



# PAINTING THE WHOLE PICTURE:

Understanding the Impacts of Energy Efficiency Using Cost-Effectiveness Testing & Economic Impact Assessments

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Dimple Gandhi

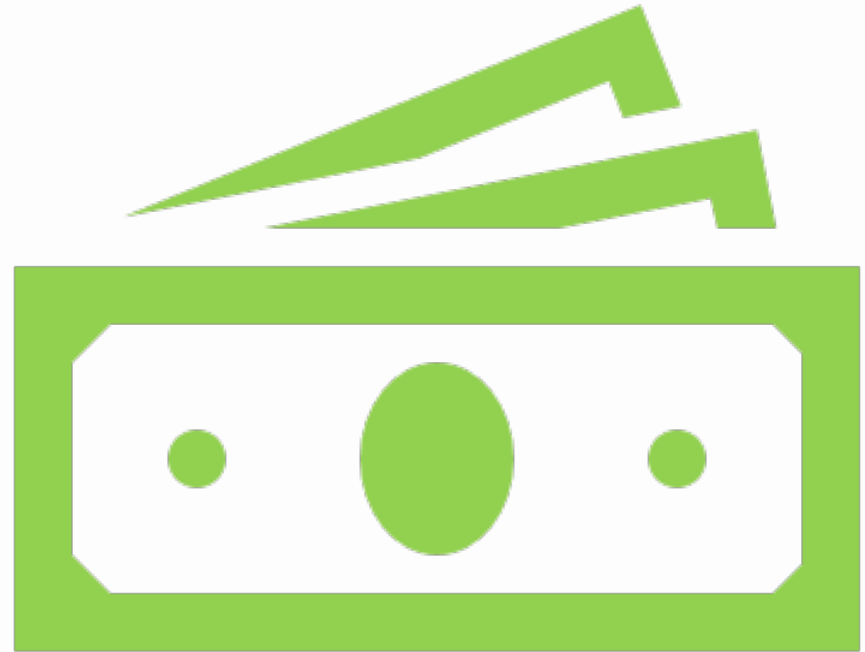
August 9, 2017



# Background & Introduction

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- Cost-effectiveness testing is standard practice for EE
- Some program administrators want more information around the economic effects of the programs they operate
- Today we will be discussing another way one can look at the economic effects of energy efficiency programs



