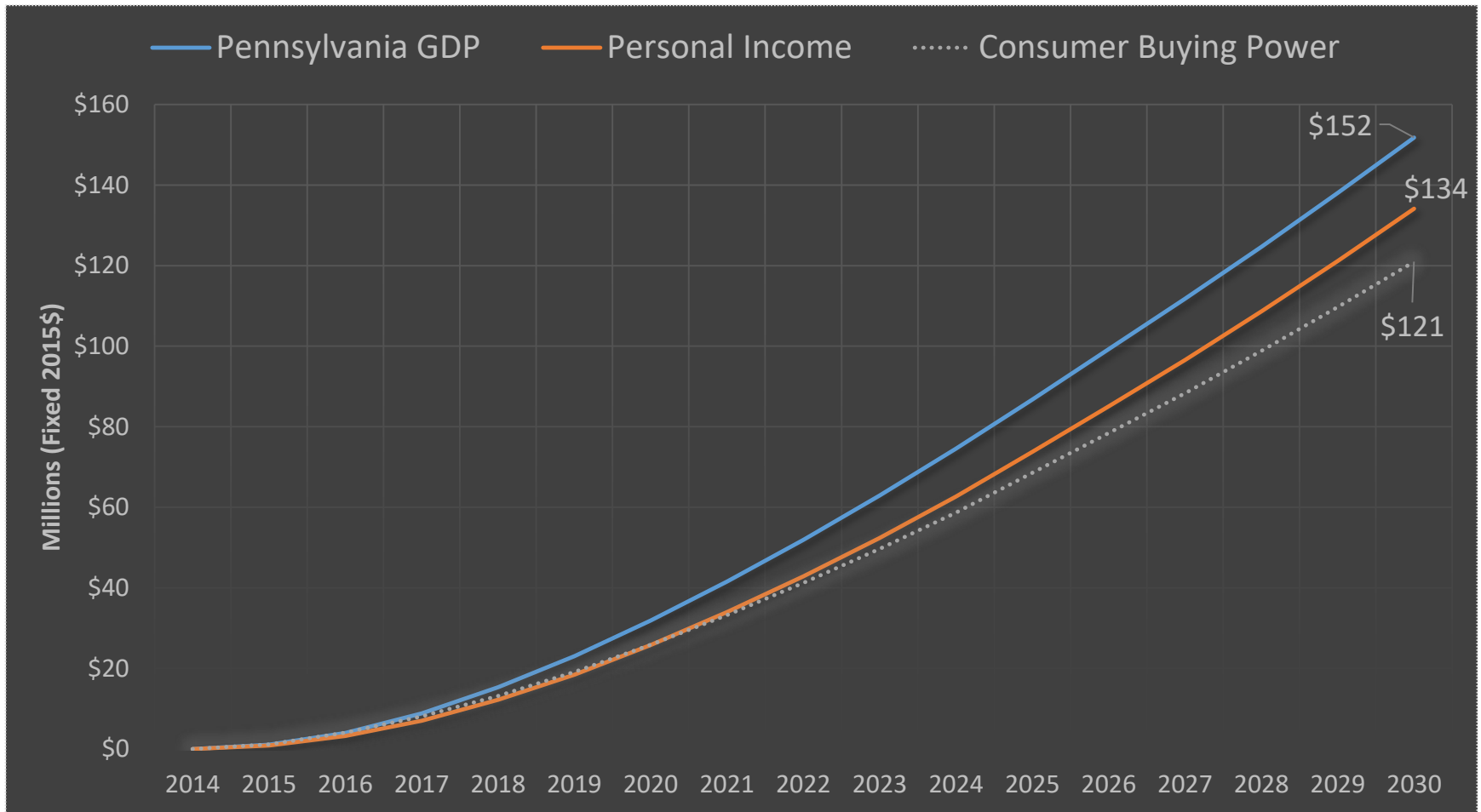


# High-Performance Buildings: Jobs Created

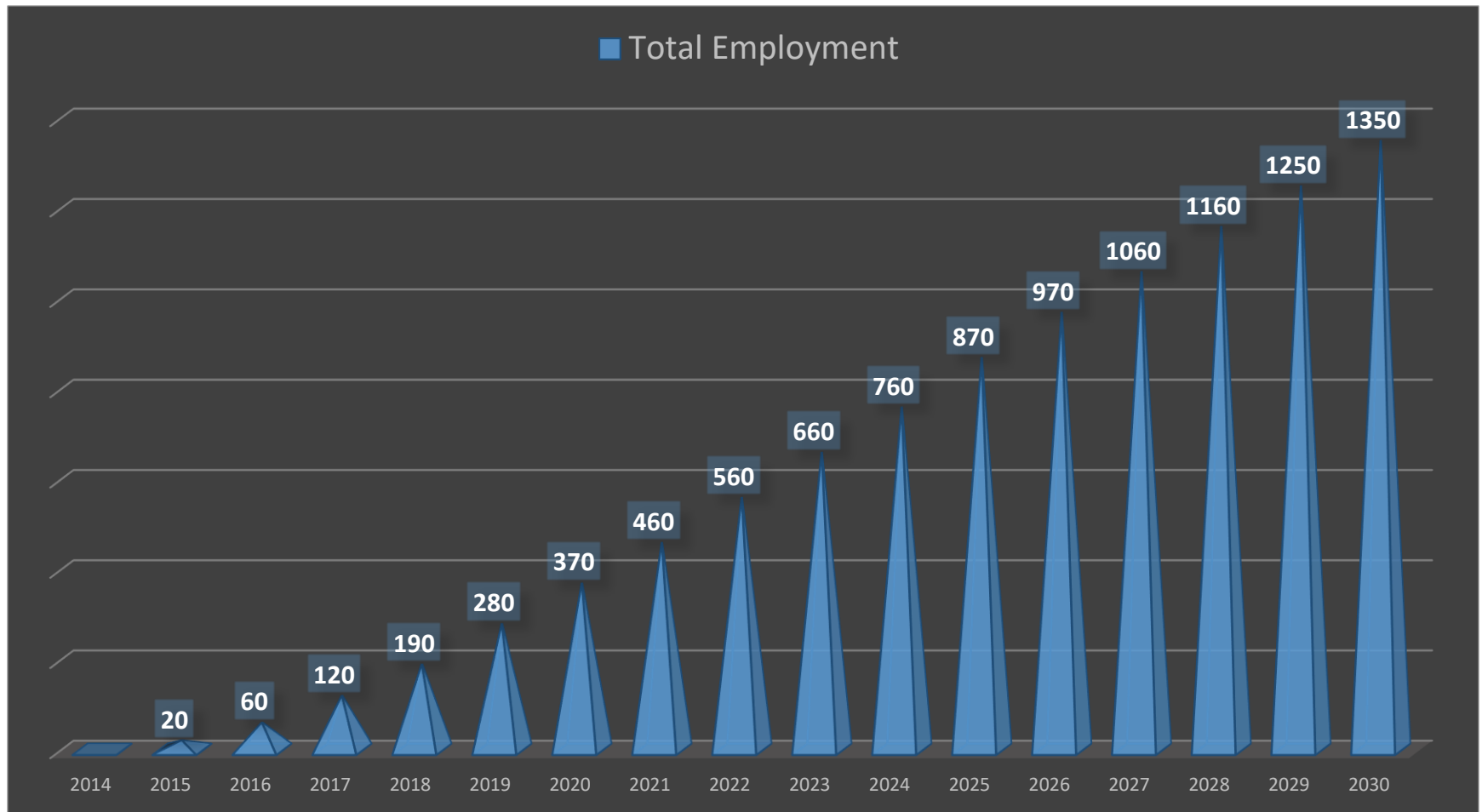




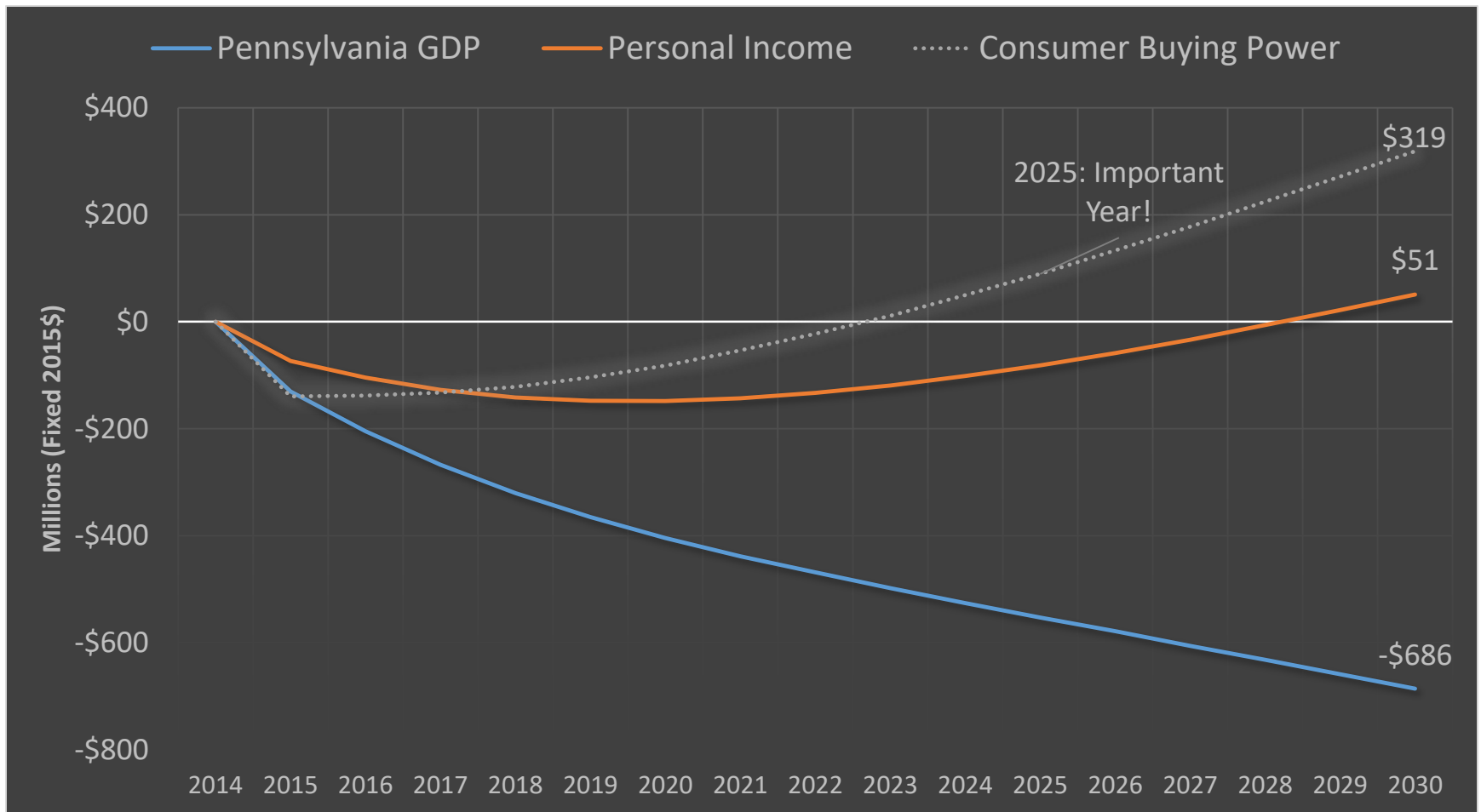
# Heavy-Duty Truck Efficiency: Savings > Costs Every Year



