CLEAN JOBS PENNSYLVANIA

86,285 CLEAN ENERGY JOBS ACROSS PENNSYLVANIA[1]

POWERING PENNSYLVANIA'S ECONOMIC RENEWAL

From rural areas like the Laurel Highlands to big cities like Philadelphia and Pittsburgh, clean energy workers are a growing and visible part of the state's economy. They build wind farms, develop equipment and parts for solar and wind companies and retrofit schools, homes and businesses to make them more energy efficient. At a time of growing income inequality across the nation, these jobs earn family-sustaining wages and salaries. Energy efficiency is by far the biggest clean energy employer in the state, with more than **65,000** jobs. Meanwhile, more than **8,500** Pennsylvanians work in renewable energy industries like solar and wind, while nearly **7,000** work in at companies that make cleaner cars like hybrids and electric vehicles.

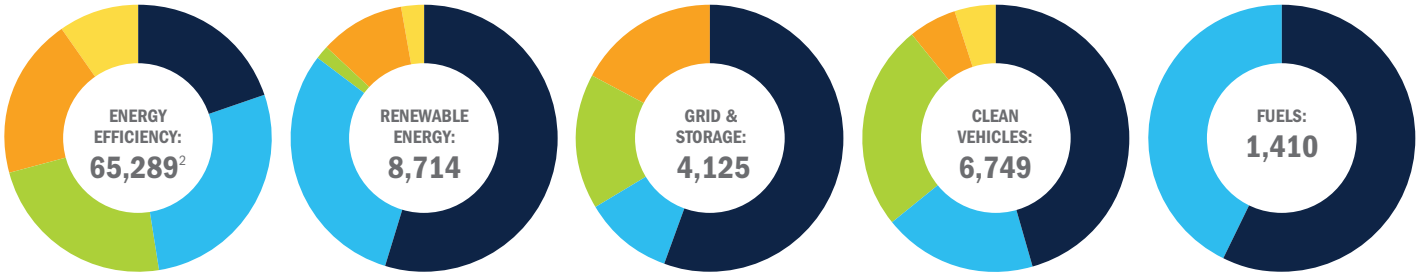
CLEAN ENERGY JOBS IN PERSPECTIVE

All
67 Counties
in Pennsylvania have residents working in clean energy

#11
Pennsylvania ranks 11th among all 50 states and D.C. in clean energy jobs

42%
of all Pennsylvania clean energy workers are involved in construction

INDUSTRY BREAKDOWN



- ENERGY STAR & Lighting: **12,985**
- Trad. HVAC: **18,084**
- High-Efficiency HVAC & Renewable H&C: **15,184**
- Adv Materials: **12,833**
- Other: **6,203**

- Solar: **4,777**
- Wind: **2,677**
- Geothermal: **133**
- Bioenergy/CHP: **906**
- Low-Impact Hydro: **221**

- Storage: **2,297**
- Smart Grid: **446**
- Micro-Grid: **683**
- Other Grid Modernization: **699**

- Hybrid Electric Vehicles: **3,084**
- Plug-In Hybrid Vehicles: **1,250**
- Electric Vehicles: **1,701**
- Natural Gas Vehicles: **381**
- Hydrogen & Fuel Cell: **333**

- Other Ethanol/ Non-Woody Biomass: **810**
- Other Biofuels: **600**

PRESENTED BY:

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JUNE 2018
E2FS: 18-06-A

For more information, contact **Noah Dubin** at **ndubin@e2.org**.

For questions regarding this report, visit E2's Clean Jobs America FAQ at www.e2.org/cleanjobsamerica/FAQ.

E2 would like to thank Sharon Pillar for making the Clean Jobs Pennsylvania issue brief possible.

IN PARTNERSHIP WITH:

CLEAN JOBS COUNT E2

KEEA KEYSTONE ENERGY EFFICIENCY ALLIANCE

sbn Sustainable Business Network of Greater Philadelphia

Sustainable Pittsburgh

GREEN BUILDING ALLIANCE

POLICIES MATTER

Pennsylvania's renewable energy policies are weak compared to those of its neighbors and better policies would lead to more clean energy jobs in the Commonwealth. Under the state's 2004 Alternative Energy Portfolio Standard, just 8 percent of electricity sales must come from "Tier 1" resources (including renewables) by 2021, with 0.5 percent from solar.

