

GREEN UTILITIES REPORT

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Vol. 8, No. 44

www.energyintel.com

October 31, 2019

EI New Energy Top 100 Green Utilities

TOP 100 RANKINGS BASED ON CARBON EMISSIONS AND RENEWABLE ENERGY

Rank				Capacity		Rank				Capacity	
2019	2018	Points	Company	Country	(GW)	2019	2018	Points	Company	Country	(GW)
1	1	172	Acciona	Spain	9.6	51	42	73	CEZ	Czech Rep.	15.0
2	4	158	E.ON	Germany	9.8	52	45	73	Calpine	US	25.9
3	2	153	China General Nuclear (CGN)	China	49.7	53	47	73	Entergy	US	25.2
4	3	150	Iberdrola	Spain	47.4	54	NA	72	Acwa Power	Saudi Arabia	7.5
5	5	147	NextEra Energy	US	45.6	55	50	71	Corpoelec	Venezuela	24.0
6	11	143	China Three Gorges	China	70.3	56	53	71	Vietnam Electricity	Vietnam	25.9
7	9	141	Orsted	Denmark	6.7	57	NA	71	Tenaska	US	7.0
8	7	137	Energias de Portugal (EDP)	Portugal	27.2	58	46	69	Comision Federal de Electricidad (CFE)	Mexico	42.0
9	13	131	EDF	France	131.0	59	59	69	Kyushu Electric Power Co.	Japan	18.8
10	6	130	Invenergy	US	6.0	60	27	68	Sembcorp Industries	Singapore	9.5
11	12	120	Enel	Italy	85.6	61	NA	67	Egco	Thailand	5.2
12	30	120	China National Nuclear Corp.	China	22.7	62	60	67	Tennessee Valley Authority (TVA)	US	33.5
13	16	115	Statkraft	Norway	19.3	63	55	66	Dubai Elec. & Water Authority (Dewa)	UAE	11.1
14	19	111	Exelon	US	32.5	64	NA	66	Bulgarian Energy Holding (BEH)	Bulgaria	6.3
15	NA	111	Copel	Brazil	5.7	65	29	66	Tata Power	India	11.0
16	10	110	State Power Investment (SPIC)	China	140.3	66	63	66	Kansai Electric Power Co.	Japan	35.9
17	17	108	Vattenfall	Sweden	28.5	67	44	65	RWE	Germany	41.7
18	24	106	Elektrobras	Brazil	49.8	68	48	62	China Resources	China	37.4
19	20	106	Verbund	Austria	9.7	69	62	61	Talen Energy	US	14.6
20	15	106	SSE	UK	10.5	70	58	61	Egyptian Electricity Holding (EEHC)	Egypt	53.2
21	NA	104	Cemig	Brazil	6.1	71	NA	61	Pinnacle West Capital	US	6.8
22	25	104	Ontario Power Generation	Canada	16.1	72	54	59	AES	US	22.2
23	23	104	Axpo	Switzerland	9.3	73	61	59	Xcel Energy	US	18.2
24	NA	104	NHPC	India	6.4	74	NA	59	OGE Energy	US	6.6
25	NA	100	NPCIL	India	6.8	75	49	57	American Electric Power (AEP)	US	28.5
26	26	100	Engie	France	68.5	76	68	56	Inter RAO UES	Russia	33.7
27	NA	100	Hidroelectrica	Romania	6.4	77	77	55	FirstEnergy	US	15.3
27	30	100	Rosatom	Russia	30.1	78	70	55	Chubu Electric Power Co.	Japan	33.5
29	35	100	Energoatom	Ukraine	14.2	79	69	54	Tokyo Electric Power Co. (Tepco)	Japan	63.7
30	32	100	Hydro-Quebec	Canada	37.3	80	66	54	Korea Electric Power Corp. (Kepco)	S. Korea	81.4
31	33	100	BC Hydro	Canada	12.1	81	72	53	Uniper	Germany	36.6
32	28	97	PG&E	US	7.7	82	71	52	Tenaga Nasional Berhad (TNB)	Malaysia	14.1
33	NA	95	NY Power Authority (NYPA)	US	5.9	83	56	52	Elektrik Uretim AS (EUAS)	Turkey	18.5
34	14	94	Berkshire Hathaway Energy	US	31.2	84	NA	52	EPH	Czech Rep.	11.6
35	34	92	Dominion Energy	US	25.1	85	83	52	CLP Holdings	China	19.4
36	8	90	China Energy Investment	China	238.4	86	67	52	Taqva	UAE	9.6
37	NA	89	Alpiq	Switzerland	6.1	87	57	52	TransAlta	Canada	8.2
38	36	89	Fortum	Finland	13.7	88	73	52	Tohoku Electric Power Co.	Japan	16.8
39	37	88	Energie Baden-Wuerttemberg (EnBW)	Germany	13.4	89	NA	51	Emera	Canada	10.3
40	40	88	Naturgy	Spain	15.6	90	74	50	Taiwan Power	Taiwan	33.4
41	38	87	Public Service Ent. Group (PSEG)	US	11.9	91	78	48	Egat	Thailand	15.8
42	52	83	A2A	Italy	11.7	92	NA	48	Shikoku Electric Power Co.	Japan	5.4
43	51	83	EuroSibEnerg	Russia	19.6	93	75	47	Tavanir	Iran	36.3
44	22	81	China Datang	China	138.9	94	76	45	Sonelgaz	Algeria	15.7
45	18	81	China Huaneng	China	176.6	95	80	45	Hokuriku Electric Power Co.	Japan	8.1
46	39	81	Southern Co.	US	45.8	96	NA	44	Alliant Energy	US	6.2
47	41	80	Duke Energy	US	53.8	97	65	43	DTE Energy	US	12.5
48	43	78	RusHydro	Russia	38.2	98	86	43	Vistra Energy	US	40.5
49	21	75	China Huadian	China	147.8	99	88	41	WEC Energy	US	8.6
50	NA	73	Electricity Supply Board (ESB)	Ireland	5.6	100	79	41	J-Power	Japan	24.2