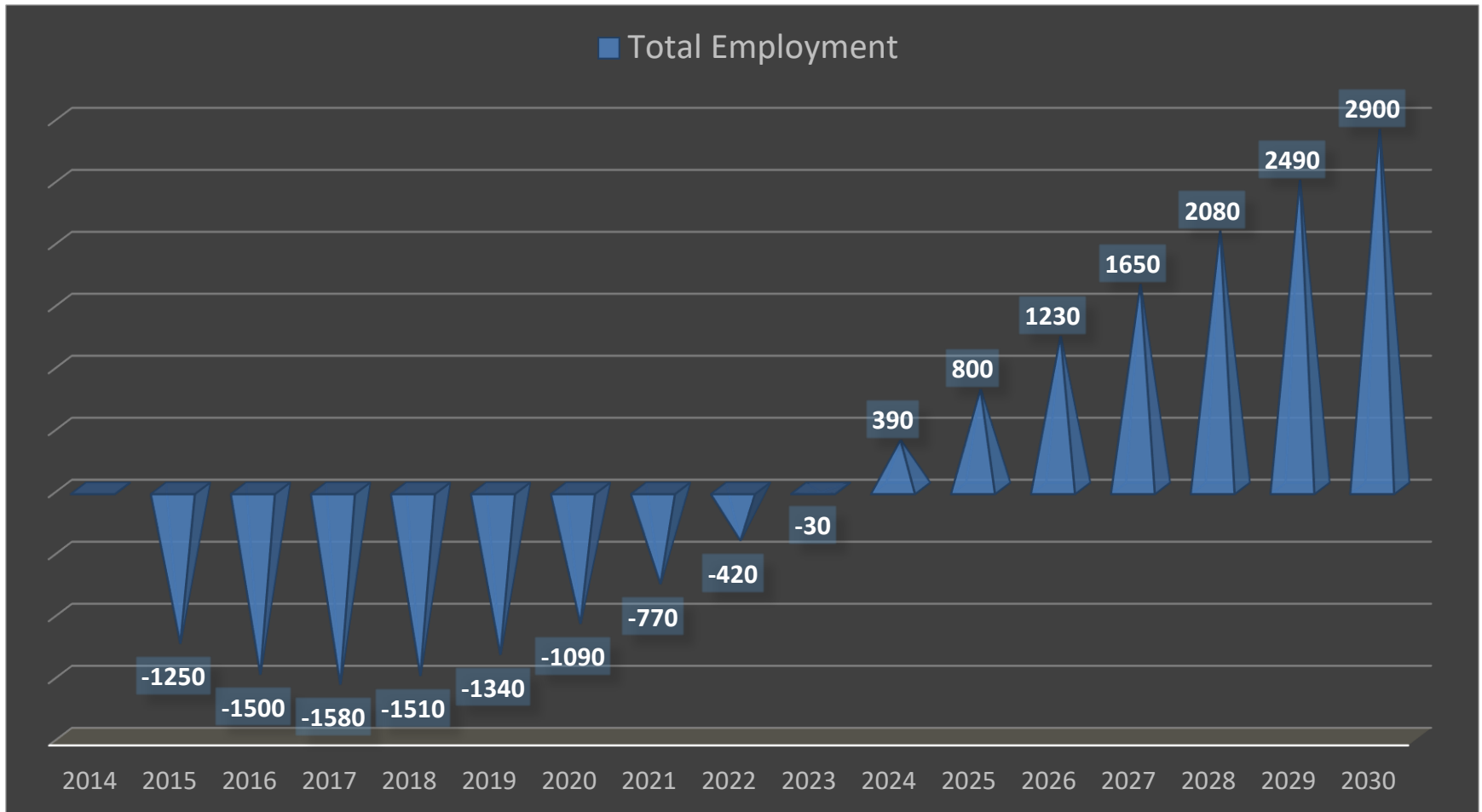
# Heavy-Duty Trucks: Lower Costs = More Activity = More Jobs



# Re-Light PA: Early Equipment Spending Hurts, Energy Savings Catch up



# Re-Light PA: Compliance Costs Burden Employment at Start, Lift Employment Later



# Strategies: Designing Policies to Optimize Economic Impact

1. Cost effective actions increase economic efficiency and expansion

2. Energy savings actions cut energy costs, stimulate labor investment

3. Shifts to indigenous vs. imported energy and resources cut capital outflows

6. Labor intensive activities create more jobs, even if at higher cost (up to a point)

5. New investment from outside sources stimulates labor investment at home

4. Actions supported by local vs. distant supply chains cut job outflows

# Strategies: How to ID Winning Policies?

## Keep Costs Smaller Than Savings

- Return more of surcharges/fees to general public – seek revenue *and* cost neutrality
- Steady investment, rising benefits
- Seek cost reductions, price reductions, operating-cost reductions

## Efficiencies! PA Plans Excel Here

- Lower operating costs
- More money to spend
- Falling utility industry size but overall prosperity growth

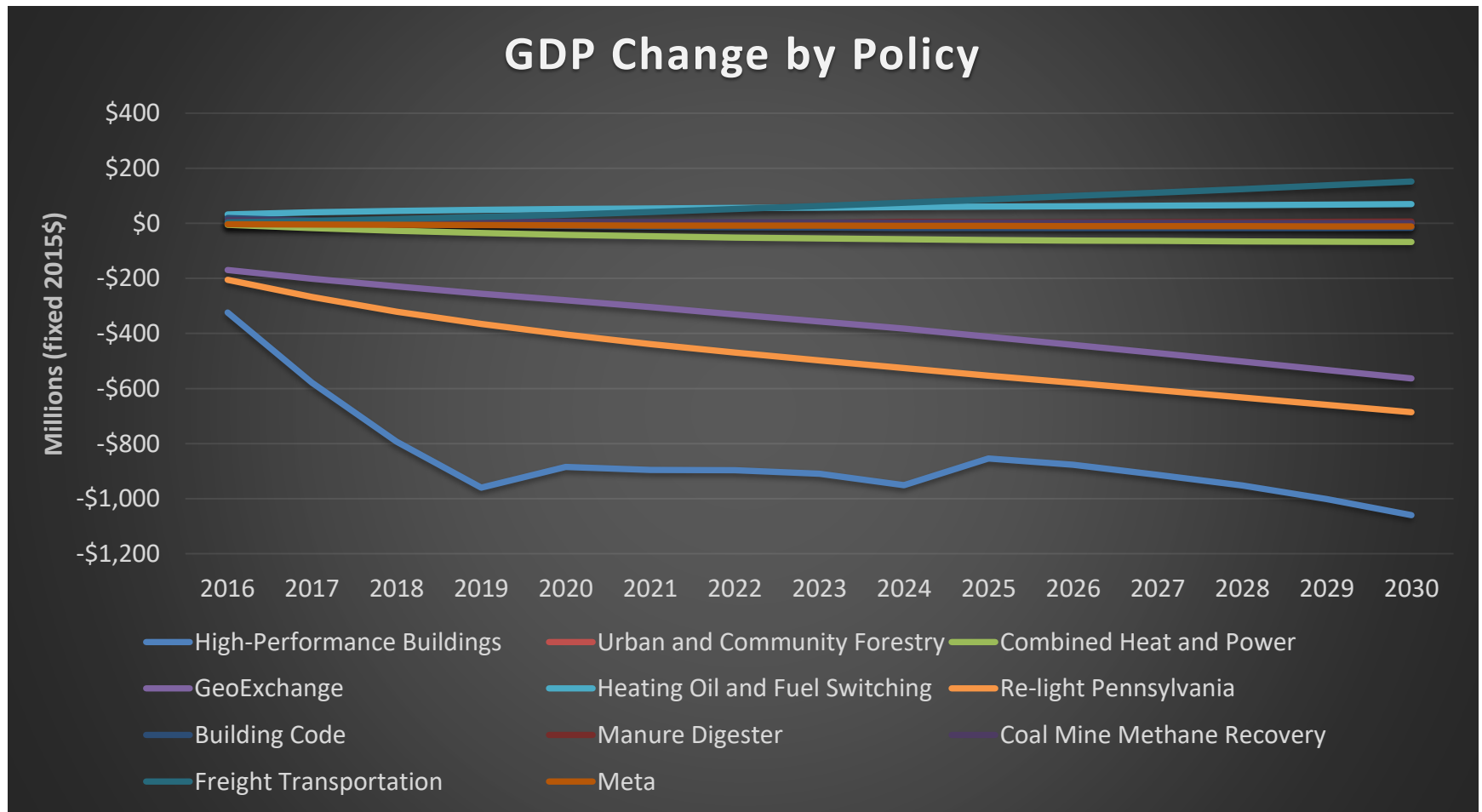
## Mandates for In-State Sourcing

- But: watch for feasibility, increases in cost
- PA Work Plans: trees, parts, equipment, machinery, etc., what can be sourced in-state?