Although Pennsylvania is home to more than 17,000 solar installations and numerous wind farms, only about 5 percent of the commonwealth's electricity comes from renewable energy—far less than in neighboring states.

Pennsylvania's main energy efficiency policy, Act 129, has delivered $6.4 billion in benefits to Pennsylvania electric customers since 2009 and saved the amount of electricity consumed by roughly 330,000 Pennsylvania households each year. According to a report issued by the Pennsylvania Public Utility Commission, for every $1 invested in energy efficiency over the past three years, Pennsylvania electricity customers have realized $1.70 in benefits.[2]

Recent polices (including Act 40), updates to the state's building energy codes, and new Commercial Property Assessed Clean Energy (C-PACE) legislation are moving Pennsylvania in the right direction. But more needs to be done to keep Pennsylvania's clean energy economy—and the jobs that come with it—growing.

Lawmakers in Harrisburg and Washington, D.C. can:

// **Increase the requirement for renewable energy in the AEPS.** While the AEPS was a forward-looking policy when it passed in 2004, most states have since set far more aggressive renewable energy portfolio standards, realizing the tremendous job growth potential. New York and New Jersey both now have state goals of 50 percent renewables by 2030, and Maryland is 25 percent by 2020 with a 2.5 percent goal for solar. With half the population of Pennsylvania, the state of Massachusetts has nearly 20,000 solar jobs, in large part because it has some of the best clean energy policies in the country.[3]

// **Lift the energy efficiency investment cap on utilities.** Under current law, utility investment in energy efficiency programs is limited to 2 percent of each utility's 2006 total revenues. As a result, the state's electricity usage has only been reduced by about 0.8 percent annually. But the PUC's Statewide Evaluator has found that those savings could be doubled up to 2 percent, if the cap were removed.

// **Permit community shared solar in Pennsylvania.** Pennsylvanians who do not have access to solar on their own property can participate in a solar installation elsewhere and be credited for that solar production directly on their electric bill. The legislature should change the virtual net-metering regulations to permit community solar and include provisions that encourage the inclusion of low- to moderate-income individuals in community solar programs.

// **Adopt policies to support more electric vehicles.** Increasing the use of electric vehicles (EVs), together with cleaning up the electricity grid, is critical for reducing carbon pollution to mitigate climate change. But adoption of EVs has been slow in Pennsylvania due to a lack of charging infrastructure. Maximizing investments in charging infrastructure under the Volkswagen settlement and legislation like House Bill 1446, which would give utilities more ability to build charging stations, will both reduce air pollution and grow jobs in Pennsylvania's clean transportation sector.

// **Implement carbon limits and a carbon pricing program that invests in renewable energy and energy efficiency measures.** One option would be for Pennsylvania to participate in the Regional Greenhouse Gas Initiative (RGGI), which caps and prices CO_2 pollution from the electricity sector. New Jersey and Virginia are expected to join nine other Northeastern states where power sector CO_2 pollution has decreased more than 45 percent since 2005. The RGGI state economies have expanded, and RGGI investments have returned billions of dollars of energy savings to households and businesses and supported significant renewable energy development.[4]

// **The state's PUC should issue a strong policy statement on alternative ratemaking that prioritizes energy efficiency and distributed renewable energy.** Under the current utility business model, when customers become more energy efficient or install distributed generation on their property, the utility's revenues decrease. To combat this disincentive, many states have successfully adopted alternative ratemaking policies that financially incentivize utilities to help customers use less energy. In a significant step, the PA Public Utility Commission recently released a proposed policy statement inviting utilities to submit rate proposals that would better align with the goals of energy efficiency and distributed generation. To ensure the market for energy efficiency and distributed energy continues to grow, the PUC should make it clear in its Final Policy Statement that utility rates should incentivize the deployment of energy efficiency and other clean energy technologies.