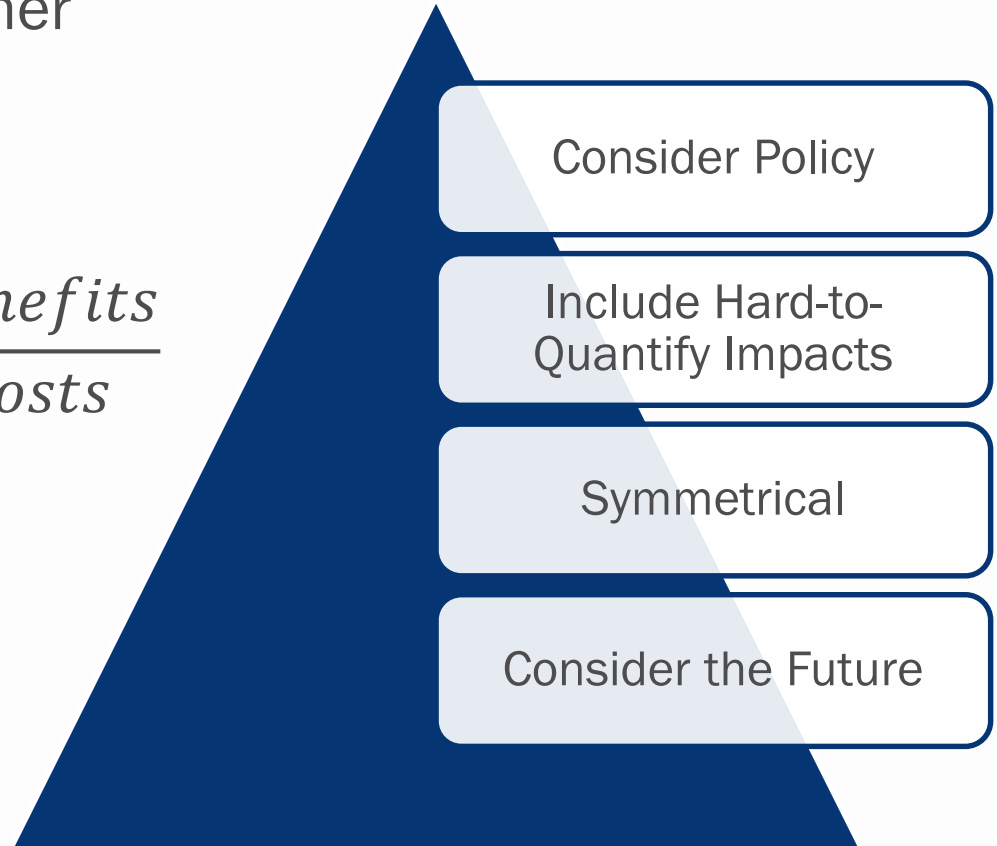
# Cost-Effectiveness Testing

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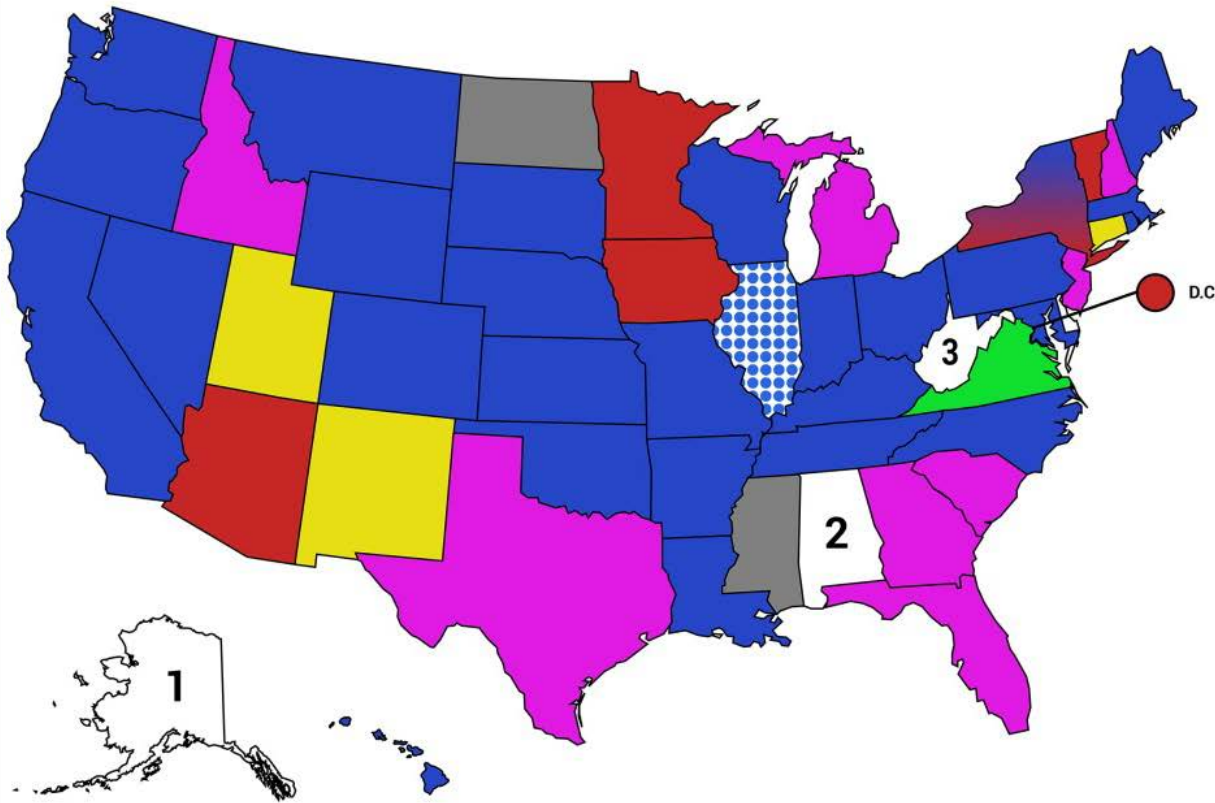
- Tool used to assess whether or not EE programs are beneficial

$$\textit{Benefit} - \textit{Cost Ratio} = \frac{\textit{Benefits}}{\textit{Costs}}$$

- A range of common cost-effectiveness tests exist providing different perspectives