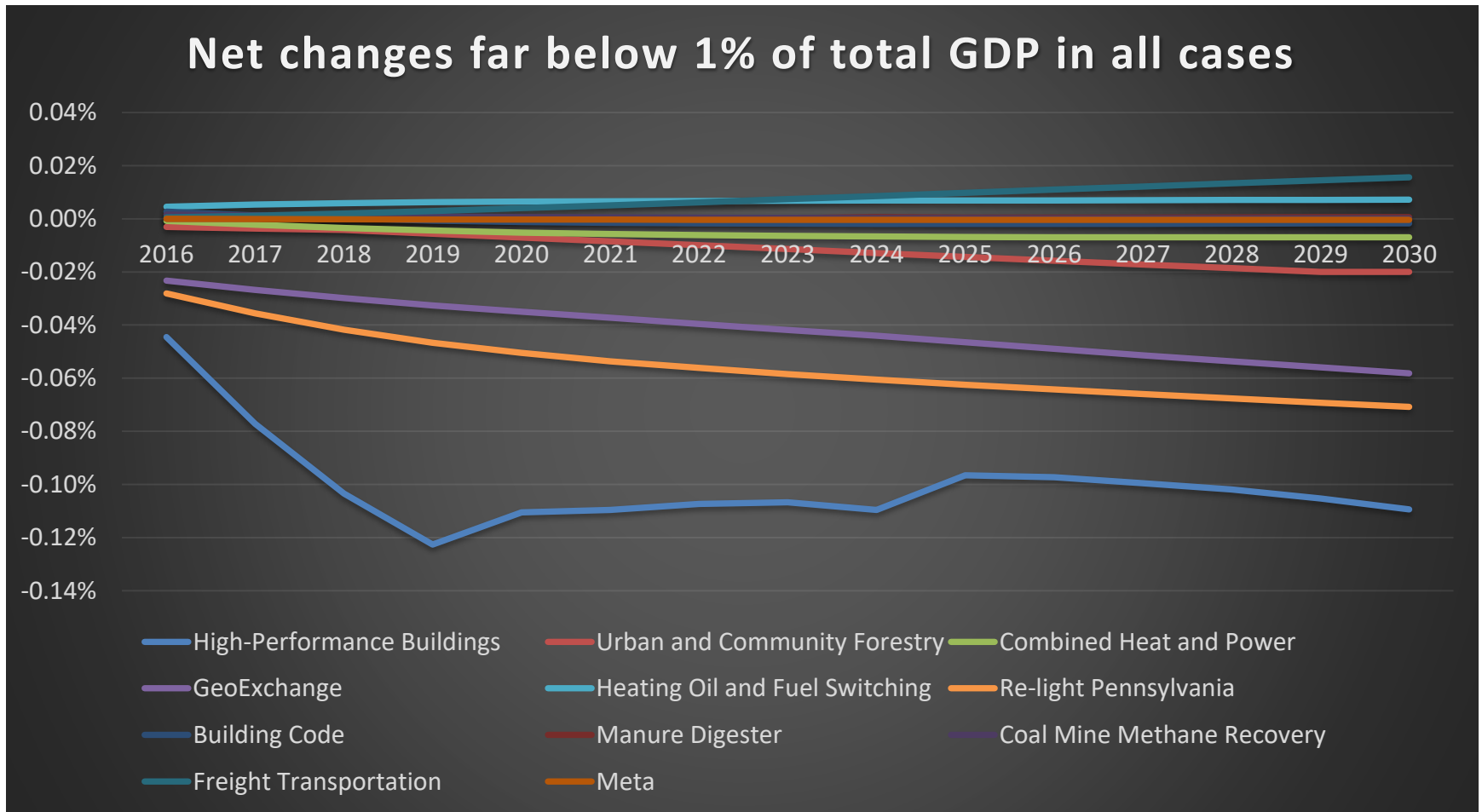
## Macro Optimization Strategy:

- Make this Systematic
- Start early – beginning of policy design
- Iterate analyses *ex ante* to ID impacts, winners, losers

