



Transitioning All Electricity In U.S. Cities To 100% Renewable Energy Will Reduce Carbon Pollution, Help U.S. Meet Paris Climate Agreement Targets

New Sierra Club analysis shows that powering U.S. cities with 100 percent renewable electricity can reduce carbon pollution and contribute to the United States meeting the goals of the Paris Agreement. The Sierra Club prepared this analysis based on data from the National Renewable Energy Laboratory (NREL) and Energy Information Administration (EIA). While the focus of this analysis is on the U.S. electric sector, which accounts for roughly one third of US energy-related emissions of carbon dioxide,¹ there are also many actions cities of all sizes can take to eliminate carbon pollution from buildings and transportation.

President Trump's decision to withdraw the United States from the Paris climate agreement has placed greater urgency on leaders at the state and city level to defend the health and well-being of their constituents by accelerating the transition from fossil fuels to renewable energy.

In the past month more than 1,200 governors, mayors, businesses, investors, and colleges & universities across the United States **declared** their intent to ensure that the U.S. remains a global leader in reducing carbon emissions.²

Transitioning to 100 percent renewable energy is a strategy cities can use to achieve progress toward meeting the goals outlined in the Paris Agreement. More than 30 cities have committed to transition to 100 percent renewable electricity, many as part of a comprehensive climate action plan, paired with citywide greenhouse gas reduction goals.

Salt Lake City has set a goal to transition to the community's electricity supply to 100 percent renewable energy by 2032 and to reduce greenhouse gas emissions by 80 percent by 2050, compared to a 2005 baseline.³ San Diego's 2015 Climate Action Plan set a target to achieve 100 percent renewable electricity by 2035, which will help the city reduce emissions 50 percent by 2035.⁴

Across the U.S., a growing number of cities and towns have committed to transition to 100 percent renewable energy in one or more sectors, including major metropolises like Atlanta and small towns like Abita Springs, Louisiana. More than 100 mayors have endorsed the vision of 100 percent renewable energy as part of a new *Mayors for 100% Clean Energy* initiative.

Sierra Club quantified the carbon pollution reductions associated with three groups of cities transitioning to 100 percent renewable electricity:

1. Thirty-six U.S. cities that have passed local policy establishing a goal of powering all electricity use with 100 percent renewable energy. These cities represent a total estimated population of 5.9 million Americans.
2. One-hundred U.S. cities whose mayors have pledged to transition to 100 percent renewable energy by joining *Mayors for 100% Clean Energy*,⁵ an initiative launched in April that engages and recruits mayors to endorse a goal of 100 percent renewable energy in cities across the country. *Mayors for 100% Clean Energy* is co-chaired by Mayor Philip Levine of Miami Beach, Mayor Jackie Biskupski of Salt Lake City, Mayor Kevin Faulconer of San Diego, and Mayor Stephen K. Benjamin of Columbia, South Carolina.
3. The 1,400+ member cities of the United States Conference of Mayors (USCM), the nation's largest nonpartisan organization of cities, if they were to formally commit to transition to 100 percent renewable electricity. On June 23, USCM will host its annual meeting in Miami Beach. Ahead of the gathering, USCM Vice President Mayor Steve Benjamin, along with his *Mayors for 100% Clean Energy* Co-Chairs, introduced a landmark resolution that would establish support from the organization's membership for an urban policy goal of 100 percent renewable energy in the in cities nationwide. If approved, the measure would represent one of the most ambitious energy policies ever supported by USCM and could pave the way to community-wide 100 percent

renewable energy commitments in cities throughout the United States. The policy positions adopted at the annual meeting collectively represent the views of the nation's mayors and are distributed to the President of the United States and Congress.

KEY FINDINGS:

Group 1: 36 cities committed to 100 percent renewable electricity

- When these cities achieve their goal, it will reduce electric sector carbon dioxide emissions by 19.1 million metric tons per year, with 53 percent of these carbon emission reductions occurring by 2025.
- 19.1 million metric tons per year of carbon emission reductions is greater than the total electric sector emissions of many states, including Nevada, New Jersey, Montana, or Maryland.⁶

Group 2: 100+ Mayors for 100% Clean Energy

- If all 100 cities represented by *Mayors for 100% Clean Energy* were to transition to 100 percent renewable electricity, Sierra Club's analysis found that it would reduce electric sector carbon dioxide emissions by 34.5 million metric tons per year.
- This is an amount greater than the electric sector emissions of 28 individual states, including Utah, Iowa, or South Carolina.⁷ The figure is roughly equivalent to Chile's total electric sector carbon emissions.⁸