Giant and Minnows Alike Shifting Power Portfolios

Many power companies are shifting their portfolios to add renewables and phase out fossil fuels, with both industry heavyweights and smaller newcomers aiding the transition. By the numbers, carbon-free power technologies including solar, wind, hydropower and nuclear accounted for 80% of new generation capacity added last year, or 46 gigawatts, by companies in Energy Intelligence’s annual ranking of 100 of the world’s top “green” utilities and independent power producers (IPP). This was instrumental in bringing average carbon dioxide emissions of companies in the ranking to 440 kilograms per megawatt hour, down from 565 kg CO₂/MWh in 2011 when the ranking was first published. This is largely due to the progressive switch of large incumbents’ capacity to more renewables, but also to the arrival in the ranking of specialized renewable companies, such as Spain’s infrastructure conglomerate and IPP Acciona (ranked first this year for the fifth time in a row) and the US’ Invenegy (10), which could soon be joined by smaller but growing developers such as Singapore’s Vena Energy or India’s Greenko.

The 100 companies in the ranking represent approximately 45% of the world’s power generating capacity. By technology, they account for 90% of global nuclear capacity, which all belongs to large operators, but only around 30% of wind and solar generation, where millions of “prosumers” are involved alongside utilities and large IPPs. Since the first ranking, while total capacity accounted for has increased by 10% to 3,140 GW, up from 2,867 GW, non-hydro renewables have almost tripled to 329 GW or 10% of total capacity, up from 116 GW or 4%. Meanwhile, fossil fuels dropped from 65% to 57%, while hydro-power slightly grew from 19% to 21% and nuclear stagnated at 12% (NE Oct.24’19).

