

Economic and Revenue Impact of Data Centers in PA

An analysis of the potential growth of data centers in PA as a result of the proposed data center sales and use tax exemption

July 2019

Submitted on behalf of: First Energy
Green Fig
Iron Mountain
PECO
Penn Power Group
PPL

Modeling the Impact of an Expanded Data Center Exemption in PA

A coalition of current data center operators, potential data center operators, utilities, and economic developers asked Econsult Solutions to model the impact with a limited incentive and potential impact of data centers in PA after passage of an exemption like that proposed in SB 471 / HB 1088.

ESI modeled:

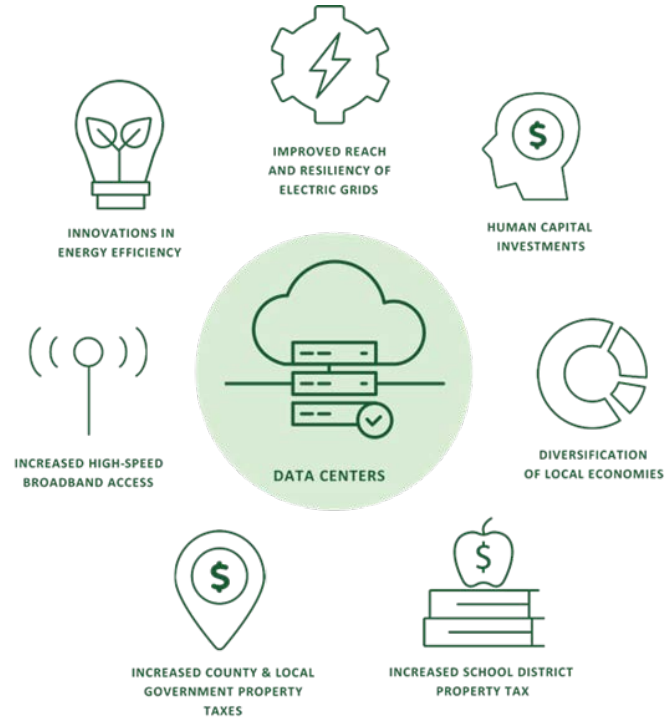
- **Status Quo Growth Scenario** – Economic and fiscal impact of data centers under current law from 2019 to 2024
 - Assumes PA grows at same rate as projected US industry growth
- **New Exemption Growth Scenario** – Economic and fiscal impact of data centers after passage of new incentive from 2019 to 2024
 - Assumes PA information industry employment grows at 16% annual rate (based on revenue growth implied by PA Dept. of Revenue in fiscal note for SB 471)
 - Assumes 4 million square feet of new data centers built by 2024, based on same growth rate

The Data Center Industry in the U.S. and PA

Data Center Growth Nationally

- Demand for data centers – the facilities that house the computers and equipment that power the information needs of the modern economy – is exploding as data needs and use grow
- States are competing to attract data centers to their jurisdictions, using tax incentives to entice data center operators
- The centers provide direct, indirect, and induced impacts through the construction, expansion, and operation of the centers

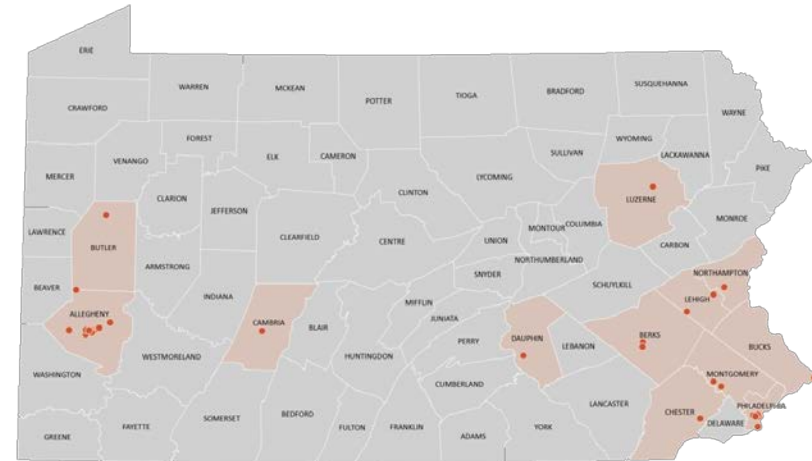
Data centers also contribute to broader economic and fiscal benefits, including:



Data Centers in Pennsylvania

Pennsylvania should be a strong location for data centers

- Large data users – large business and university research communities
- Geography – close proximity to major business and government centers
- Good for operations – low electricity costs, temperate weather
- Strong workforce – colleges and universities provide talent



Source: DataCenterMap.com (2019), Various Data Center Websites (2019)

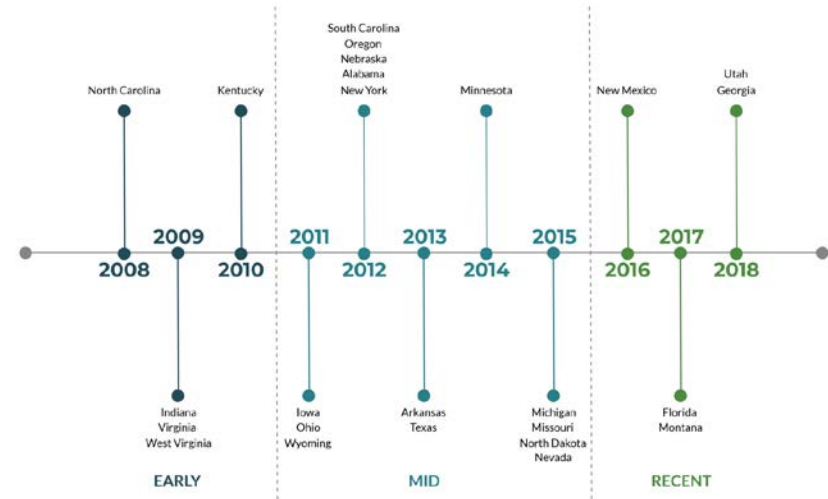
PA Falling Behind Competition

- Since 2008, 25 states have created new tax incentives to attract data center investment
- Most offer some form of sales and use tax exemption for computer equipment and technology
- Pennsylvania's current exemption is a rebate capped at \$5 million per year, as compared to unlimited in leaders like Virginia
- Incentives have been cited as a driving factor in recent data center location decisions
- Since 2008, PA's share of data center industry employment has shrunk from 3.8% to 2.8%

States with Data Center Incentives



Source: *Magnum Economics, Potential Impact of a Data Center Incentive in Illinois (2018)*¹



Source: *Magnum Economics (2018), Data Center Knowledge (2019)*

Modeling the Potential Impact of Expanded Incentive for PA

Current and Proposed Incentives for PA

Existing law – Act 84 of 2016

- Limited sales tax refund for computer data center equipment
- Eligibility – Minimum payroll of \$1 million per year or, within first 4 years of certification, make capital investment of \$25 to \$50 M (depending on county size)
- Cap of \$5 million allocated pro-rated for eligible applicants

Proposed Legislation – SB 471 / HB 1088

- Standard exemption for computer data center equipment for eligible centers and their tenants
- Eligibility – Minimum payroll of \$1 million per year, and within first 4 years of certification, make capital investments of \$35 to \$60 M (depending on county size)
- No cap on exemption, so exemptions applied through standard exemption certificate

Potential Revenue Growth Due to Exemption

- In Fiscal Note for SB 471, PA Department of Revenue estimated the total revenue loss due to the proposed data center sales and use exemption
- Starting in FY 2019-2020, after adjusting for small firms, DOR estimates \$24.6 million in gross sales tax exemption, or \$410 million in exempted sales
- By 2024, DOR expects the exemption to grow to \$53.1 million, or \$885 million in exempted sales
- Based on this growth expectation, we projected total Data Processing, Hosting and Related Services Industry employment to grow by the same rate to result in over 20,000 employees in 2024