	Number of Cities	Population (millions)	Total Electricity Use (million MWh)	% of U.S. electricity consumption	New Renewable Energy Capacity (GW)	Potential Carbon Reductions
Cities Committed to 100% Renewable Electricity	36	5.8	62	1.7%	15	19.1 million metric tons
Mayors in support of 100% Renewable Electricity	100	12.5	125	3.4%	30	34.5 million metric tons
Members of the U.S. Conference of Mayors	1,481	148	1,558	41.8%	422	619 million metric tons

Group 3: 1,481 United States Conference of Mayors member cities

- If every city that is a member of the U.S. Conference of Mayors were to transition to 100 percent renewable electricity, it would reduce electric sector carbon dioxide emissions by 619 million metric tons.
- This is roughly the equivalent of the total electric sector carbon emissions of Texas, Pennsylvania, Indiana, Florida, and Ohio combined. It is also 34% percent of 2016 U.S. electric sector carbon emissions.⁹

DATA AND METHODOLOGY:

Electricity consumption estimates (2013) for each city were taken from the [NREL's State and Local Energy Data \(SLED\) tool](#). Existing wind and solar electricity generation as well as legislated renewable portfolio standards were taken into account when estimating potential additional renewable energy generated by cities committing to move to 100 percent renewable energy.

The emissions reduction potential of this additional renewable energy generation was estimated using state-specific emissions factors for non-zero marginal cost electricity, derived from [EIA electric power sector carbon dioxide emissions](#) (2014 reported and 2016 estimated) and [net generation](#) datasets.

New renewable energy capacity was calculated using state-specific wind energy capacity factors. This calculation was performed for wind energy, purely for illustrative purposes. The city commitments would lead to a mixture of new wind and solar capacity.

Population numbers are taken from 2010 U.S. census data.

CONCLUSION

While President Trump retreats on climate action, local leaders across the United States are advancing bold and ambitious plans to accelerate the move away from fossil fuels. Transitioning to 100 percent renewable energy in



one or multiple sectors is an emerging strategy adopted by over 30 U.S. cities and supported by over 100 U.S. mayors. The U.S. Conference of Mayors, the nation's largest nonpartisan organization of cities and mayors, will also soon consider whether to formally support the goal of 100 percent renewable energy in cities nationwide.

According to a Sierra Club analysis of NREL and EIA data, transitioning to 100 percent clean electricity in cities across the country can help the United States meet its Paris climate commitments while achieving significant reductions in electric sector carbon pollution.

APPENDIX A: LIST OF CITIES COMMITTED TO 100% CLEAN ENERGY

Cities	State	Date of Commitment	Population	Target Date
Aspen	CO	May 2007	6,658	Achieved in 2015
San Jose	CA	October, 2007	945,942	2022
Rock Port	MO	April 18, 2008	1,318	Achieved in 2008
Greensburg	KS	May 19, 2008	777	Achieved in 2013
Kodiak Island	AK	2008	6,130	Achieved 99.5% in 2012
San Francisco	CA	December 2010	805,235	2030
Burlington	VT	July 26, 2012	42,417	Achieved in 2014
Georgetown	TX	2012	47,400	2017
Palo Alto	CA	March 2013	64,403	2017
County of Taos	NM	October 15, 2013		2030
Taos	NM	October 22, 2013	5,716	2030
Questa	NM	January 7, 2014	1,770	2030
Eagle Nest	NM	January 28, 2014	290	2030
Taos Ski Valley	NM	February 4, 2014	313	2030
Red River	NM	March 21, 2014	477	2030
Angel Fire	NM	April 22, 2014	1,216	2030
East Hampton	NY	May, 20 2014	21,457	2030
San Diego	CA	December 15, 2015	1,307,402	2035
Del Mar	CA	June 6, 2016	4,161	2035
Salt Lake City	UT	July 12, 2016	186,440	2032
Park City	UT	October 11, 20 16	7,558	2032
St. Petersburg	FL	November 21, 2016	253,693	2030
Boulder	CO	December 6, 2016	97,385	2030
Pueblo	CO	February, 13 2017	108249	2035
Moab	UT	February 14, 2017	5,046	2032
Abita Springs	LA	March 21, 2017	2,365	2030
Madison	WI	March 21, 2017	233,209	TBD
South Lake Tahoe	CA	April 18, 2017	21,403	2032
Cambridge	MA	April 24, 2017	105,162	2035
Atlanta	GA	May, 1 2017	420,003	2035
Southampton	NY	May 9, 2017	3,109	2025
Hanover	NH	May 9, 2017	8,636	2050
Portland	OR	June 1, 2017	583,776	2050
Santa Barbara	CA	June 6, 2017	88,410	2030
Monterey	CA	June 6, 2017	27,810	2040
Sarasota*	FL	June 19, 2017	51,917	2040
Columbia*	SC	June 20, 2017	129,272	2036