# GDP Change by Policy (Dollars)

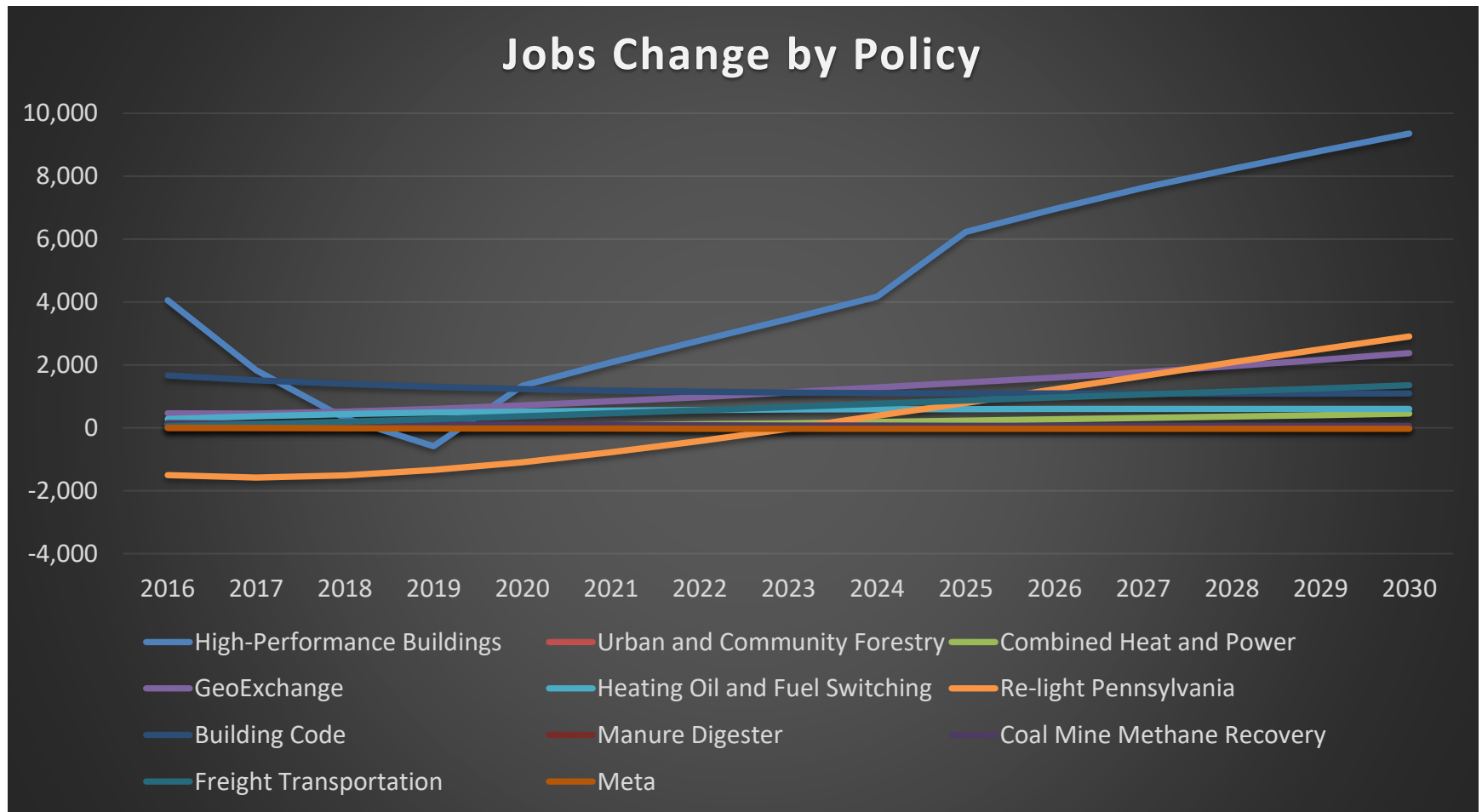


# GDP Changes by Policy (Percent)

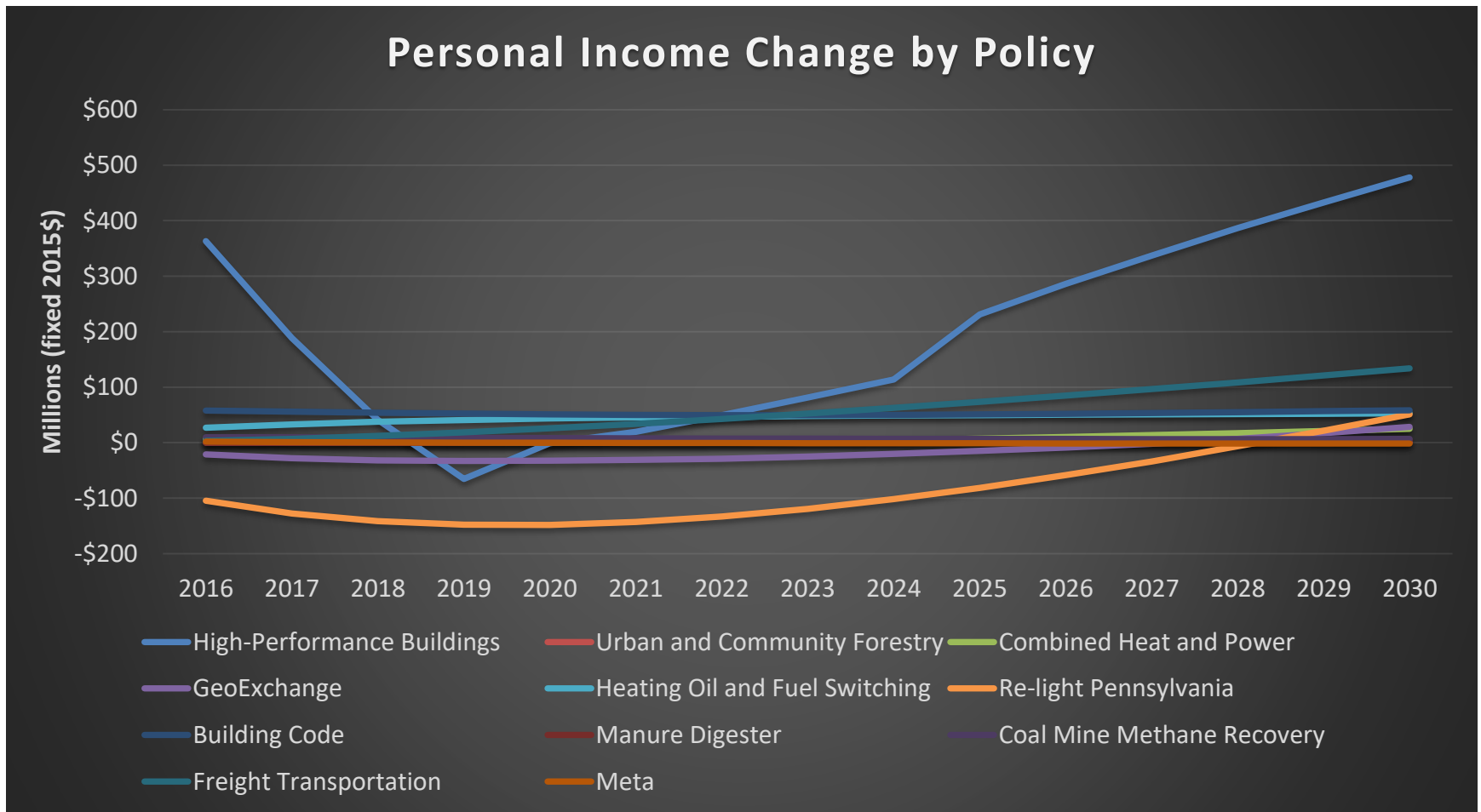




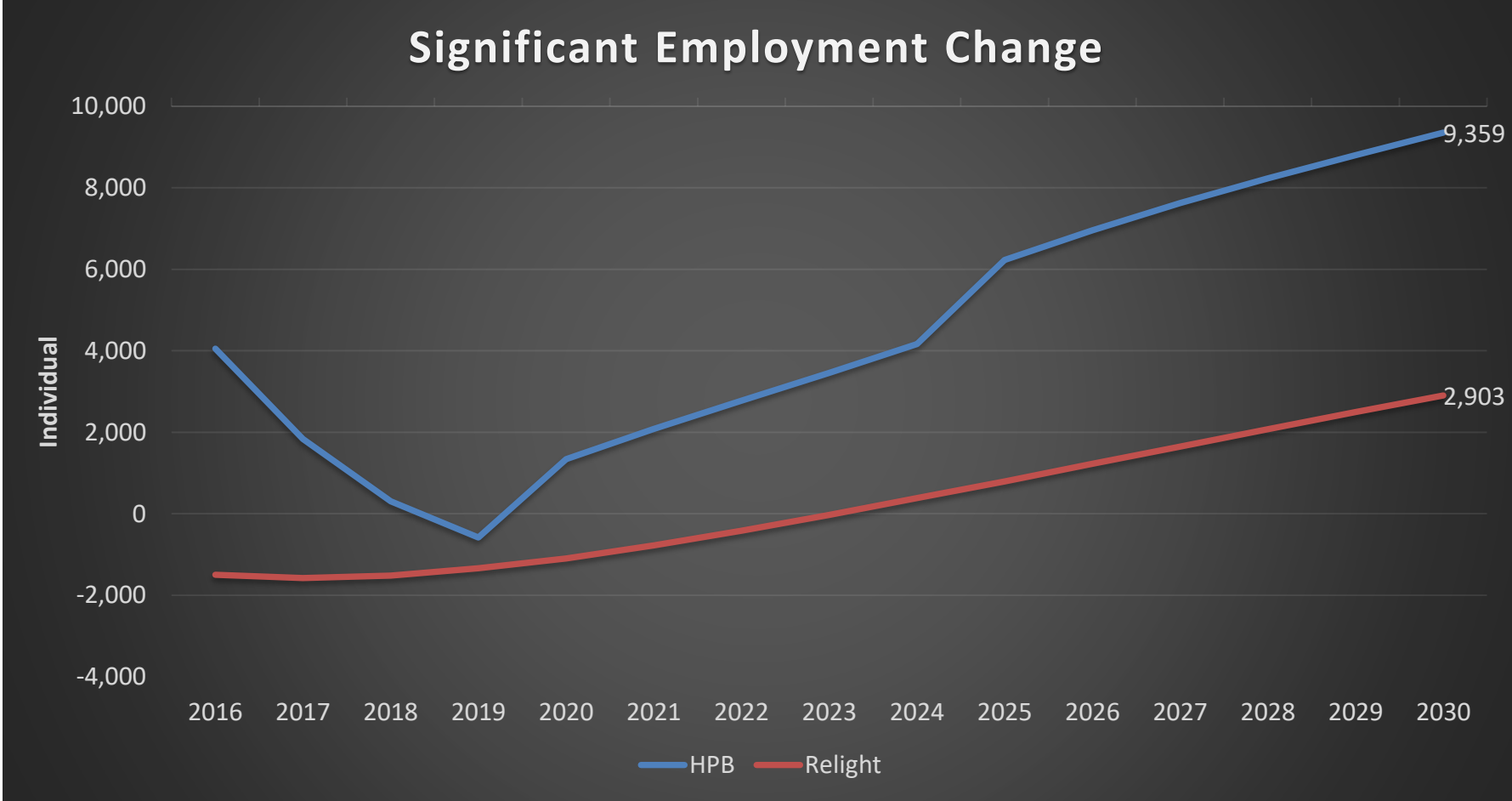
# Jobs change by Policy



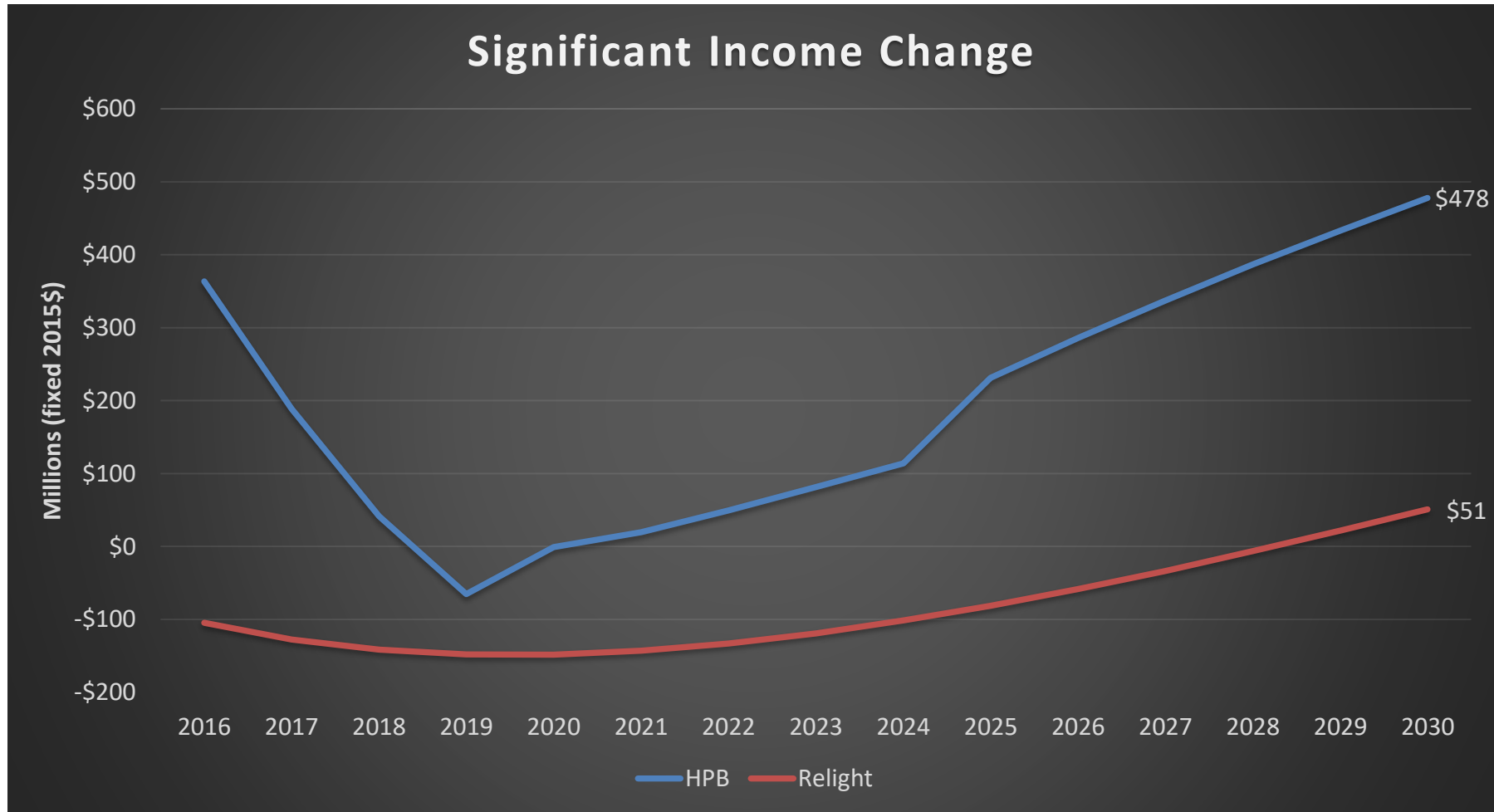
# Personal Income Change by Policy



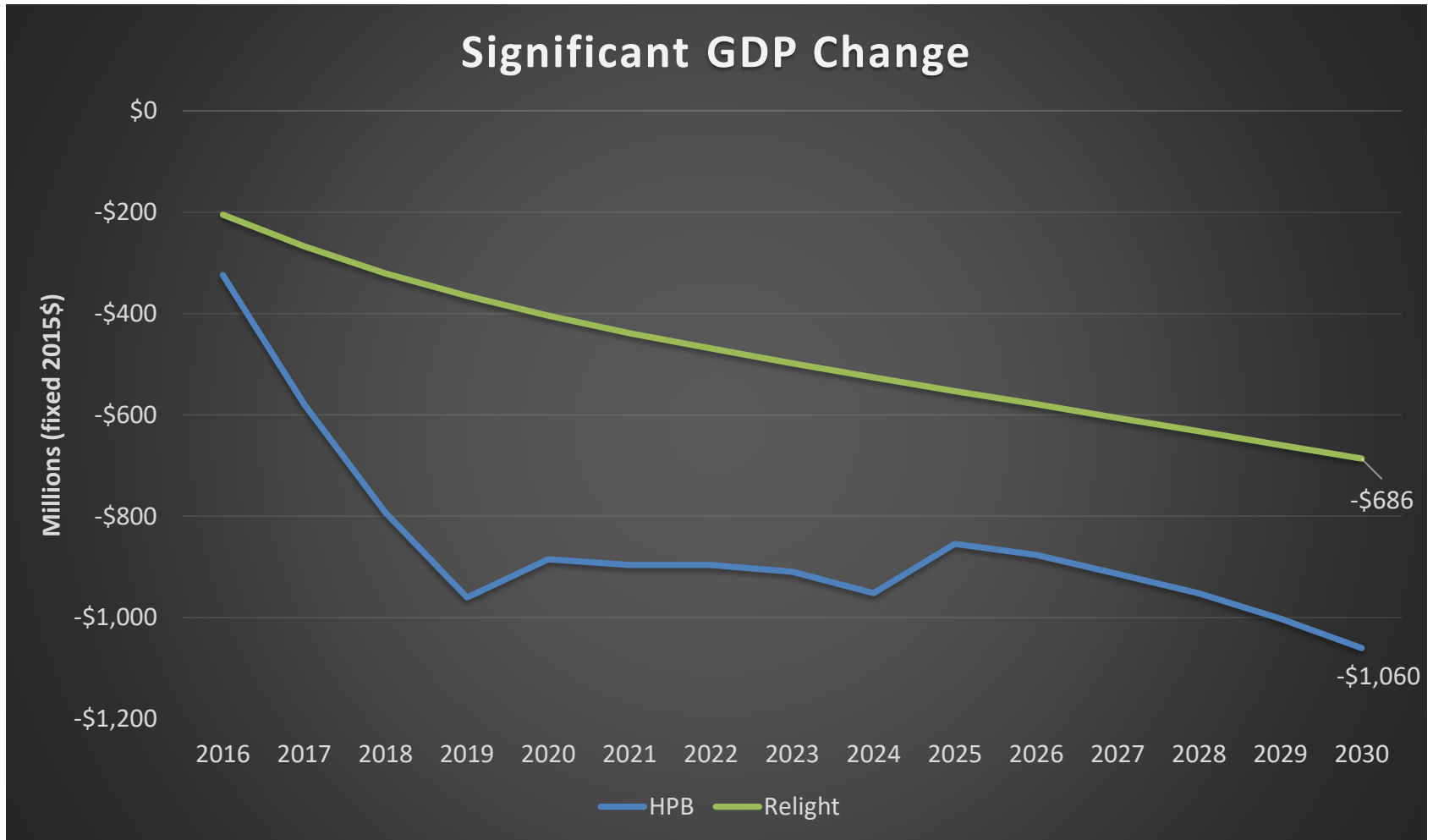
# High-Performance Buildings and ReLight: Big Job Gains