Department of Revenue Fiscal Note to SB 471 PN 477
Sales and Use Tax Exemption for Data Campus Inputs
Effective July 1, 2019

	SUT Impact	Adjustment for Small Firms	Impact from Repealing Data Center Tax Refund	Net Impact
2018-2019	0.0	0.0	0.0	0.0
2019-2020	-28.0	-24.6	5.0	-19.6
2020-2021	-36.2	-31.8	5.0	-26.8
2021-2022	-42.9	-37.7	5.0	-32.7
2022-2023	-50.9	-44.8	5.0	-39.8
2023-2024	-60.4	-53.1	5.0	-48.1

PA Data Center Baseline

- 2018 Employment in Data Processing, Hosting and Related Services Industry (NAICS code 518210): 9,431
- \$789 million in 2018 wages
- BLS expected annual national employment growth to 2026: 1.2%
- Total PA Data Center square footage: 3.5 million sq. ft.

BLS Employment and Wage Information for Data Processing, Hosting, and Related Services Industry - NAICS code 518210 in Pennsylvania, 2007 through 2018

Year	All Employees	Annual Employment Growth Rate	Total Annual Wages (\$M)	Annual Wage Growth Rate
2007	10,001	-	\$687	-
2008	9,949	-0.5%	\$682	-0.7%
2009	9,260	-6.9%	\$642	-5.9%
2010	9,126	-1.4%	\$625	-2.7%
2011	9,001	-1.4%	\$615	-1.7%
2012	9,009	0.1%	\$651	6.0%
2013	9,252	2.7%	\$683	4.9%
2014	8,698	-6.0%	\$644	-5.7%
2015	8,921	2.6%	\$690	7.1%
2016	8,860	-0.7%	\$691	0.2%
2017	8,973	1.3%	\$726	5.0%
2018	9,431	5.1%	\$789	8.6%

Source: Bureau of Labor Statistics, Employment and Wages from Occupational Employment Statistics (OES) survey 2007-2018 (2019)

Building New Data Centers

Using estimates from the US Chamber of Commerce, Uptime Institute and industry representatives, we estimated the construction costs as well as the server and cabinet needs and costs for a typical new 500,000 sq. ft. data center:

- \$610 M in base building and electrical and mechanical equipment cost
- Nearly \$1B in total server and cabinet costs, phased in over 10 years -
 - \$93 million per year in server and cabinet cost
 - \$5.6 million in annual sales tax

Cost of Constructing a New 500,000-Square Feet Data Center

Specifications	Values
Total Building Square Feet	500,000
Base Building Construction Cost per Square Foot	\$270
Mechanical and Electrical Equipment Cost per Square Foot	\$950
Total Base Building Construction Cost	\$135,000,000
Total Mechanical and Electrical Equipment Cost	\$475,000,000
Total Building and Mechanical and Electrical Equipment Cost Without Cabinet and Server Purchase	\$610,000,000
Square Feet per Cabinet	110
Number of Cabinets	4,550
Cost of One Cabinet with Servers	\$205,000
Total Server and Cabinet Cost	\$932,750,000
Server and Cabinet Installation Period (Yrs)	10
Annual Server and Cabinet Cost	\$93,275,000
Sales Tax Rate	6%
Annual Sales Tax from Server and Cabinet Cost	\$5,596,500
Total One-Time Capital Investment	\$703,275,000

Source: U.S. Chamber of Commerce Technology Engagement Center (2019), Uptime Institute (2019), Econsult Solutions (2019), Confidential (2019)

Impact of Building a New 500,000 sq. ft. Data Center

Economic Impact of Construction of a 500,000-Square-Foot Data Center

Impact of Construction	Commonwealth of Pennsylvania
Direct Output (\$M)	\$610
Indirect and Induced Output (\$M)	\$509
Total Output (\$M)	\$1,119
Annual Employment Supported	7,200
Employee Compensation (\$M)	\$335

Source: IMPLAN (2015)