The top 10 include six European, two Chinese and two US firms together owning 318 GW or a staggering 80% of carbon-free capacity — almost equally split between nuclear (28%), hydropower (26%) and other renewables (25%). Those companies boast average emissions of just 93 kg/MWh. Slight adjustments were made to the 2019 methodology in order to expand the sample under consideration while better rewarding low emissions regardless of a company’s mix. As a result of these changes, some of the most coal-intensive generators present in earlier editions were dropped. Those include Australia’s AGL, South Africa’s Eskom, Israel’s IEC, India’s NTPC, Indonesia’s PLN, Poland’s PGE, Greece’s PPC and the US’ Ameren, Evergy, NRG Energy and PPL (NE Apr.25’19). The most inefficient oil and gas-centered generators were also dropped, including Kuwait’s MEW,

Saudi Electricity Co. and Russia’s Mosenergo and OGK-2. China’s Yudean and Japan’s Chugoku Electric and Hokkaido Electric also left the ranking.

New additions this year include hydropower specialists Copel (15) and Cemig (21) of Brazil, India’s NHPC (24), Romania’s Hidroelectrica (27) and the US’ NYPA (33). It also includes India’s nuclear operator NPCIL (25) and Switzerland’s Alpiq (37), which combines substantial hydro and nuclear capacity. Other additions are lower in the ranking and include Ireland’s ESB (50), Saudi Arabia’s Acwa Power (54), a major developer of renewable projects in the Mideast and South Africa, the US’ Tenaska (57), Pinnacle West Capital (71), OGE Energy (74) and Alliant Energy (96), Thailand’s Egco (61), Bulgaria’s BEH (64), the Czech Republic’s EPH (84), Canada’s Emera (89) and Japan’s Shikoku Electric (92).

The rankings are calculated using a system in which each company is awarded up to 200 points, 100 of which are based on carbon intensity, or CO₂/MWh generated. The other 100 points are based on non-hydro renewable capacity, in absolute and relative terms, because such capacity, which mostly consists of wind and solar, is growing rapidly in most parts of the world and reflects generators’ efforts to decarbonize. The main table lists all 100 companies with points — in whole numbers, even though actual points are fractional — along with their rank in 2019 and 2018 and their total capacity as an indication of size. Three other tables show the top 20 performers under each criterion — CO₂ emissions per MWh, size of renewable energy capacity in GW and proportion of non-hydro renewables in total capacity.

A fifth table shows the top CO₂-free generators, with hydropower and nuclear assigned equal status with non-hydro renewables. Hydro is not included as a form of renewable energy in the main ranking due to the controversial social and environmental impacts of large dams. The report also includes a summary graph showing each company as a “bubble” that is sized according to renewable capacity in GW and placed according to its emissions intensity and share of renewable capacity. Firms with large bubbles in the upper right corner of the graphic rank highest.

The ongoing energy transition has had its most dramatic impact on European utilities, which, besides adding 43 GW of wind and solar capacity since 2011, have retired or divested 100 GW of fossil fuel assets (NE Nov.1’18). Spain’s Iberdrola (4), Portugal’s EDP (8), France’s EDF (9) and Engie (26) and Italy’s Enel (11) are among the leading renewable developers globally (NE Jan.31’19). Orsted (7), the largest offshore wind company in the world, and Sweden’s Vattenfall (17) are both committed to

Power Capacity Changes by Region Since 2011

(in GW)	Renewables	Hydro	Nuclear	Fossil Fuels	Total
China	131.0	87.1	38.5	225.9	482.5
FSU	0.2	3.8	12.5	1.8	18.4
Other Americas	2.5	11.0	-1.4	5.0	17.1
Other Asia-Pacific	3.7	7.2	9.3	-33.9	-13.7
Japan	0.3	-4.2	-13.2	-3.4	-20.6
Europe	43.3	15.8	-3.9	-99.8	-44.6
Mideast-Africa	2.2	1.3	-0.9	-64.2	-61.6
US	29.1	-1.5	-6.5	-125.9	-104.9
Total	212.3	120.6	34.2	-94.6	272.5