CLEAN JOBS BY VALUE CHAIN

- Construction: 42.5%
- Manufacturing: 21.3%
- Trade: 13.3%
- Other Services: 15.5%
- Professional Services: 6.0%
- Agriculture and Forestry: 1.1%
- Utilities: 0.4%

TOP 5 METRO AREAS FOR CLEAN ENERGY JOBS

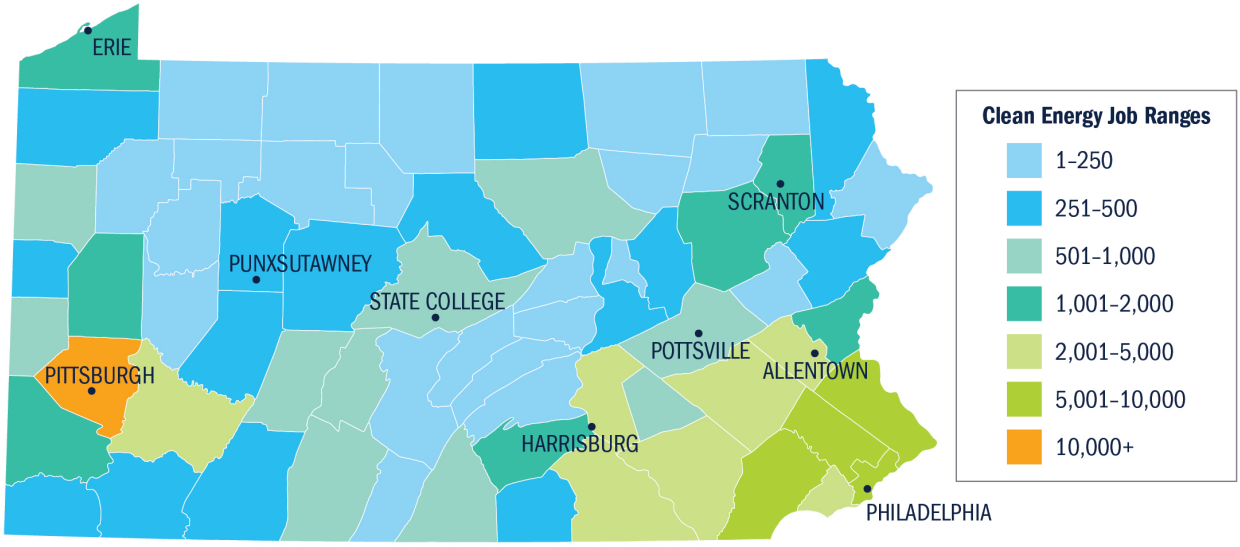
Metro Area (MSA)	Clean Energy Jobs*	Renewable Energy Jobs	Energy Efficiency Jobs
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	30,010	2,767	21,753
Pittsburgh, PA	17,990	1,659	12,992
Allentown-Bethlehem-Easton, PA-NJ	4,672	370	3,434
Harrisburg-Carlisle, PA	3,987	327	2,910
Scranton—Wilkes-Barre, PA	3,870	320	2,822

* Total includes all clean energy jobs categories, including solar, wind, energy efficiency, clean vehicles, battery storage, advanced biofuels, low-impact hydro and other areas.

TOP COUNTIES

County	Clean Energy Jobs*
Allegheny	11,950
Philadelphia	9,262
Montgomery	9,069
Chester	5,269
Bucks	5,013
Lancaster	4,455
Berks	3,644
Delaware	3,386
York	3,339
Lehigh	2,541

CLEAN ENERGY JOBS COUNTY HEAT MAP



PROFILE: WORKING IN SOLAR

NAME:
Lemuel Coleman

COMPANY:
Scalo Solar Solutions LLC

LOCATION:
Pittsburgh

POSITION:
Solar Installer

TIME IN POSITION:
1 year

HOW DID YOU BECOME A SOLAR INSTALLER?
"I started with Burns & Scalo Roofing, the parent company of Scalo Solar, in their wall panel division about a year and half ago. There was an increase in solar installations, so I was given the option to move over into the solar division and get trained. I thought it would be an interesting new environment. It was an easy transition. The most difficult thing about working on roofs is the weather, and I wasn't as used to working on roofs as some of the other guys who came from the roofing division. I'm very careful up there, and we have had to learn a lot of safety procedures. But when the solar is installed, it is really something to see. I'm glad I made the transition."