Tax Impact of Construction of a 500,000-Square-Foot Data Center

Tax Type	Direct Tax	Indirect and Induced Tax	Total Tax
Income Tax Revenues (\$M)	\$4.3	\$3.1	\$7.4
Sales Tax Revenues (\$M)	\$3.5	\$3.2	\$6.7
Business Tax Revenues (\$M)	\$1.1	\$1.0	\$2.1
Total Tax Revenues (\$M)	\$8.9	\$7.3	\$16.2

Source: IMPLAN (2015)

Power Usage and Power Tax Impact of a 500,000 sq. ft. Center

Power Usage and Power Tax Impact of a 500,000 sq. ft. Center in 2019

Specifications	Values
Total Data Center Square Feet	500,000
Total Number of Cabinet	4,545
Total MW	23
MW / Hr Draw	12.5
kWh	82,125,000
Power Cost	\$4,352,625
Electric Sales Tax Rate	\$261,158
Gross Receipt Taxes	\$272,910
Total Power Taxes	\$534,067

Source: Confidential (2019), Econsult Solutions (2019)

Estimating Operations Impact of Potential Exemption

ESI modeled 2 scenarios:

1. New exemption growth scenario
2. Status quo growth scenario

By 2024, when compared to the status quo scenario, the new exemption growth scenario would have:

- Over 10,000 more employees in industry and over 33,000 more total jobs (direct, indirect, and induced)
- Over \$6 billion more in total output
- Over \$2 billion more in employee compensation

Employment Estimates of Different Operation Scenarios

Estimates	Existing Operations, 2019	Scenario 1: New Exemption Growth Scenario, 2024	Scenario 2: Status Quo, 2024
Number of Employees	9,549	20,611	10,160
Employee Compensation (\$M)	\$931	\$2,009	\$990

Source: Bureau of Labor Statistics, Employment Projections 2016-2026 (2019), Bureau of Labor Statistics, Employment and Wages from Occupational Employment Statistics (OES) survey 2018 (2019), Bureau of Labor Statistics Employment Projections 2016-2026 (2016)

Economic Impact of Different Operation Scenarios

Impact of Operations	Existing Operations, 2019	Scenario 1: New Exemption Growth Scenario, 2024	Scenario 2: Status Quo, 2024
Direct Output (\$M)	\$2,713	\$5,856	\$2,887
Indirect and Induced Output (\$M)	\$3,126	\$6,747	\$3,326
Total Output (\$M)	\$5,839	\$12,603	\$6,213
Annual Employment Supported	30,000	65,000	32,072
Employee Compensation (\$M)	\$1,913	\$4,128	\$2,035

Source: IMPLAN (2015)

Direct, Indirect, and Induced Employment Impact

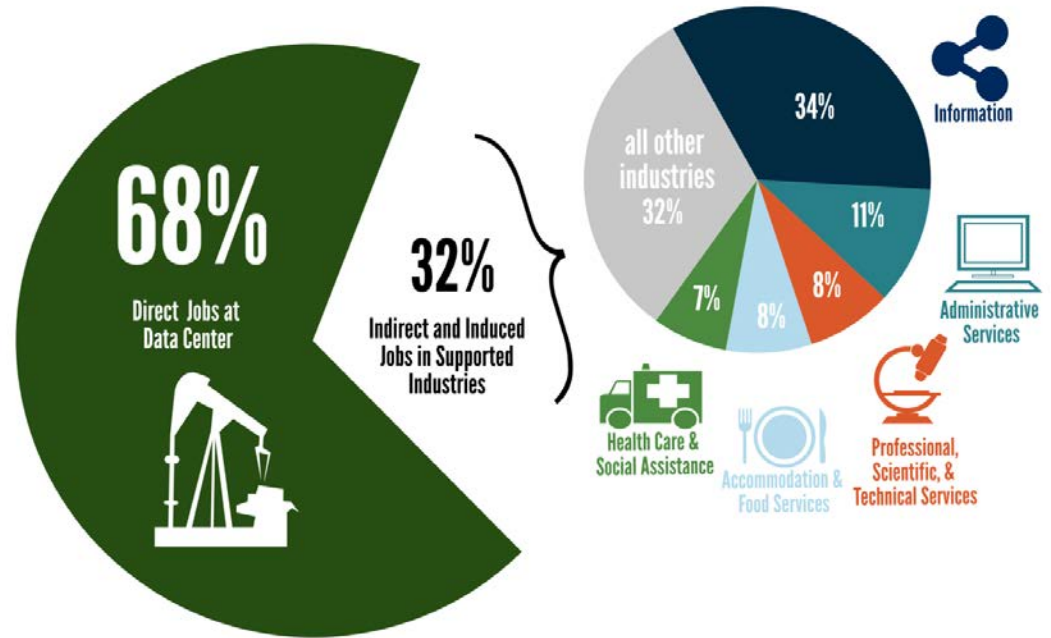
Under the New Exemption Growth Scenario, data center operations will support 65,000 employees with \$4.1 billion in earnings across a range of industries in 2024.