# Status Quo



## Primary Test By State

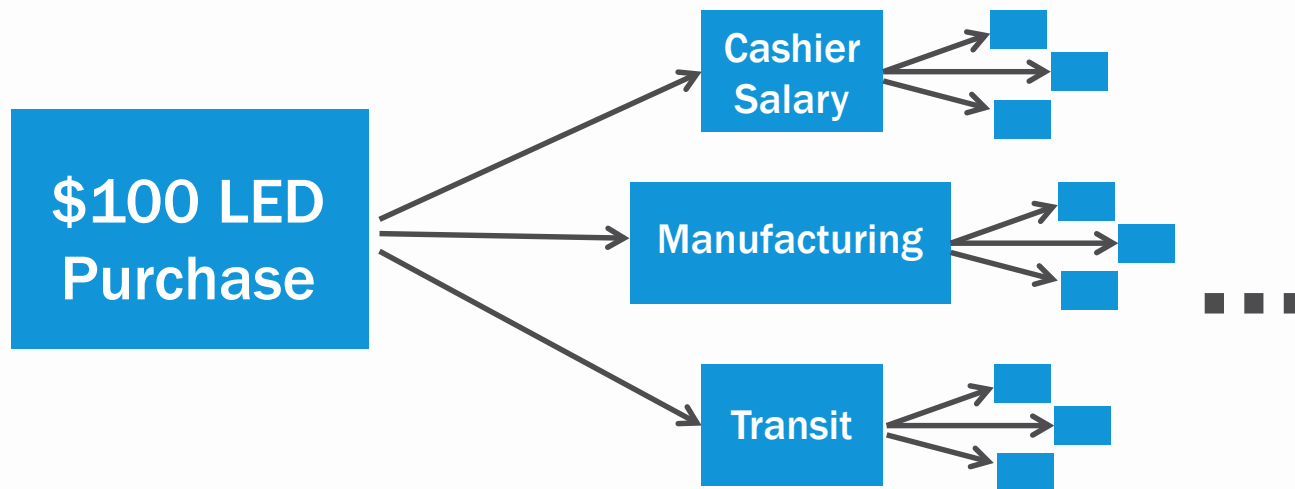
- SCT
- TRC
- TRC with societal components
- TRC, switching to SCT
- UCT
- RIM
- No Primary Test
- None

Source: Non-Energy Impacts Approaches and Values: an Examination of the Northeast, Mid-Atlantic, and Beyond. NEEP, July 2017

# Input-Output Modeling

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- Treats economy as a set of linked economic sectors that are interdependent
- Treats events as a change in a specific set of sectors
- Because sectors are linked, cascading effects occur



# Application of Method

- Input-output models are available as software packages
- Input “events” representing effects
- Code events into various sectors (similar to SIC or NAICS)
- Run model