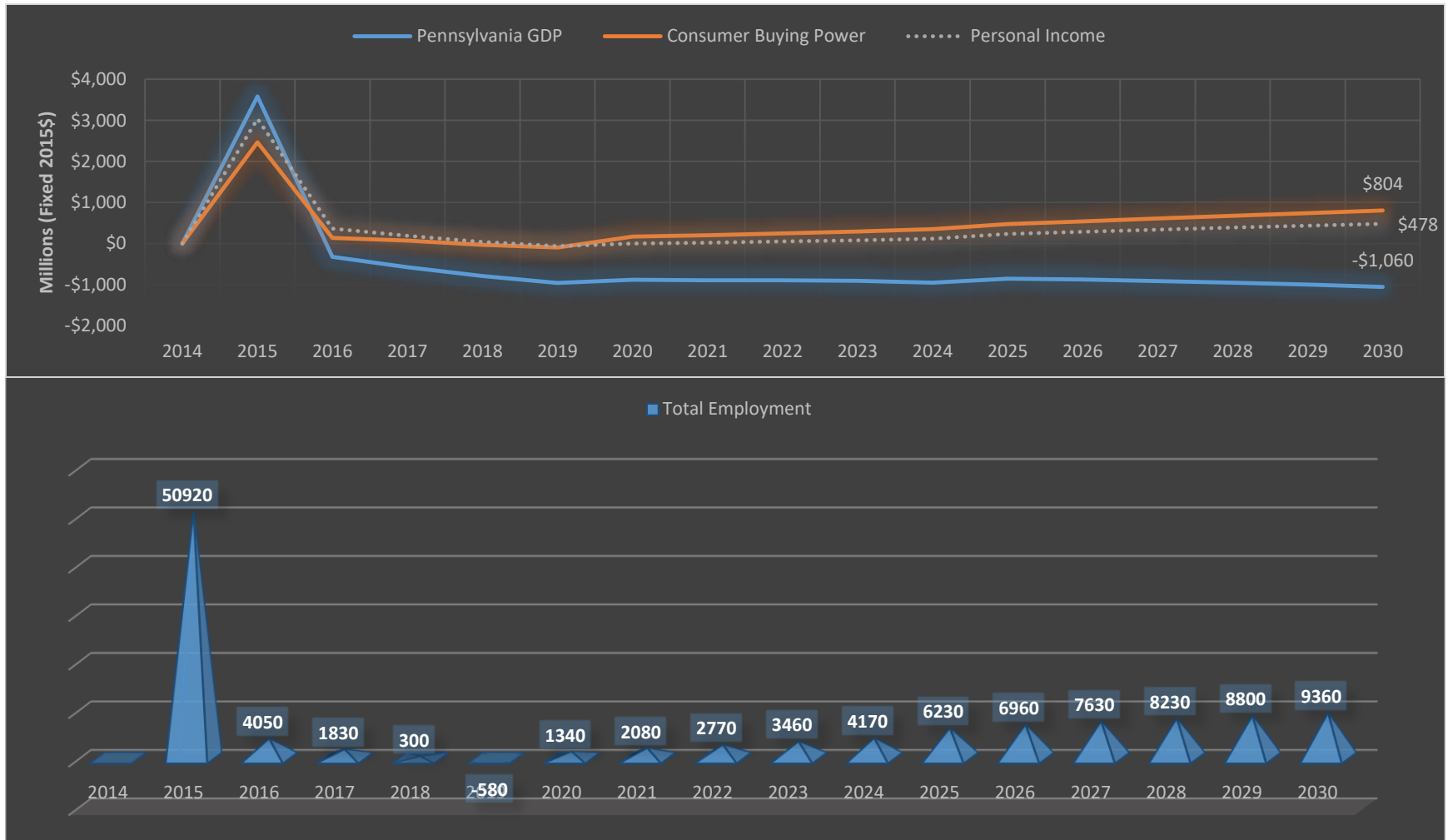
# And Income Gains!