WHAT DO YOU LIKE ABOUT WORKING IN SOLAR?
"I like the concept of solar. It's basically using the free energy from the God-given sun. It's energy that can be stored and used later. Solar saves people money—it's a not a just a cost, it's an investment. I like that we are helping people. Eventually, it will be installed on everything, not just our roofs but on our cars, on walls, even on our devices. It will be everywhere. Solar is the future."

CASE STUDY: SOLAR EQUIPMENT MANUFACTURING

PIONEERING MONTGOMERY COUNTY COMPANY'S PENNSYLVANIA SUPPLY CHAIN CREATES JOBS IN SOLAR, POWER STORAGE AND MANUFACTURING

Inside an unassuming office park in suburban Philadelphia, a handful of Pennsylvania's 85,000 clean energy workers are helping pioneer electrical hardware that improves the performance and lowers the cost of clean energy technologies like solar power and batteries.

Alencon Systems LLC—an abbreviation for "alternative energy conversion"—employs about a dozen people at its office in Hatboro, located in Montgomery County about 20 miles north of downtown Philadelphia. Founded in 2009, most of Alencon's workers are mechanical and electrical engineers or software developers, with a small but growing sales and commercial team.

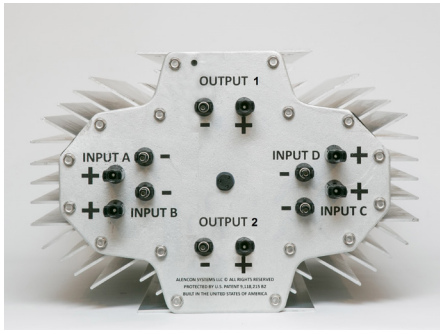
Alencon is in the power electronics business. It designs solar power equipment like inverters and DC-DC optimizers. To the untrained eye, the inverters look like unassuming, gray metal boxes. However, inside are sophisticated electrical components and cutting-edge engineering concepts protected by U.S. and international patents.

Alencon's products are truly "Made in Pennsylvania." While Alencon designs the products in Montgomery County, the company relies on a Central Pennsylvania-based business to actually manufacture its devices and the electrical hardware they contain. Alencon's products are then installed at solar projects across the country and even on military bases.

According to the company: "Alencon is committed not only to manufacturing its products in the U.S., but here in Pennsylvania. We believe that with our strong, Pennsylvania-based supply chain, we can make a high-quality product at a competitive price with the shortest possible lead times from order to shipment."

One of Alencon's main products is called SPOT. Recently, several SPOT DC-DC optimizers were installed in a major solar project in the Southeastern U.S. At this site, Alecon's inverter helps regulate the voltage between the project's solar PV panels and a large, 4 megawatt-hour battery, as well as the solar system's grid-tied inverter. By helping integrate solar PV with energy storage in this way, Alencon claims it can make both technologies more financially viable, more efficient and safer.

Alencon's power electronics hardware installed at a solar array. (Photo courtesy of Alencon)



A close-up of an Alencon product designed in Montgomery County and manufactured at a facility in Central Pennsylvania. (Photo courtesy of Alencon)

PENNSYLVANIA CLEAN ENERGY EMPLOYMENT BY DISTRICT

U.S. CONGRESSIONAL DISTRICT

District	Clean Energy Jobs*	Renewable Energy Jobs	Energy Efficiency Jobs
1 (Rep. Brady)	5,978	572	4,279
2 (Rep. Evans)	4,439	367	3,226
3 (Rep. Kelly)	6,047	466	4,424
4 (Rep. Perry)	5,906	461	4,321
5 (Rep. Thompson)	3,619	291	2,645
6 (Rep. Costello)	9,344	860	6,786
7 (vacant)	6,268	582	4,506
8 (Rep. Fitzpatrick)	6,895	657	4,966
9 (Rep. Schuster)	5,170	406	3,775
10 (Rep. Marino)	5,581	433	4,078
11 (Rep. Barletta)	3,740	315	2,713
12 (Rep. Rothfus)	6,345	710	4,465
13 (Rep. Boyle)	1,452	115	1,059
14 (Rep. Doyle)	6,477	528	4,713
15 (vacant)	5,631	1,169	3,546
16 (Rep. Smucker)	3,081	386	2,137
17 (Rep. Cartwright)	2,202	185	1,597
18 (Rep. Lamb)	2,789	212	2,051