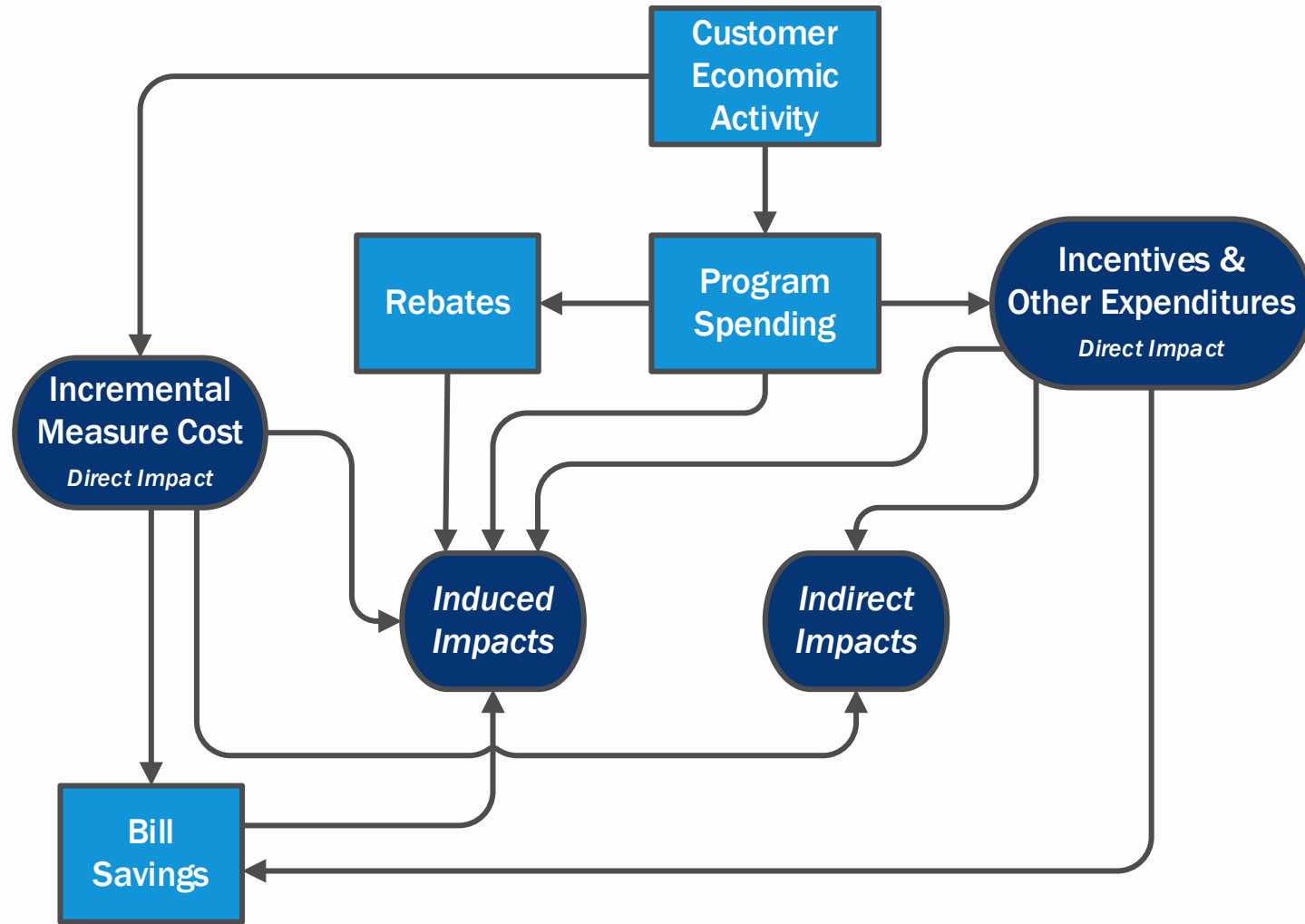
The screenshot displays the IMPLAN software interface. On the left, the 'Model Information' section shows data for the year 2011, including a Gross Regional Product of \$19,710,377,722 and a total employment of 257,321. The 'Areas in the Model' section lists Illinois and Kane County. The right side of the interface is divided into three main sections: 'Gross Regional Product' with a 'Value Added' table, 'Economic Indicators' showing a Shannon-Weaver Diversity Index of 0.73310, and 'Top Ten Industries' table.

Value Added		Final Demand	
Employee Compensation:	\$10,980,982,528	Household	
Proprietor Income:	\$1,013,667,066	State/Local Govern	
Other Property Type Income:	\$6,189,768,547	Federal Govern	
Tax on Production and Import:	\$1,525,959,580	Capital	
		Exports	
		Imports	
		Institutional S	
		Total Final Dem	
Total Value Added:		\$19,710,377,722	