Change in generation capacity in the Top 100 ranking from 2011-18, in gigawatts. As companies have changed over the period, capacity variations are either caused by internal changes within companies or changes in the ranking composition. Source: Energy Intelligence

Power Capacity Additions by Region

(in GW)	Renewables	Hydro	Nuclear	Fossil Fuels	Total
China	18.7	10.0	7.4	8.8	45.0
Mideast-Africa	0.7	14.0	0.3	0.0	15.0
FSU	0.0	1.1	0.4	2.2	3.7
Other Asia-Pacific	0.0	5.8	-2.0	-1.3	2.5
Other Americas	0.6	-0.9	1.1	0.0	0.8
Europe	8.1	-7.6	0.4	-1.6	-0.7
Japan	0.0	-2.5	0.0	-0.5	-3.0
US	3.6	-6.6	0.0	-0.7	-3.7
Total	31.7	13.3	7.6	6.8	59.5

Net generation capacity added in 2018 by companies in the ranking, in gigawatts. Source: Energy Intelligence

Top 10 Generators Based on Carbon Emissions and Renewable Energy

Rank	Company	Country	Emissions		Renewables	
			(kg CO ₂ /MWh)	(GW)	(% of Total)	
1	Acciona	Spain	2	8.8	91%	
2	E.On	Germany	0	5.7	58%	
3	China General Nuclear (CGN)	China	98	15.5	31%	
4	Iberdrola	Spain	163	16.6	35%	
5	NextEra Energy	US	198	16.8	37%	
6	China Three Gorges	China	18	10.0	14%	
7	Orsted	Denmark	131	3.8	57%	
8	Energias de Portugal (EDP)	Portugal	257	11.3	42%	
9	EDF	France	66	9.8	7%	
10	Invenery	US	183	2.9	49%	

Top 10 companies in the ranking with emissions in kilograms of carbon dioxide per megawatt hour of electricity, and renewable capacity (excluding hydro) in gigawatts and % of total capacity. Source: Energy Intelligence

abandon all fossil fuel generation soon. Germany’s two biggest utilities, E.On (2) and RWE (67), are also working hard on decarbonization (NE Sep.26’19). After E.On spun off its legacy fossil fuel assets into newly created Uniper (81) in 2016, the two companies are now engaged in an asset swap that will turn E.On into a grid and retail operator, and RWE into a pure generator — but a bigger and greener one than today. RWE announced it would be carbon neutral by 2040, while E.On will most likely leave Energy Intelligence’s ranking, which is about generating capacity and related emissions. Despite heavy reliance on coal, Germany’s EnBW (39) and the Czech Republic’s CEZ (51) are also investing significantly in renewables, keeping them in — or almost in — the first half of the ranking.

The switch from fossil fuels to renewables among the largest US utilities has also been remarkable. NextEra Energy (5), Exelon (14), Berkshire Hathaway Energy (34), Dominion Energy (35), PSEG (41), Southern (46), Duke Energy (47), Entergy (53), Xcel Energy (73) and AEP (75), which together account for around 320 GW or approximately 30% of total US capacity, have added 26 GW of renewable generation since 2011. Meanwhile, their fossil fuel capacity shrank by a considerable 37 GW while massively switching from coal to gas. These factors caused their average emissions to drop to 364 kg CO₂/MWh — roughly those of a combined-cycle gas turbine (CCGT) — in 2018, down 36% from 568 kg CO₂/MWh in 2011. Although noteworthy, this remains a long way off from what is needed to reach the Paris Agreement’s targets (NE Oct.10’19).