PENNSYLVANIA CLEAN ENERGY JOBS BY DISTRICT

STATE SENATE

District	Clean Energy Jobs
1 (Sen. Farnese)	4,978
2 (Sen. Tartaglione)	1,117
3 (Sen. Street)	372
4 (Sen. Haywood III)	1,869
5 (Sen. Sabatina)	248
6 (Sen. Tomlinson)	3,869
7 (Sen. Hughes)	1,748
8 (Sen. Williams)	507
9 (Sen. Killion)	4,651
10 (Sen. McIlhinney)	2,603
11 (Sen. Schwank)	2,389
12 (Sen. Greenleaf)	1,299
13 (Sen. Martin)	2,842
14 (Sen. Yudichak)	2,250
15 (Sen. DiSanto)	2,375
16 (Sen. Browne)	2,517
17 (Sen. Leache)	3,164
18 (Sen. Boscola)	1,564
19 (Sen. Dinniman)	1,760
20 (Sen. Baker)	1,616
21 (Sen. Hutchinson)	2,380
22 (Sen. Blake)	1,738
23 (Sen. Yaw)	2,085
24 (Sen. Mensch)	1,092
25 (Sen. Scarnati)	1,473

District	Clean Energy Jobs
26 (Sen. McGarrigle)	705
27 (Sen. Gordner)	1,203
28 (Sen. Wagner)	2,475
29 (Sen. Argall)	982
30 (Sen. Eichelberger)	2,555
31 (Sen. Regan)	1,645
32 (Sen. Stephano)	1,572
33 (Sen. Alloway)	857
34 (Sen. Corman)	1,282
35 (Sen. Langerholc)	1,141
36 (Sen. Aument)	1,071
37 (Sen. Reschenthaler)	4,562
38 (Sen. Vulakovich)	1,991
39 (Sen. Ward)	2,397
40 (Sen. Scavello)	999
41 (Sen. White)	1,864
42 (Sen. Fontana)	2,929
43 (Sen. Costa)	703
44 (Sen. Rafferty)	409
45 (Sen. Brewster)	500
46 (Sen. Bartolotta)	1,572
47 (Sen. Vogel)	1,427
48 (Sen. Folmer)	746
49 (Sen. Laughlin)	1,803
50 (Sen. Brooks)	1,066

STATE HOUSE

District	Clean Energy Jobs
1 (Rep. Harkins)	789
2 (Rep.Fabrizio)	648
3 (Rep. Bizzarro)	310
4 (Rep. Sonney)	125
5 (Rep. Jozwiak)	1,084
6 (Rep. Roae)	503
7 (Rep. Longietti)	489
8 (Rep. Nesbit)	752
9 (Rep. Sainato)	544

District	Clean Energy Jobs
10 (Rep. Bernstine)	410
11 (Rep. Ellis)	328
12 (Rep. Metcalfe)	627
13 (Rep. Lawrence)	710
14 (Rep. Marshall)	430
15 (Rep. Christiana)	660
16 (Rep. Matzie)	417
17 (Rep. Wentling)	18
18 (Rep. DiGirolamo)	888

STATE HOUSE CONTINUED

District	Clean Energy Jobs
19 (Rep. Wheatley)	3,129
20 (Rep. Ravenstahl)	870
21 (Rep. Costa, D)	528
22 (Rep. Schweyer)	900
23 (Rep. Frankel)	200
24 (Rep. Gainey)	394
25 (Rep. Markosek)	800
26 (Rep. Hennessey)	1,062
27 (Rep. Deasy)	1,064
28 (Rep. Turzai)	333
29 (Rep. O'Neill)	1,176
30 (Rep. English)	33
31 (Rep. Warren)	1,118
32 (Rep. DeLuca)	476
33 (Rep. Dermody)	209
34 (Rep. Costa, P)	302
35 (Rep. Davis, A)	649
36 (Rep. Readshaw)	259
37 (Rep. Fee)	2,083
38 (Rep. Kortz)	76
39 (Rep. Saccone)	736
40 (Rep. Maher)	835
41 (Rep. Miller, B.)	463
42 (Rep. Miller, D.)	>10
43 (Rep. Greiner)	813
44 (Rep. Mustio)	470
45 (Rep. Kulik)	50
46 (Rep. Ortitay)	174
47 (Rep. Gillespie)	1,384
48 (Rep. O'Neal)	66
49 (Rep. Cook)	706
50 (Rep. Snyder)	143
51 (Rep. Dowling)	262
52(Rep. Warner)	250
53 (Rep. Godshall)	1,170
54 (Rep. Evankovich)	1,348
55 (Rep. Petarca)	550
56 (Rep. Dunbar)	42
57 (Rep. Nelson)	116
58 (Rep. Walsh)	117
59 (Rep. Reese)	405
60 (Rep. Pyle)	295
61 (Rep. Harper)	1,121