Shannon-Weaver Diversity Index:	0.73310
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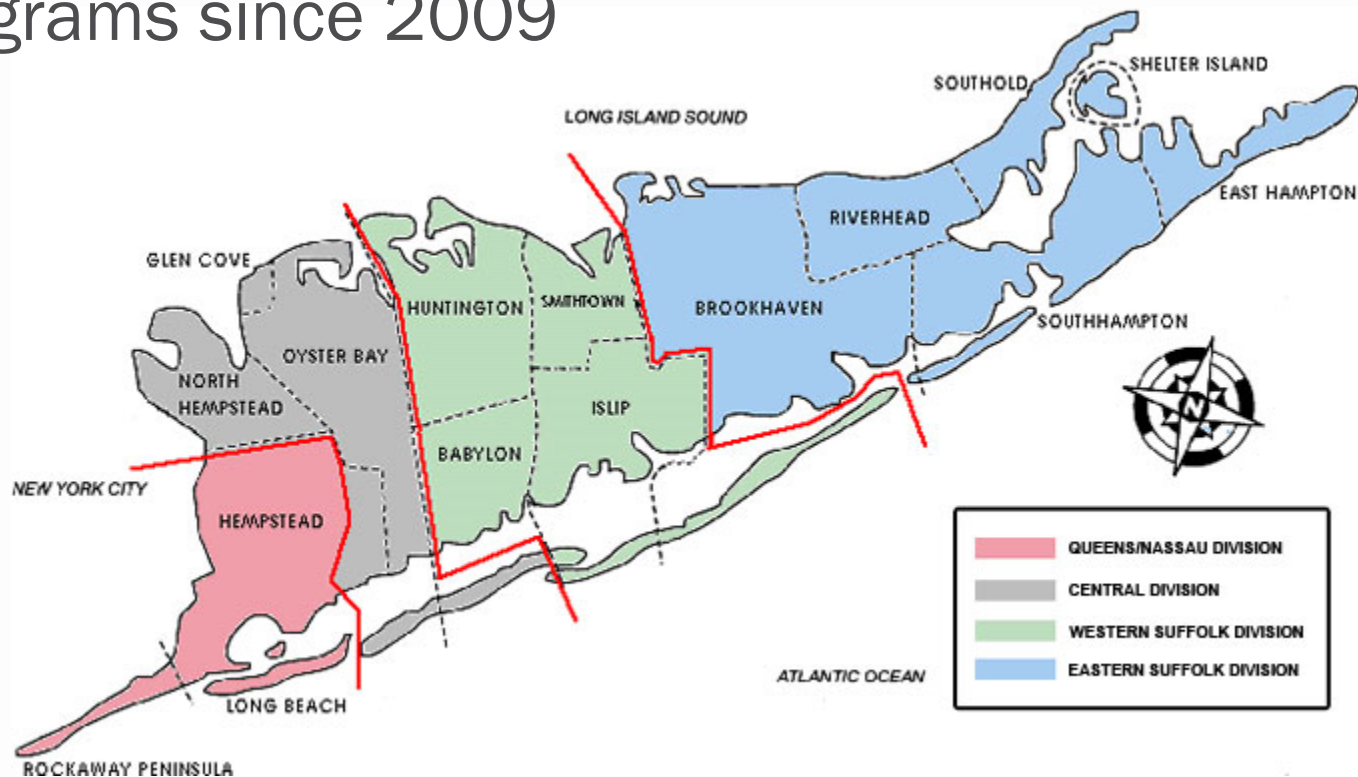
Sector	Description	Employer	Labor Income	Output
438	* Employment and payroll onl...	16,267	\$997,801,...	\$1,139,93
413	Food services and drinking pl...	14,489	\$302,824,...	\$819,250
382	Employment services	14,254	\$307,091,...	\$454,303
319	Wholesale trade businesses	13,785	\$967,303,...	\$2,500,15
437	* Employment and payroll onl...	9,781	\$525,332,...	\$601,576
394	Offices of physicians, dentists...	7,990	\$572,177,...	\$919,512
360	Real estate establishments	7,755	\$73,227,750	\$1,286,78
397	Private hospitals	7,232	\$443,456,...	\$917,738

# Economic Impact Analysis Visual Model



# PSEG Long Island

- Electric utility serving over 1.1 million customers
- Implemented a portfolio of energy efficiency programs since 2009





# Cost-Effectiveness

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- Portfolio has consistently screened as cost-effective using both TRC and PA tests

Year	TRC	PA
2011	2.7	4.4
2012	1.9	2.9
2013	1.8	3.1
2014	2.1	3.4
2015	2.2	3.3

# Economic Impacts (Dollars)

## First-Year

Year	Program Investment	Total Output	Multiplier
2011	\$46.8	\$61.6	1.3
2012	\$74.8	\$81.6	1.1
2013	\$80.4	\$85.0	1.1
2014	\$70.3	\$73.9	1.1
2015	\$70.5	\$77.5	1.1