A growing number of US utilities have set decarbonization goals in line with their European counterparts, which predict that EU electricity will be 75% carbon free by 2030, up from 58% in 2018, and fully decarbonized by 2050 (NE Sep.19’19). The US’ Duke Energy, for example, plans to cut its CO₂ emissions by half over 2005-30 and fully decarbonize by 2050. “The reduction Duke Energy has already achieved meets or exceeds the standards of the former Clean Power Plan and the 2025 US commitment to the Paris Agreement,” the company touted in a recent statement. Similarly, carbon-intensive Xcel Energy hopes to cut CO₂ emissions by 80% over 2005-30 and aims for zero-carbon electricity by 2050, while AEP is “confident” it will cut CO₂ emissions by more than 80% over 2000-50 and has recently revised its 2030 reduction target to 70%, up from the previous 60% (NE Sep.27’18). This will involve adding some 8.6 GW of new wind and solar generation to serve the company’s regulated utility customers by 2030.

While the most carbon-intensive generators have been dropped, several coal-dependent companies remain in the lowest part of the

ranking, such as Japan’s J-Power (100), Midwestern US utilities WEC Energy (99), Vistra Energy (98), DTE Energy (97) and Alliant Energy, and Canada’s TransAlta (87). And while some of the companies at the bottom of the ranking perform reasonably well in terms of emissions — at around 500 kg CO₂/MWh, much better than coal’s 800-1,000 kg/MWh — they are handicapped by the small size — or sometimes nonexistence — of renewable capacity. Examples include Thailand’s Egat (91), Taiwan Power (90), Malaysia’s TNB (82), South Korea’s Kepco (80) and Russia’s Inter RAO UES (76) which together own only 1.3 GW of renewables, or less than 1% of their total capacity (NE Oct.10’19).

Likewise, Mideast generators tend to rank poorly because they do not consider renewables a priority while a large chunk of their generating fleets are made of inefficient steam-cycle plants — rather than CCGTs. Algeria’s Sonelgaz (94), Iran’s Tavanir (93) and the United Arab Emirate’s Taqa (86) are ranked about as low as coal-based utilities. Another UAE company, Dewa (63), achieves reasonably low emissions and comparatively good rankings thanks to modern CCGTs — often associated with seawater desalination — and investments in renewable projects.

Japanese utilities rank in the second half of the ranking, from Kyushu Electric (59) to Hokuriku Electric (95), although renewable generation tripled in Japan to well over 10% of total production now, up from 3.5% in 2010, as most of it belongs to small independent operators rather than the utilities. Japanese utilities’ emissions also grew after the 2011 Fukushima accident, which caused all nuclear capacity to be shut down and the share of coal and gas to increase substantially as a substitute.

Among fossil fuel-producing countries, Venezuela’s Corpoelec (55), Vietnam Electricity (56), Mexico’s CFE (58), Egypt’s EEHC (70) and Turkey’s EUAS (83) take advantage of large hydro resources — while suffering from the very little investment they make in other renewables. Hydropower also allows Norway’s Statkraft (13), Brazil’s Eletrobras (18), Austria’s Verbund (19), Canada’s Hydro-Quebec (30) and BC Hydro (31), and Russia’s EuroSibEnerg (43) and RusHydro (48) to achieve very low emissions levels. Nuclear operators such as China National Nuclear Corp. (12), Russia’s Rosatom (27) and Ukraine’s Energoatom (29) perform equally well because nuclear emits no CO₂. Switzerland’s Axpo (23) and Alpiq, Canada’s Ontario Power Generation (22) and Finland’s Fortum (38) combine significant hydro and nuclear capacity.