Employment Supported by Data Center Operations under New Exemption Growth Scenario, 2024

Industry	Direct, Indirect, and Induced FTEs	Employment Impact (%)
Information	21,864	33.6%
Administrative and Support and Waste Management and Remediation Services	7,467	11.5%
Professional, Scientific, and Technical Services	5,162	7.9%
Accommodation and Food Services	5,007	7.7%
Health Care and Social Assistance	4,725	7.3%

Source: IMPLAN (2015)

Direct, Indirect, and Induced Employment Impact of Data Center Operations
New Exemption Growth Scenario, 2024



Source: IMPLAN (2015); Piktochart(2019)

Estimating Operations State Tax Impact of Potential Exemption

By 2024, when compared to status quo scenario, the new exemption growth scenario would result in:

- \$40 million more in total income tax revenue
- \$35 million more in sales tax revenues
- \$11 million more in business tax revenues

Tax Impact of Different Operation Scenarios (\$M)

	Existing Operations, 2019			Scenario 1: New Exemption Growth Scenario, 2024			Scenario 2: Status Quo, 2024		
	Direct Tax	Indirect and Induced Tax	Total Tax	Direct Tax	Indirect and Induced Tax	Total Tax	Direct Tax	Indirect and Induced Tax	Total Tax
Income Tax Revenues	\$17	\$20	\$36	\$36	\$43	\$79	\$18	\$21	\$39
Sales Tax Revenues	\$12	\$21	\$33	\$26	\$45	\$70	\$13	\$22	\$35
Business Tax Revenues	\$4	\$7	\$10	\$8	\$14	\$22	\$4	\$7	\$11
Total Tax Revenues (\$M)	\$32	\$47	\$79	\$70	\$102	\$171	\$34	\$50	\$84

Source: IMPLAN (2015)

Construction Tax Impact of Building New Centers

Based on DOR's projected growth rate, under the new exemption, we estimate:

- 4.1 million sq. ft. of new data center capacity built by 2024
- 820,000 sq. ft. of data center capacity constructed annually

In 2024, the annual sales tax generated from new data center capacity construction and the server purchase for data centers constructed since 2020 will be \$45.8 million.

Tax Impact of Adding New Data Centers

	2019	2020	2021	2022	2023	2024
New Data Center Capacity Added (sq. ft.)	0	820,000	820,000	820,000	820,000	820,000
Tax from New Data Center Capacity Added (\$Million)	\$0	\$9.2	\$9.2	\$9.2	\$9.2	\$9.2
Tax from New Data Center Continuous Construction within 10 Year Period (\$Million)	\$0	\$0	\$9.2	\$18.3	\$27.5	\$36.7
Total Tax from Data Center Capacity Added (\$Million)	\$0	\$9.2	\$18.3	\$27.5	\$36.7	\$45.8

Source: Uptime Institute (2019), Econsult Solutions (2019)

Tax Impact of Exemption Growth Scenario

Combining construction and operations, under the New Exemption Growth Scenario, net tax revenue to the Commonwealth, after accounting for DOR projected exemption, would grow to over \$190 million by 2024.