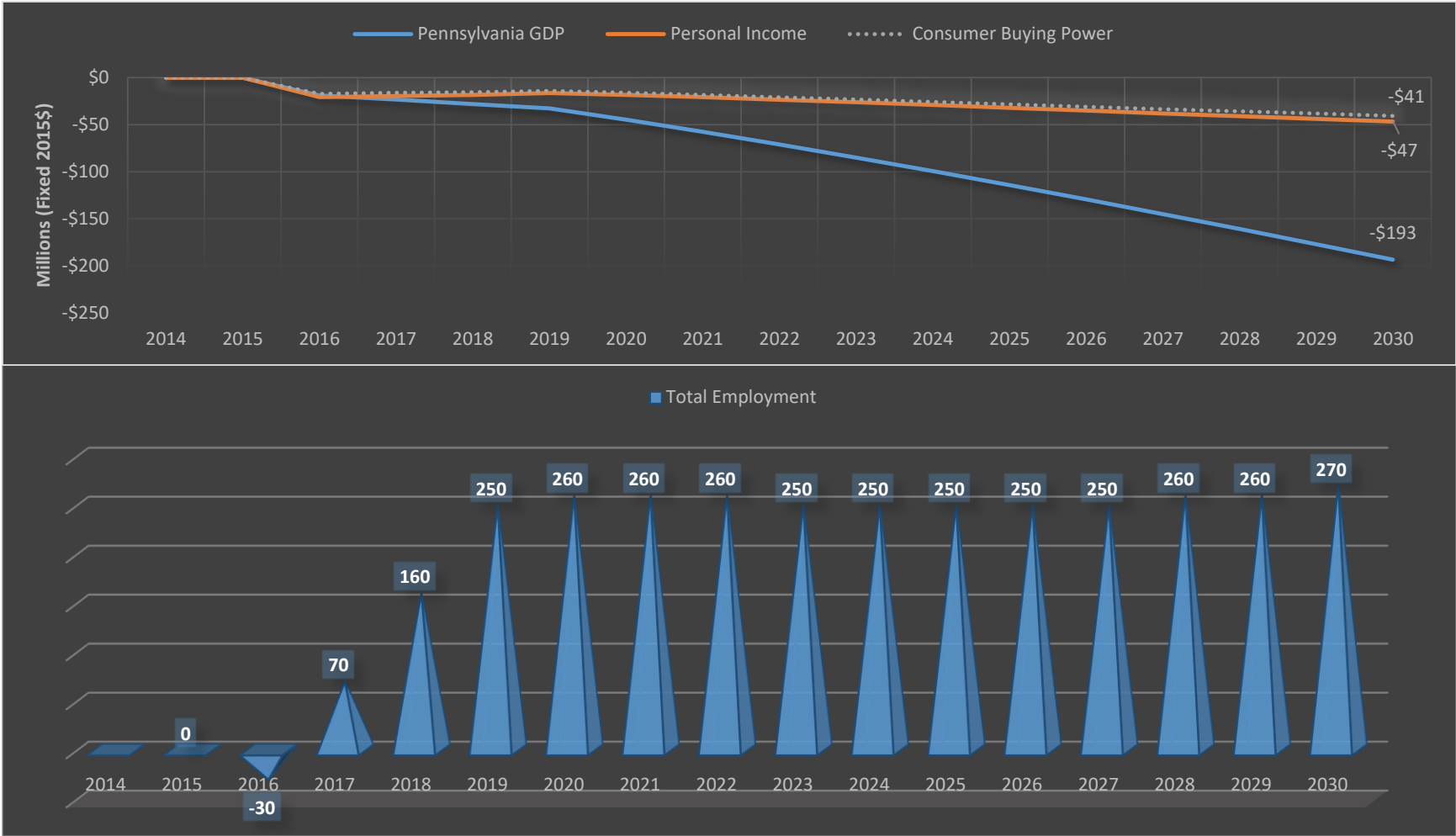
# ...But GDP Reductions



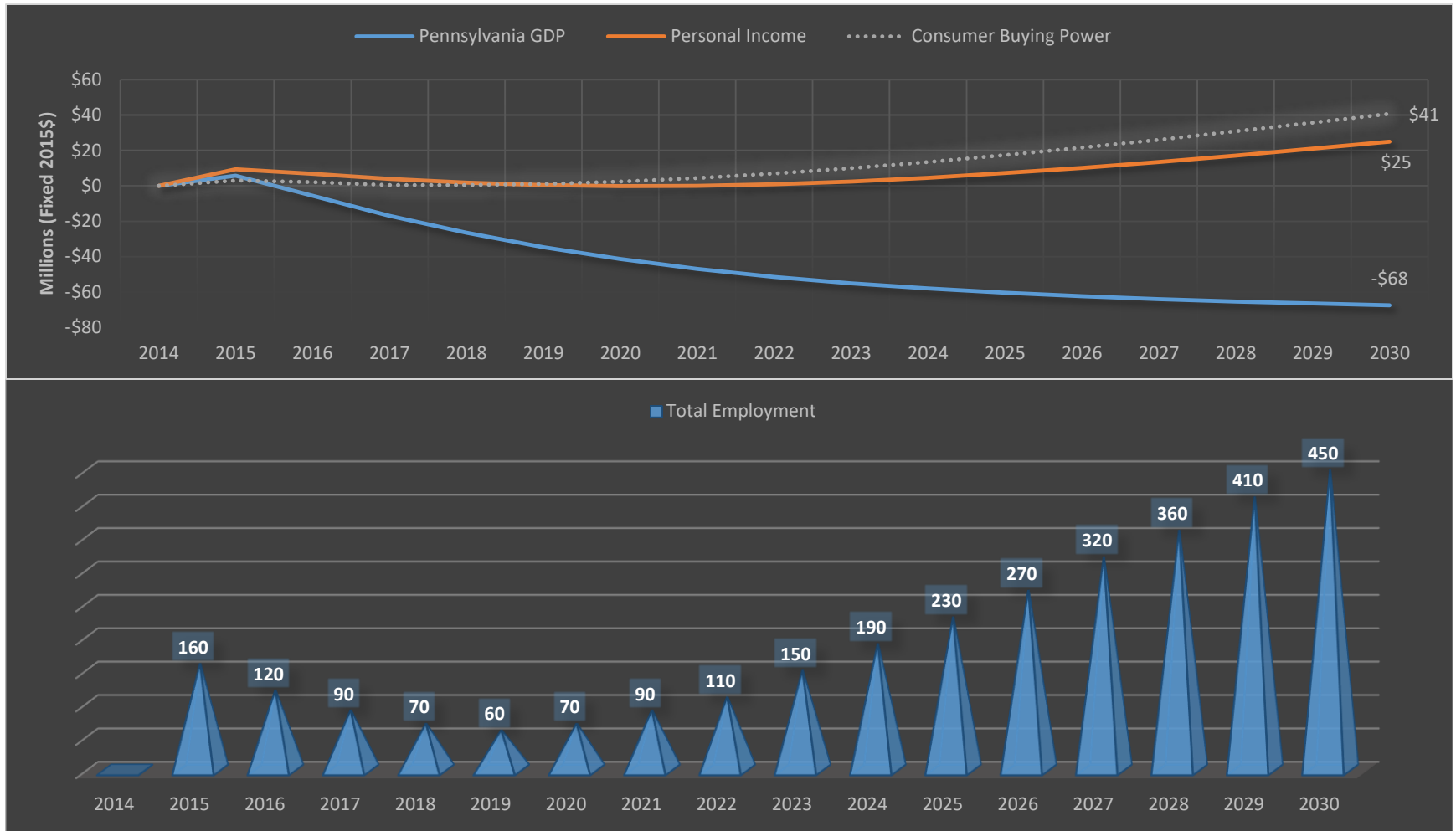
# High Performance Building



# Urban Community Forest

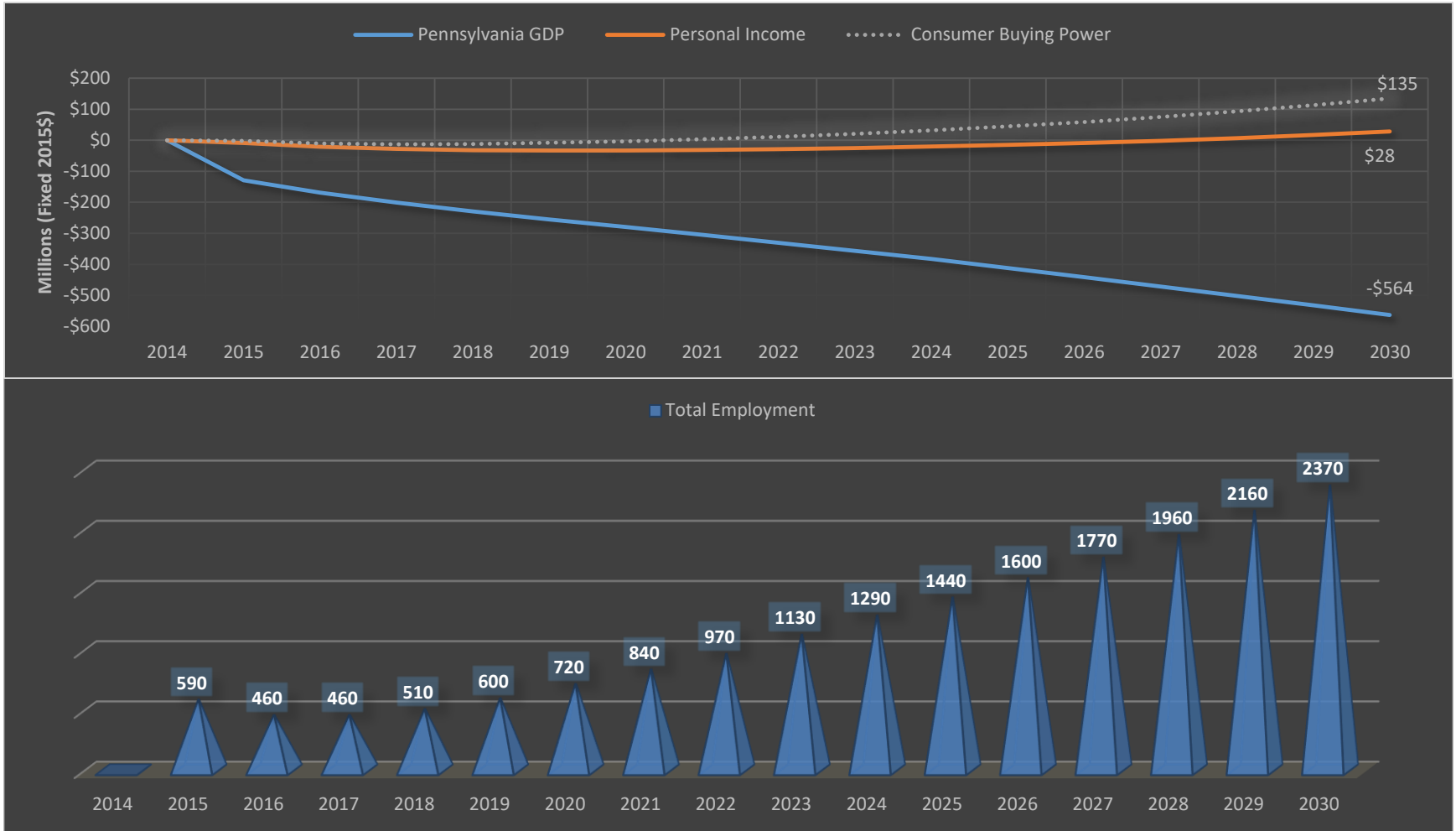


# Combined Heat and Power

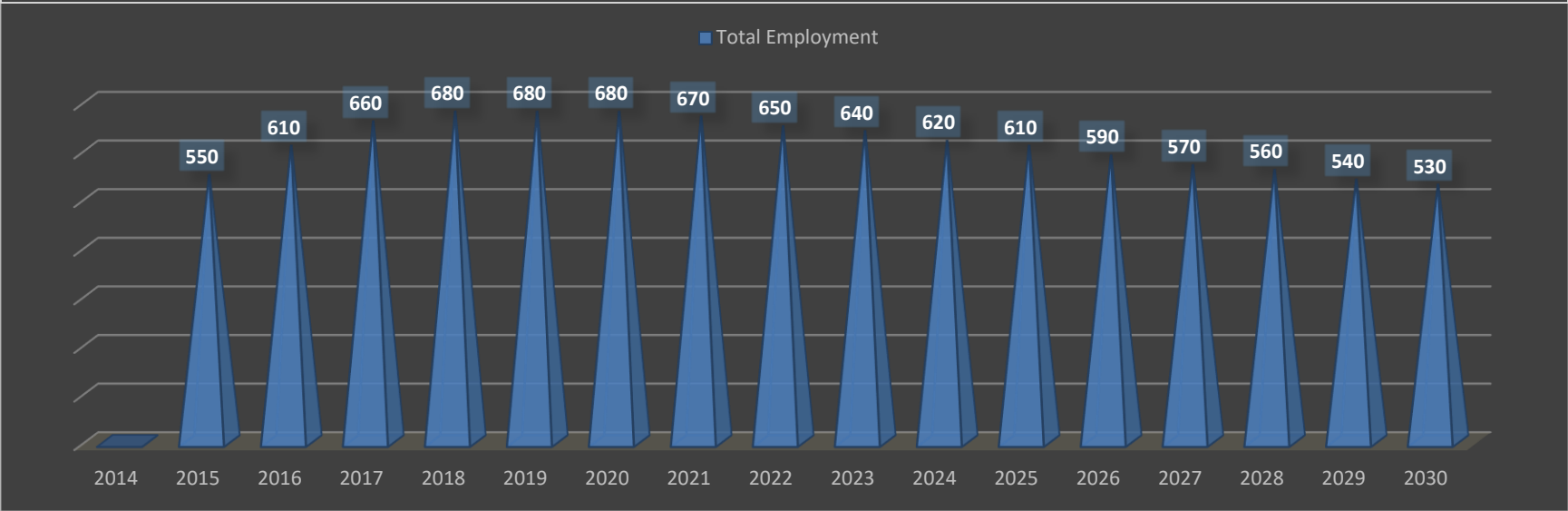
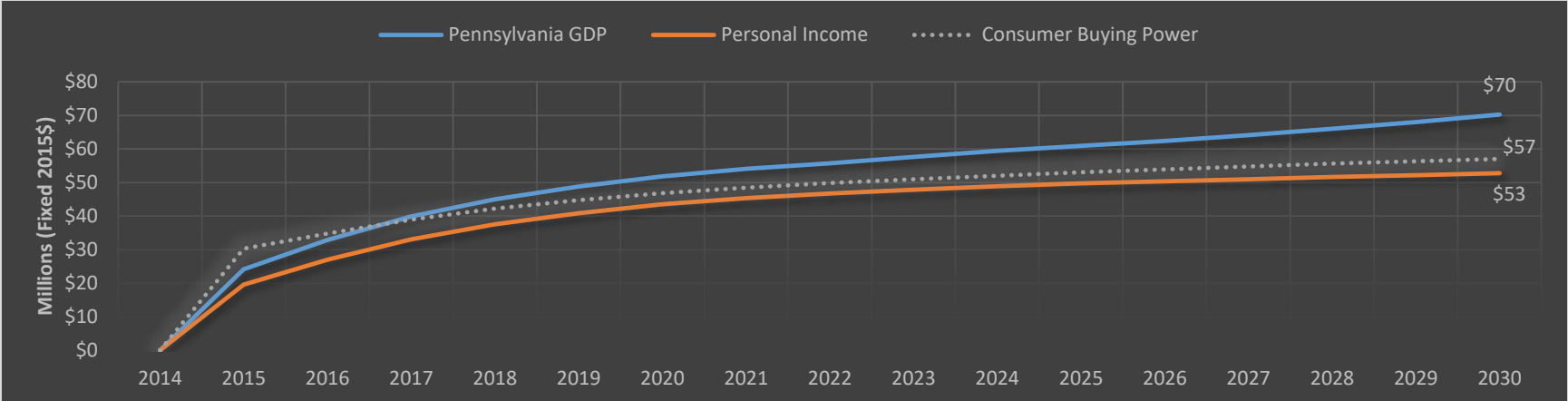