The change in methodology from last year mostly penalized China’s largest generators, which are among the biggest renewable operators in the world but also own huge amounts of carbon-intensive coal-fired plants. China Energy Investment (36), China Datang (44), China Huaneng (45) and China Huadian (49) still made it in the first half of the ranking but at the end of it, while China Resources, which is less diversified in green technologies, ranks 68. By contrast, CGN (3) and China Three Gorges (6) are unique examples of companies combining nuclear or hydro with substantial renewable capacity and very little fossil fuel generation. SPIC (16) operates an equally unique and relatively balanced mix of fossil fuels (56%), wind and solar (23%), hydropower (17%) and nuclear (4%). ■

How We Rank the Top 100 Green Utilities

For the ranking, Energy Intelligence selected some 125 power generators from around the world with a capacity of at least 5 gigawatts. Important countries such as Australia are hardly represented in that selection — while some, such as Argentina, are not represented at all — because the local power sector is fragmented in those countries. Similarly, and sometimes simultaneously, most power generation has been taken over by foreign companies in countries such as Chile and the Netherlands. Since power consumption remains very small in each African country, only one sub-Saharan African company, South Africa’s Eskom, was included in the initial selection — and did not make it to the final ranking this year because of its coal dependency and limited renewable capacity.

To evaluate their “greenness,” each utility was awarded up to 200 points based on three criteria:

- The first assesses direct carbon dioxide emissions per megawatt hour of electricity produced, with 100 points for the lowest emitters — such as pure renewable or nuclear generators — and zero for the highest emitter in the selection, Eskom, at just over 1,000 kilograms of CO₂ per megawatt hour. Other companies’ points are based on how they compare to the highest and lowest emitters. Nuclear energy and renewable sources are considered to be emission-free, despite indirect emissions related, for example, to the manufacturing of equipment and mining of fuel. Emissions caused by generating the electricity that utilities procure from independent producers are not taken into account. On average, companies in the ranking emit 440 kg CO₂/MWh, ranging from zero for six companies to 834 kg CO₂/MWh for China Resources.
- The second and third criteria measure a company’s renewable energy capacity in GW and in proportion to their total capacity. These criteria exclude hydropower because large dams are controversial and often excluded from the “renewables” category in official statistics. The firm with the greatest renewable capacity, China Energy Investment, earned 50 points in the second criterion, while

11 companies without renewable generation received no points and an additional 19 companies received less than one point. Similarly, in the third criterion, a company can earn between zero points without any renewables to 50 points with 100% renewables. Points under these two criteria are to some extent correlated, but large companies may own substantial renewable capacity that only amounts to a modest share of their total fleet, while smaller ones may have a high proportion of renewable capacity without it being huge in absolute terms.

The ranking uses the latest available full-year data, usually fiscal year 2018, mostly from official company sources. While companies are getting more open to disclosing information on CO₂ emissions, those often remain hard to obtain, especially outside of Europe and North America. Energy Intelligence has therefore produced its own estimates based on published or estimated fuel consumption data for about 20 companies in the ranking. It is worth noting that US utilities’ emissions, which were seldom available until last year, are now provided by most companies under the sustainability template designed by the Edison Electric Institute, the industry’s lobby group.

The capacity of the 100 companies in the ranking ranges from 238 GW for China Energy Investment to just over 5 GW for Thailand’s Egco, with non-hydro renewables ranging from China Energy Investment’s 40 GW and over 10 GW for another 10 companies, to 100 megawatts or less for 24 companies. In all, they total 3,140 GW, or 45% of the world’s total generating capacity, based on 2017 data from the International Energy Agency. This includes 62% of capacity in Japan, 59% in China, 52% in Europe, 46% in the US and 42% in the former Soviet Union, but only 37% in the rest of the Americas, 25% in the Mideast and Africa and 22% in the rest of the Asia-Pacific region. Some large utilities in terms of sales, such as New York’s Con Edison, are not included, as they only supply power without generating it. Conversely, independent power producers without retail customers, such as Spain’s Acciona and the US’ Invenergy, are included. ■

Top Green Power Generators: Carbon-Free Generation Capacity (GW)