Total Tax (Income/Sales/Business Tax) Projection by Year for Exemption Growth Scenario (\$M)

Year	Direct Total Tax from New Data Centers Added	Direct Total Tax from Construction Activity	Indirect and Induced Total Tax from Construction Activity	Direct Total Tax from Operation	Indirect and Induced Total Tax from Operation	Tax Exemption	Net Tax Revenue
2018-2019	\$0.0	\$0.0	\$0.0	\$32.3	\$47.1	\$5.0	\$74.4
2019-2020	\$9.2	\$14.6	\$12.8	\$37.6	\$55.0	\$24.6	\$104.6
2020-2021	\$18.3	\$14.6	\$12.8	\$43.9	\$64.1	\$31.8	\$121.9
2021-2022	\$27.5	\$14.6	\$12.8	\$51.2	\$74.8	\$37.7	\$143.2
2022-2023	\$36.7	\$14.6	\$12.8	\$59.7	\$87.2	\$44.8	\$166.2
2023-2024	\$45.8	\$14.6	\$12.8	\$69.6	\$101.7	\$53.1	\$191.5

Source: IMPLAN (2015)

Tax Impact of Status Quo Scenario

Under Status Quo Scenario, net tax revenue to the commonwealth, after accounting for current \$5M annual refund exemption, would grow by \$5 million to nearly \$80 million by 2024.

Total Tax (Income/Sales/Business Tax) Projection by Year for Status Quo Scenario (\$M)

Year	Direct Total Tax from New Data Centers Added	Direct Total Tax from Construction Activity	Indirect and Induced Total Tax from Construction Activity	Direct Total Tax from Operation	Indirect and Induced Total Tax from Operation	Tax Exemption	Net Tax Revenue
2018-2019	\$0.0	\$0.0	\$0.0	\$32.3	\$47.1	\$5.0	\$74.4
2019-2020	\$0.0	\$0.0	\$0.0	\$32.7	\$47.7	\$5.0	\$75.4
2020-2021	\$0.0	\$0.0	\$0.0	\$33.1	\$48.3	\$5.0	\$76.4
2021-2022	\$0.0	\$0.0	\$0.0	\$33.5	\$48.9	\$5.0	\$77.4
2022-2023	\$0.0	\$0.0	\$0.0	\$33.9	\$49.5	\$5.0	\$78.4
2023-2024	\$0.0	\$0.0	\$0.0	\$34.3	\$50.2	\$5.0	\$79.5

Source: IMPLAN (2015)

Difference in Tax Revenues Received b/w Growth and Status Quo

By 2024, if the growth assumed under the new exemption growth scenario occurs, the state would gain over \$110 million in net tax revenues for the commonwealth over what would be expected under the status quo scenario.

Net Difference in Tax between Exemption Growth Scenario and Status Quo Scenario (\$M)

Year	Income Tax Net Difference	Sales Tax Net Difference	Business Tax Net Difference	Total Tax Net Difference
2018-2019	\$0.0	\$0.0	\$0.0	\$0.0
2019-2020	\$18.5	\$5.6	\$5.1	\$29.2
2020-2021	\$25.1	\$13.4	\$7.0	\$45.5
2021-2022	\$32.9	\$23.6	\$9.2	\$65.8
2022-2023	\$42.1	\$33.9	\$11.8	\$87.8
2023-2024	\$52.9	\$44.3	\$14.8	\$112.0

Source: IMPLAN (2015)

Conclusion

Bottom Line

By 2024, as compared to the Status Quo scenario, under the Exemption Growth scenario, PA would gain:

- Over 33,000 more total jobs, including 10,000 more jobs in the sector
- Over \$6 billion more in total output
- Over \$2 billion more in total wages
- Over \$110 million more in net tax revenues in FY 24, even after the tax exemption

- Given these estimates, even a much smaller growth rate of the industry or construction of new centers would result in a net positive revenue position for the state, along with employment and spending growth

- Pennsylvania would also return to a leadership position in the modern data center world

What else PA can gain...