*Commitments adopted but final adopted language not yet posted when this report was printed

APPENDIX B: LIST OF MAYORS FOR 100% CLEAN ENERGY (AS OF JUNE 15, 2017)

	Title	Name	City	State	Population (2010)
1	Mayor	Philip Levine	Miami Beach	FL	87,779
2	Mayor	Jackie Biskupski	Salt Lake City	UT	186,440
3	Mayor	Steve Benjamin	Columbia	SC	129,272
4	Mayor	Kevin Faulconer	San Diego	CA	1,307,402
5	Mayor	Eric Garcetti	Los Angeles	CA	3,792,621
6	Mayor	Suzanne Jones	Boulder	CO	97,385
7	Mayor	Greg Lemons	Abita Springs	LA	2,365
8	Mayor	Sam Liccardo	San Jose	CA	945,942
9	Mayor	Mark Meadows	East Lansing	MI	48,579
10	Mayor	Greg Scharff	Palo Alto	CA	64,403
11	Mayor	Helene Schneider	Santa Barbara	CA	88,410
12	Mayor	Steve Skadron	Aspen	CO	6,658
13	Deputy Mayor	D. Dwight Worden	Del Mar	CA	4,161
14	Mayor	Ardell Brede	Rochester	MN	106,769
15	Mayor	Rick Kriseman	St. Petersburg	FL	244,769
16	Mayor	Bob Dixon	Greensburg	KS	779
17	Mayor	Rosalynn Bliss	Grand Rapids	MI	188,040
18	Mayor	Drew Fixell	Tarrytown	NY	11,277
19	Mayor	Christopher Taylor	Ann Arbor	MI	113,934
20	Mayor	Phillip D. Kramer	Franklin Township	NJ	5,045
21	Mayor	Ethan K. Strimling	Portland	ME	66,194
22	Mayor	Cary Glickstein	Delray Beach	FL	60,522
23	Mayor	Tom Butt	Richmond	CA	103,701
24	Mayor	John Engen	Missoula	MT	66,788
25	Mayor	Frank Bivona	Franklin Lakes	NJ	10,590
26	Mayor	Philip K. Stoddard	South Miami	FL	11,657
27	Mayor	Miro Weinberger	Burlington	VT	42,417
28	Mayor	David Mejia	Alhambra	CA	83,089
29	Mayor	John A Ostenburg	Park Forest	IL	21,975
30	Mayor	JoAnn B Seghini	Midvale City	UT	27,964
31	Mayor	Peter Rustin	Tenafly	NJ	14,488
32	Mayor	Skylar Peak	Malibu	CA	12,645
33	Mayor	Dave Coulter	Ferndale	MI	19,900
34	Mayor	Nicola Smith	Lynnwood	WA	35,836
35	Mayor	Shelley Welsch	University City	MO	35,371
36	Mayor	Jordan Norley	Borough of West Chester	PA	18,461
37	Mayor	Mary Prochnow	Los Altos	CA	28,976
38	Mayor	Eugene Flinn	Palmetto Bay	FL	23,410
39	Mayor	Lydia E Lavelle	Carrboro	NC	19,582
40	Mayor	Emmett V Jordan	Greenbelt	MD	23,068
41	Mayor	Lioneld Jordan	Fayetteville	AR	73,580
42	Mayor	Heidi Harmon	San Luis Obispo	CA	45,119