Rank	Company	Country	Nuclear	Hydro	Renewables	Total CO ₂ -free	CO ₂ -free / Total
1	Acciona	Spain	0.0	0.9	8.8	9.6	100%
1	China National Nuclear Corp.	China	19.1	1.8	1.8	22.7	100%
1	E.ON	Germany	4.2	0.0	5.7	9.8	100%
1	Rosatom	Russia	30.1	0.0	0.0	30.1	100%
5	Energoatom	Ukraine	13.8	0.3	0.0	14.2	100%
6	Hydro-Quebec	Canada	0.0	36.8	0.0	36.8	99%
7	BC Hydro	Canada	0.0	11.9	0.0	11.9	99%
8	China Three Gorges	China	0.0	57.7	10.0	67.7	96%
9	Eletrobras	Brazil	2.0	44.2	1.2	47.4	95%
10	Verbund	Austria	0.0	8.2	0.4	8.6	89%
11	Statkraft	Norway	0.0	15.7	1.2	16.9	88%
12	China General Nuclear (CGN)	China	24.3	2.3	15.5	42.1	85%
13	Ontario Power Generation	Canada	5.7	7.5	0.2	13.5	84%
14	PG&E	US	2.2	3.9	0.2	6.3	82%
15	Axpo	Switzerland	2.8	4.3	0.5	7.6	82%
16	EDF	France	73.8	22.8	9.8	106.3	81%
17	RusHydro	Russia	0.0	29.2	0.3	29.5	77%
18	EuroSibEnergo	Russia	0.0	15.1	0.0	15.1	77%
19	Energias de Portugal (EDP)	Portugal	0.2	8.8	11.3	20.3	75%
20	Exelon	US	19.7	1.6	1.6	23.0	71%

Ranking of top 20 generators based on CO₂-free generation, including nuclear, hydropower and renewables. Other generation emits CO₂ and includes coal-, gas- and oil-fired capacity. Latest available data, usually 2018. Source: Energy Intelligence

Top Power Generators Ranked by Carbon Emissions

Rank	Points	Emissions (kg CO ₂ /MWh)	Company	Country
1	100	0	China National Nuclear Corp.	China
1	100	0	E.On	Germany
1	100	0	Hydroelectrica	Romania
1	100	0	NHPC	India
1	100	0	NPCIL	India
1	100	0	Rosatom	Russia
7	100	0	Energoatom	Ukraine
8	100	1	Hydro-Quebec	Canada
9	100	2	Acciona	Spain
10	100	2	Cemig	Brazil
11	100	3	BC Hydro	Canada
12	99	6	Copel	Brazil
13	99	6	Ontario Power Generation	Canada
14	99	7	Statkraft	Norway
15	98	18	China Three Gorges	China
16	97	34	Verbund	Austria
17	96	37	Eletrobras	Brazil
18	95	46	Exelon	US
19	95	51	NY Power Authority (NYPA)	US
20	93	66	EDF	France

Ranking of top 20 generators based only on emissions intensity of power generation, or the volume of carbon dioxide emitted per megawatt hour of electricity. 100 points = no emissions, 0 point = maximum emissions. Latest available data, usually 2018. Source: Energy Intelligence

Top Generators Ranked by Renewables Capacity (%)

Rank	Points	% of Total	Company	Country
1	96	91%	Acciona	Spain
2	80	58%	E.On	Germany
3	80	57%	Orsted	Denmark
4	74	49%	Invenergy	US
5	68	42%	Energias de Portugal (EDP)	Portugal
6	64	37%	NextEra Energy	US
7	63	35%	Iberdrola	Spain
8	59	31%	Berkshire Hathaway Energy	US
9	59	31%	China General Nuclear (CGN)	China
10	50	23%	Tata Power	India
11	50	23%	State Power Investment (SPIC)	China
12	49	22%	Sembcorp Industries	Singapore
13	48	22%	SSE	UK
14	45	20%	Enel	Italy
15	45	19%	China Resources	China
16	44	19%	TransAlta	Canada
17	41	17%	China Energy Investment	China
18	37	14%	China Three Gorges	China
19	34	13%	China Datang	China
20	34	12%	China Huaneng	China