District	Clean Energy Jobs
62 (Rep. Reed)	428
63 (Rep. Oberlander)	314
64 (Rep. James)	344
65 (Rep. Rapp)	297
66 (Rep. Dush)	429
67 (Rep. Causer)	229
68 (Rep. Clint)	809
69 (Rep. Metzgar)	313
70 (Rep. Bradford)	1,009
71 (Rep. Barbin)	402
72 (Rep. Burns)	221
73 (Rep. Sankey)	319
74 (Rep. Lewis)	410
75 (Rep. Gabler)	388
76 (Rep. Hanna)	1,114
77 (Rep. Conklin)	67
78 (Rep. Topper)	527
79 (Rep. McGinnis)	746
80 (Rep. Ward)	69
81 (Rep. Irvin)	169
82 (Rep. Harris, A)	654
83 (Rep. Wheeland)	728
84 (Rep. Everett)	260
85 (Rep. Keller, F)	335
86 (Rep. Keller, M)	503
87 (Rep. Rothman)	1,123
88 (Rep. Delozier)	210
89 (Rep. Kauffman)	544
90 (Rep. Schemel)	17
91 (Rep. Moul)	704
92 (Rep. Keefer)	417
93 (Rep. Hill)	619
94 (Rep. Saylor)	67
95 (Rep. Hill-Evans)	>10
96 (Rep. Sturla)	>10
97 (Rep. Mentzer)	>10
98 (Rep. Hickernell)	340
99 (Rep. Zimmerman)	134
100 (Rep. Cutler)	192
101 (Rep. Ryan)	695
102 (Rep. Diamond)	109
103 (Rep. Kim)	1,090
104 (Rep. Helm)	479

STATE HOUSE CONTINUED

District	Clean Energy Jobs
105 (Rep. Marsico)	>10
106 (Rep. Mehaffie)	>10
107 (Rep. Masser)	765
108 (Rep. Culver)	51
109 (Rep. Millard)	160
110 (Rep. Pickett)	327
111 (Rep. Fritz)	653
112 (Rep. Haggerty)	942
113 (Rep. Flynn)	469
114 (Rep. Kavulich)	142
115 (Rep. Madden)	657
116 (Rep. Toohil)	625
117 (Rep. Boback)	370
118 (Rep. Carroll)	498
119 (Rep. Mullery)	571
120 (Rep. Kaufer)	25
121 (Rep. Pashinski)	103
122 (Rep. Heffley)	318
123 (Rep. Goodman)	356
124 (Rep. Knowles)	247
125 (Rep. Tobash)	227
126 (Rep. Rozzi)	427
127 (Rep. Caltagirone)	42
128 (Rep. Gillen)	409
129 (Rep. Cox)	66
130 (Rep. Maloney)	269
131 (Rep. Simmons)	923
132 (Rep. Schlossberg)	554
133 (Rep. Mc.Neill)	802
134 (Rep. Mackenzie)	277
135 (Rep. Samuelson)	159
136 (Rep. Freeman)	438
137 (Rep. Emrick)	352
138 (Rep. Hahn)	326
139 (Rep. Peifer)	302
140 (Rep. Galloway)	800
141 (Rep. Davis, T)	108
142 (Rep. Farry)	648
143 (Rep. Quinn)	1,301
144 (Rep. Watson)	84
145 (Rep. Staats)	25
146 (Rep. Quigley)	217
147 (Rep. Toepel)	133