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	Title	Name	City	State	Population (2010)
43	Mayor	David S Cassetti	Ansonia	CT	19,249
44	Mayor	Val Tollefson	Bainbridge Island	WA	23,025
45	Mayor	Annette M Blackwell	Maple Heights	OH	23,138
46	Mayor	John L Rowe, Jr.	Portsmouth	VA	95,535
47	Mayor	Bert H Steinmann	Ewing Township	NJ	35,707
48	Mayor	Christopher Roberts	Shoreline	WA	53,007
49	Mayor	Derrick Henry	Daytona Beach	FL	61,005
50	Village President	Charles E Tokar	Village of Chicago Ridge	IL	14,305
51	Mayor	Catherine Blakespear	Encinitas	CA	59,518
52	Mayor	Savita Vaidhyathan	Cupertino	CA	58,302
53	Mayor	Alan L Nagy	Newark	CA	42,573
54	Mayor	Ted Winterer	Santa Monica	CA	89,736
55	Mayor	Glenn Hendricks	Sunnyvale	CA	140,081
56	Mayor	Mary Casillas Salas	Chula Vista	CA	243,916
57	Mayor	Glenn R Sylvester	Daly City	CA	101,123
58	Mayor	Judy Paul	Town of Davie	FL	91,992
59	Mayor	Bobby Hopewell	Kalamazoo	MI	74,262
60	Mayor	Biff Traber	Corvallis	OR	54,462
61	Mayor	Tim Kabat	La Crosse	WI	51,320
62	Mayor	Patrick L Wojahn	College Park	MD	30,413
63	Mayor	Esther Manheimer	Asheville	NC	83,393
64	Mayor	Buddy Dyer	Orlando	FL	238,300
65	Mayor	Fred Shaw	Carpinteria	CA	13,040
66	Mayor	Len Pagano	St. Peters	MO	52,575
67	Mayor	Lamar Fisher	Pompano Beach	FL	99,845
68	Mayor	Elizabeth Patterson	Benicia	CA	26,997
69	Mayor	Mark Gamba	Milwaukie	OR	20,291
70	Mayor	Lily Mei	Fremont	CA	214,089
71	Mayor	Kathy Sheehan	Albany	NY	97,856
72	Mayor	Jesse Arreguin	Berkeley	CA	112,580
73	Mayor	Bill Peduto	Pittsburgh	PA	305,704
74	Mayor	John F. Johnston	Ojai	CA	7,461
75	Mayor	Jennifer Roberts	Charlotte	NC	731,424
76	Mayor	John Adornato	Oakland Park	FL	41,363
77	Mayor	Gary Wikinson	Town of Frisco	CO	2,683
78	Mayor	Bob Nation	Chesterfield	MO	47,484
79	Mayor	Dale Ross	Georgetown	TX	47,400
80	Mayor	Brian Wenzka	Atglen Borough	PA	1,410
81	Mayor	Barry Greenberg	Maplewood	MO	7,959
82	Mayor	Nina Jonas	Ketchum	ID	2,720
83	Mayor	Daniel Dietch	Surfside	FL	5,996

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	Title	Name	City	State	Population (2010)
84	Mayor	Matthew Fetick	Borough of Kennett Square	PA	6,151
85	Mayor	Jeri Muoio	West Palm Beach	FL	104,031
86	Mayor	Michael J Speck	Phoenixville	PA	16,599
87	Supervisor	Joe Landry	Niskayuna	NY	21,781
88	Mayor	Brian P Stack	Union City	NJ	68,668
89	Mayor	Harry Dressler	Tamarac	FL	63,793
90	Mayor	Ed Pawlowski	Allentown	PA	119,104
91	Mayor	Gary R McCarthy	Schenectady	NY	65,936
92	Mayor	Seth Leonard	Winooski	VT	7,228
93	Mayor	Reggie Jones	Dellwood	MO	5,005
94	Mayor	Richard J Kaplan	Lauderhill	FL	70,626
95	Mayor	Clyde Roberson	Monterey	CA	28,276
96	Mayor	Jack Thomas	Park City	UT	8,058
97	Mayor	Scott Donahue	Emeryville	CA	11,227
98	Mayor	Christine Berg	Lafayette	CO	29,081
99	Mayor	Pam Hemminger	Chapel Hill	NC	59,376
100	Mayor	Jim Carruthers	Traverse City	MI	15,042

The Sierra Club's **Ready for 100 campaign** launched in 2016 and is working to address climate change, cut pollution, create jobs, and make energy more affordable through an equitable transition to 100 percent clean, renewable energy in cities across the United States.

ENDNOTES

- <https://www.eia.gov/tools/faqs/faq.php?id=77&t=11>
- "We Are Still In" (<http://www.wearestillin.com>) is an open letter to the international community and parties to the Paris Agreement from U.S. state, local, and business leaders delivered by Michael Bloomberg, United Nations Secretary-General's Special Envoy for Cities and Climate Change to the United Nations Secretary-General and Executive Secretary of the UN Framework Convention on Climate Change.
- <http://www.slcgreen.com/climate-slc>
- <https://www.sandiego.gov/sustainability/climate-action-plan>
- <https://www.mayors4cleanenergy.org>
- <https://www.eia.gov/environment/emissions/state/analysis/pdf/table3.pdf>
- <https://www.eia.gov/environment/emissions/state/analysis/pdf/table3.pdf>
- <http://cait.wri.org/historical/>
- https://www.eia.gov/totalenergy/data/monthly/pdf/sec12_9.pdf

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