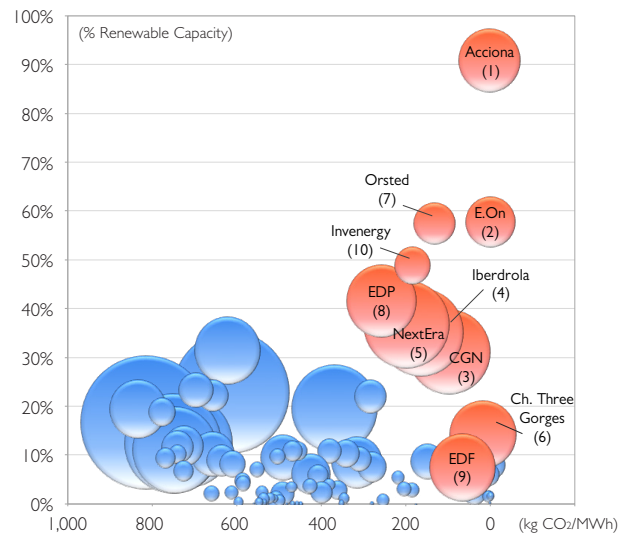
Ranking of top 20 generators based only on % share of renewable power (excluding large hydropower) in total generating capacity. 100 points = 100% renewables; 0 point = 0% renewables. Latest available data, usually 2018. Source: Energy Intelligence

Top Generators Ranked by Renewables Capacity (Volume)

Rank	Points	Renewables (GW)	Company	Country
1	100	39.7	China Energy Investment	China
2	92	31.9	State Power Investment (SPI)	China
3	78	21.8	China Huaneng	China
4	70	17.4	China Datang	China
5	69	16.8	NextEra Energy	US
6	69	16.7	Enel	Italy
7	69	16.6	Iberdrola	Spain
8	68	16.3	China Huadian	China
9	66	15.5	China General Nuclear (CGN)	China
10	56	11.3	Energias de Portugal (EDP)	Portugal
11	53	10.0	China Three Gorges	China
12	52	9.8	EDF	France
13	52	9.8	Berkshire Hathaway Energy	US
14	49	8.8	Acciona	Spain
15	43	7.3	China Resources	China
16	37	5.7	Engie	France
17	37	5.7	E.On	Germany
18	31	4.3	Southern Co.	US
19	31	4.3	RWE	Germany
20	28	3.8	Orsted	Denmark

Ranking of top 20 generators based only on volume of renewable power generating capacity (excluding hydropower) in gigawatts. 100 points = greatest volume of renewables; 0 points = smallest volume. Latest available data, usually 2018. Source: Energy Intelligence

Top 10 Green Utilities



EI New Energy top 10 green power generators are represented in orange, with ranking in parentheses. The other 90 are in blue. Size of bubble represents volume of renewable capacity in GW. Position on the chart represents % of renewable capacity and carbon emissions intensity. Best position = top right with large bubble. Source: Energy Intelligence

302, NY, NY 10016, Tel: +1 212 532 1112, Fax: +1 212 532 4479, Sales: sales@energyintel.com, Customer Service: customerservice@energyintel.com, Bureaus: Dubai: Tel: +971 4 364 2610, Houston: Tel: +1 713 222 9700, London: Tel: +44 (0)20 7518 2200, Moscow: Tel: +7 495 604 8279, Singapore: Tel: +65 6538 0363, Washington, DC: Tel: +1 202 662 0700, Other publications: Petroleum Intelligence Weekly, Oil Daily, International Oil Daily, EI Finance, Energy Compass, Energy Intelligence Briefing, Jet Fuel Intelligence, Natural Gas Week, Nefte Compass, Nuclear Intelligence Weekly, Oil Market Intelligence and World Gas Intelligence.

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