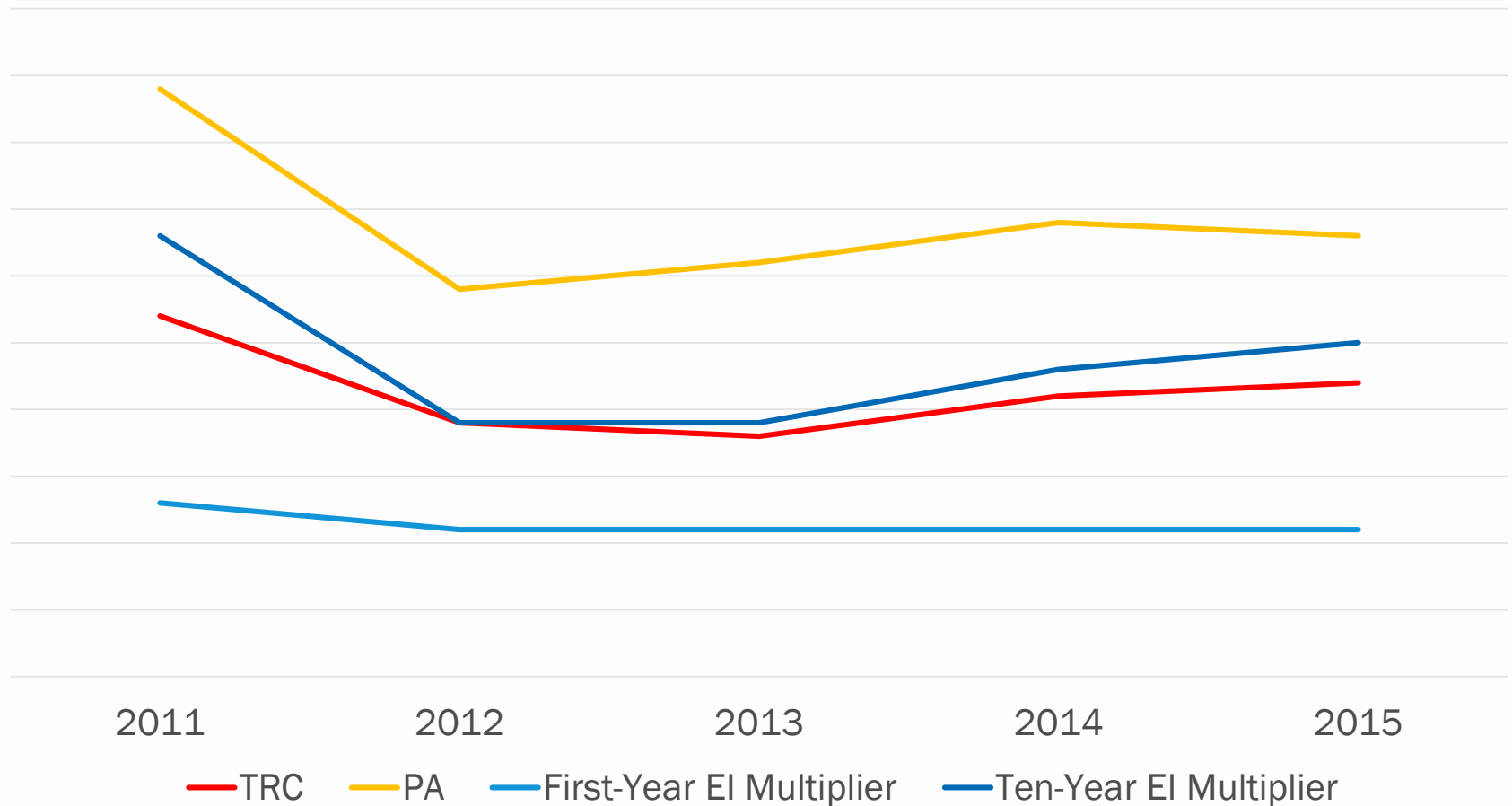
## Ten-Year

Year	Program Investment	Total Output	Multiplier
2011	\$46.8	\$155.3	3.3
2012	\$74.8	\$141.5	1.9
2013	\$80.4	\$153.3	1.9
2014	\$70.3	\$160.9	2.3
2015	\$70.5	\$178.1	2.5

All dollar values in millions



# Comparison of CE & EI Analysis Results



# Job Impacts (FTEs)

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## First-Year

Year	FTEs	FTEs/\$1M
2011	445	9.5
2012	609	8.1
2013	542	6.7
2014	473	6.7
2015	582	8.3

## Ten-Year

Year	FTEs	FTEs/\$1M
2011	1,175	25.1
2012	1,086	14.5
2013	1,096	13.6
2014	1,166	16.6
2015	1,362	19.3

All dollar values in millions

# Why Conduct Economic Impact Analyses?

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1. Quantifies *local* effects in dollars and jobs;
2. Considers details of local economic environment
3. Provides sector-level information to program administrators;
4. Tracks with CE testing;
5. Easy to tack onto existing CE analysis



# Thank You!

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Thanks also to my co-authors:

- Jake Millette & John Tortorella – Opinion Dynamics
- Dimple Gandhi – PSEG-LI