District	Clean Energy Jobs
148 (Rep. Daley)	1,356
149 (Rep. Briggs)	1,248
150 (Rep. Corr)	25
151 (Rep. Stephens)	691
152 (Rep. Murt)	476
153 (Rep. Dean)	403
154 (Rep. McCarter)	193
155 (Rep. Corbin)	496
156 (Rep. Comitta)	2,322
157 (Rep. Kampf)	417
158 (Rep. Roe)	351
159 (Rep. Kirkland)	638
160 (Rep. Barrar)	59
161 (Rep. Krueger-Braneky)	997
162 (Rep. Miccarelli)	494
163 (Rep. Santora)	729
164 (Rep. Davidson)	>10
165 (Rep. Charlton)	453
166 (Rep. Vitali)	>10
167 (Rep. Milne)	>10
168 (Rep. Quinn)	18
169 (Rep. Klunk)	58
170 (Rep. White)	244
171 (Rep. Benninghoff)	34
172 (Rep. Boyle)	529
173 (Rep. Driscoll)	>10
174 (Rep. Neilson)	>10
175 (Rep. O'Brien)	2,419
176 (Rep. Rader)	161
177 (Rep. Taylor)	178
178 (Rep. Tai)	84
179 (Rep. Dawkins)	218
180 (Rep. Cruz)	>10
181 (Rep. Thomas)	76
182 (Rep. Sims)	2,213
183 (Rep. Mako)	177
184 (Rep. Keller, W)	237
185 (Rep. Donatucci)	102
186 (Rep. Harris, J)	76
187 (Rep. Day)	857
188 (Rep. Roebuck)	101
189 (Rep. Brown, R)	34
190 (Rep. Brown, V)	76

STATE HOUSE CONTINUED

District	Clean Energy Jobs
191 (Rep. McClinton)	>10
192 (Rep. Cephas)	26
193 (Rep. Tallman)	388
194 (Rep. DeLissio)	304
195 (Rep. Bullock)	>10
196 (Rep. Grove)	9
197 (Rep. Vazquez)	>10

District	Clean Energy Jobs
198 (Rep. Youngblood)	60
199 (Rep. Bloom)	0
200 (Rep. Rabb)	>10
201 (Rep. Kinsey)	33
202 (Rep. Solomon)	>10
203 (Rep. Fitzgerald)	>10

ENDNOTES

1 Unless otherwise stated, all data is from the 2018 U.S. Energy & Employment Report (USEER) released in May 2018 by the National Association of State Energy Officials and the Energy Futures Initiative. Visit www.usenergyjobs.org to download USEER and see pages 15-17 for methodology questions. This fact sheet differs from previous reports released by E2 in Pennsylvania as the methodology has been adjusted to more accurately count the number of clean energy workers in the state. For more questions regarding methodology, visit www.e2.org/cleanjobsamerica/FAQ.

2 http://keealliance.org/act-129

3 http://programs.dsireusa.org/system/program

4 http://rggi.org/docs/ProceedsReport/RGGI_Proceeds_Report_2015.pdf.

PRESENTED BY:

E2 is a national, nonpartisan group of business leaders, investors and others who advocate for smart policies that are good for the environment and good for the economy.

Clean Jobs Count is a campaign to raise awareness of the economic importance of the clean economy. Visit www.cleanjobscount.org to join thousands of business leaders, workers and others to tell lawmakers and policymakers that clean jobs count.

IN PARTNERSHIP WITH:

The Keystone Energy Efficiency Alliance (KEEA) is a non-profit, tax-exempt 501(c)(6) corporation dedicated to promoting the energy efficiency and renewable energy industries in Pennsylvania.

The Sustainable Business Network is a community of local businesses and individuals committed to building a just, thriving and sustainable economy in the Greater Philadelphia region.

Sustainable Pittsburgh affects decision-making in the Pittsburgh region to integrate economic prosperity, social equity, and environmental quality as the enduring accountability, bringing sustainable solutions for communities and businesses.

Green Building Alliance (GBA) advances innovation in the built environment by empowering people to create environmentally, economically, and socially vibrant places.