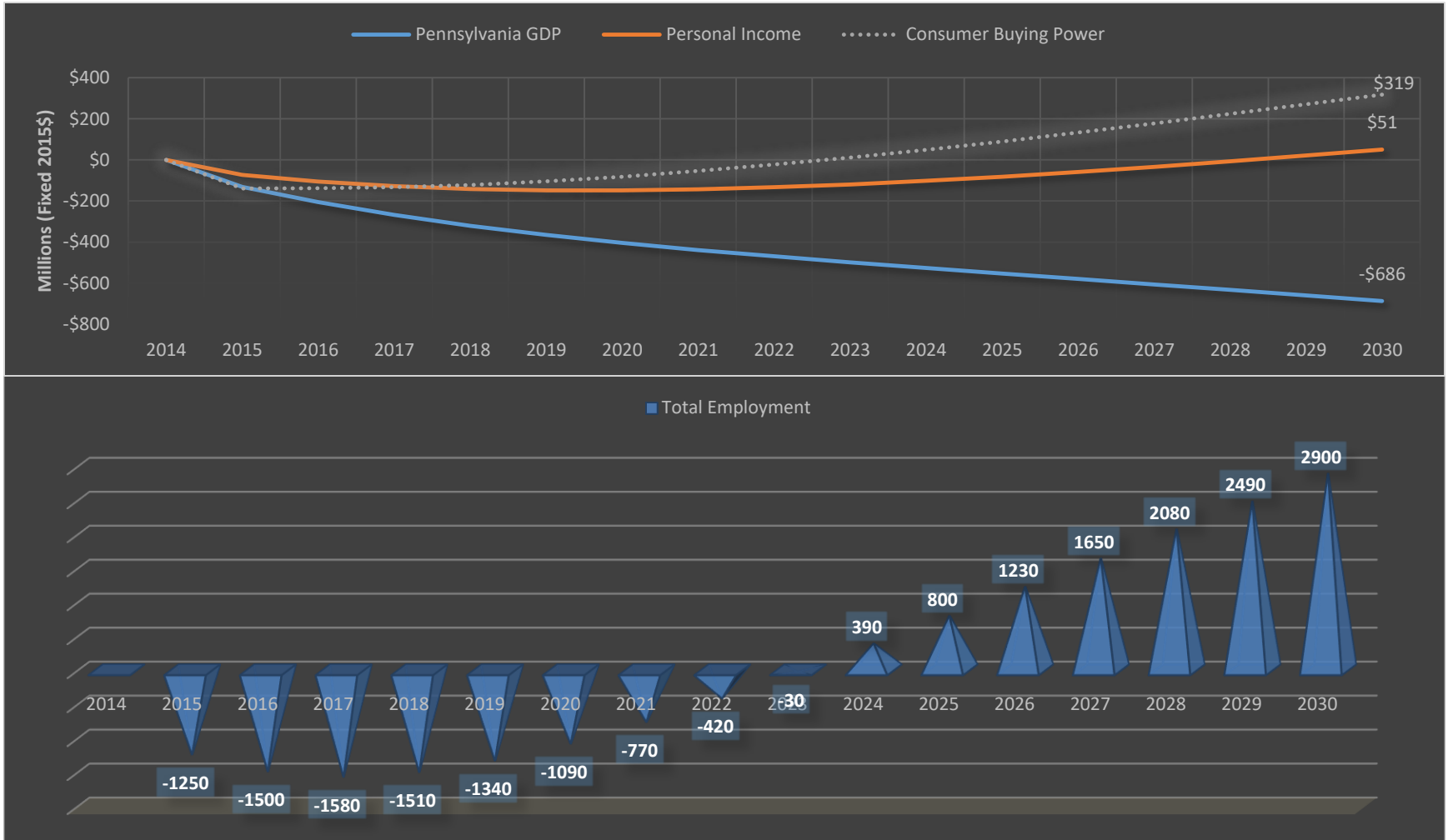
# GeoExchange Systems



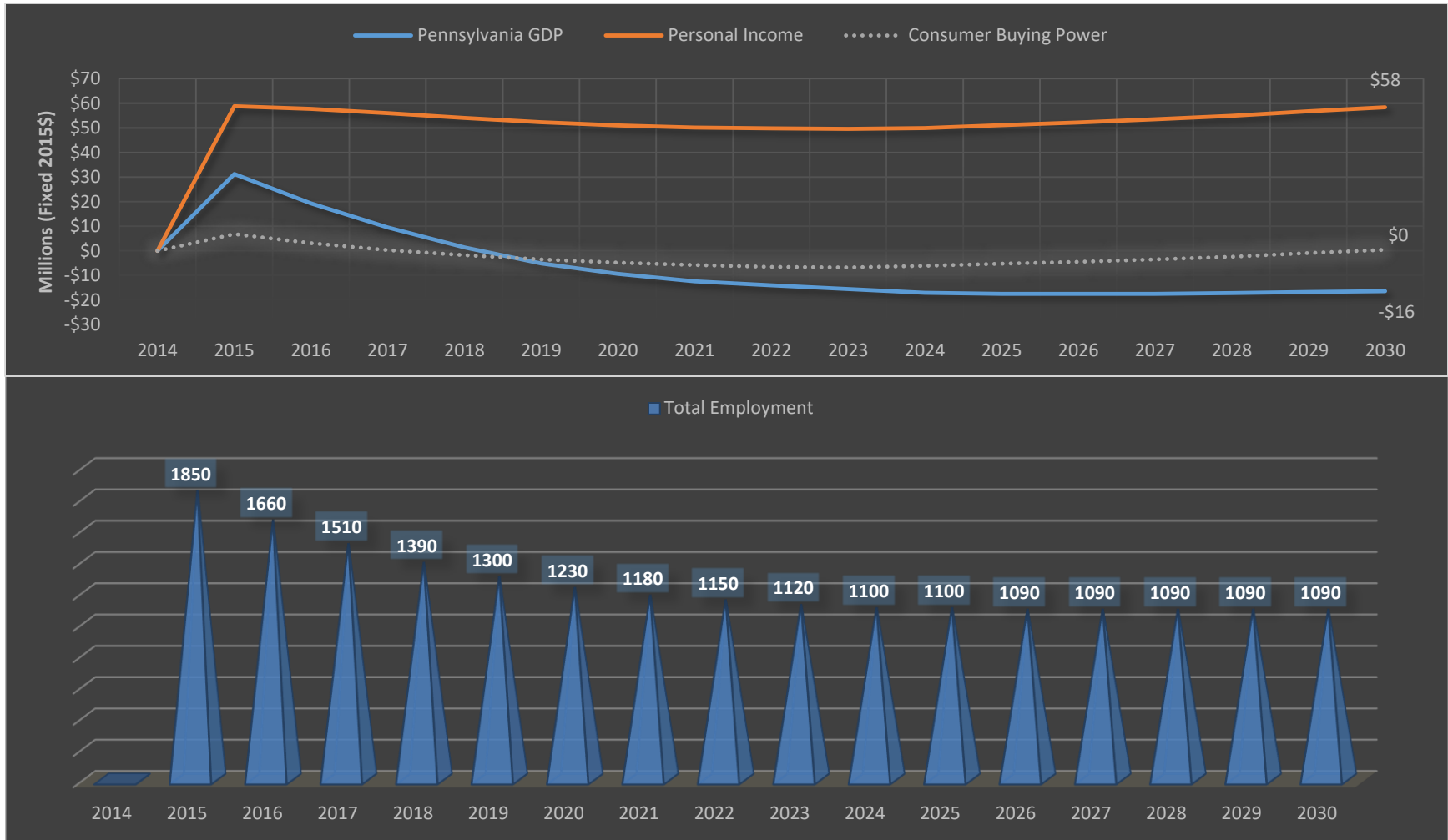
# Heating Oil and Fuel Switching



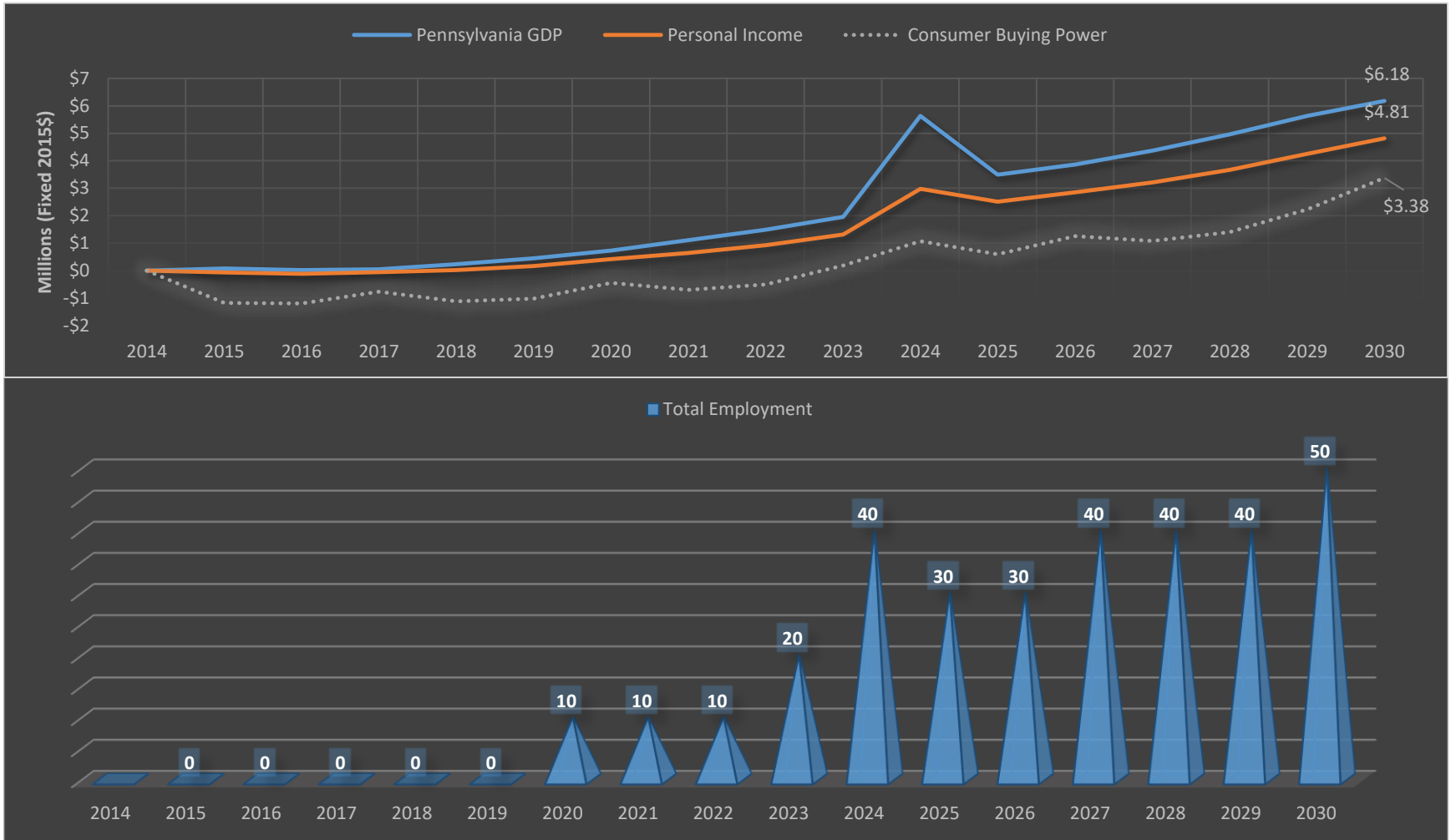
# Re-light Pennsylvania



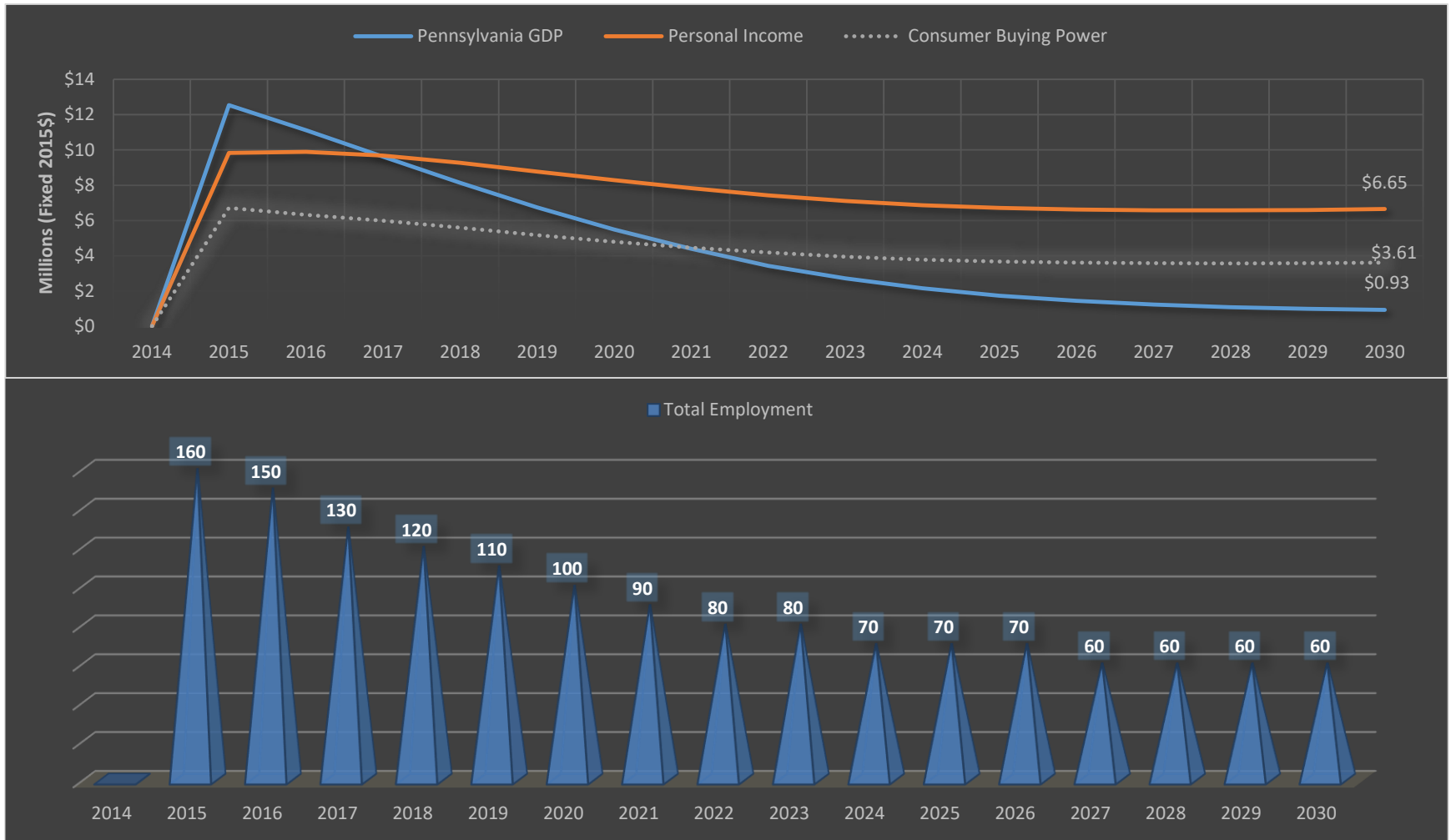
# Building Codes (existing)



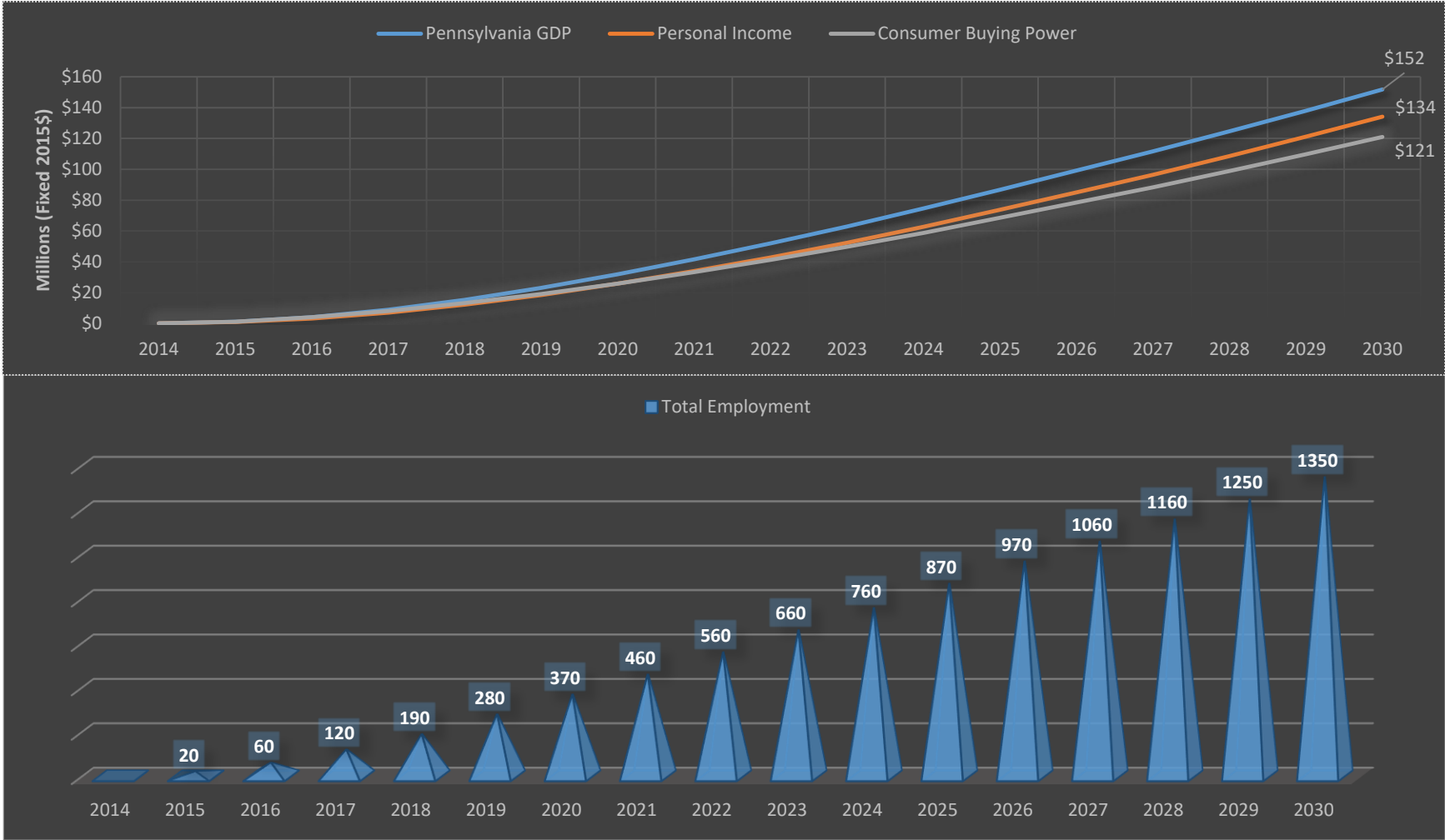
# Manure Digesters



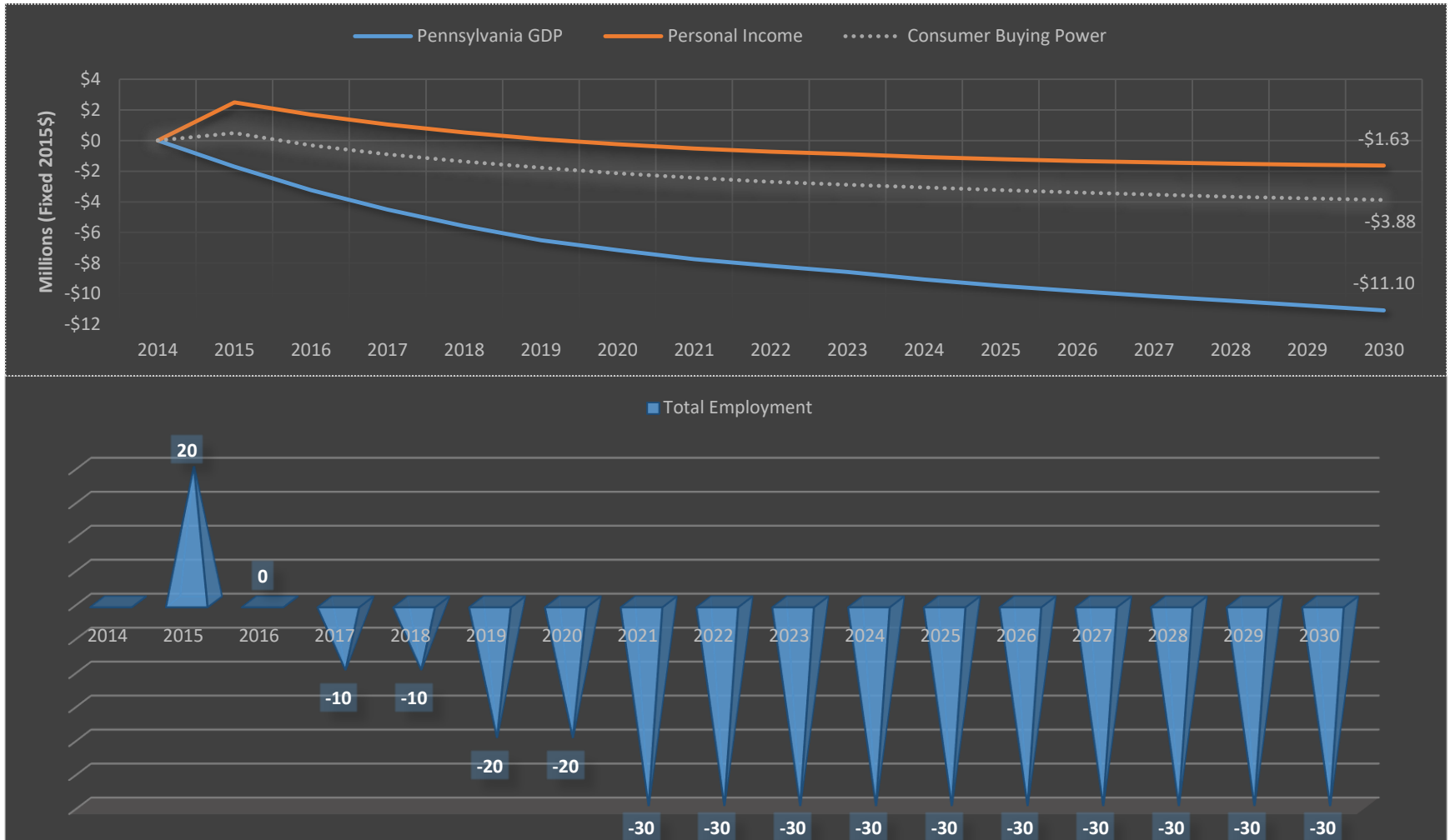
# Coal Mine Methane Capture & Use



# Freight Transportation



# META





*Thank you for your time and attention!*

## *Questions?*

Center for Climate Strategies  
1800 K Street NW, Suite 714  
Washington, DC 20006  
[www.climatestrategies.us](http://www.climatestrategies.us)

Scott Williamson  
(202) 293-4591  
(202) 560-4962  
*swilliamson@climatestrategies.us*