Energy Intelligence

GREEN UTILITIES REPORT 2020

part of the Energy Transition Service

energyintel.com

Energy Intelligence

EI NEW ENERGY®

VOL. 9, NO. 45
NOVEMBER 5, 2020
WWW.ENERGYINTEL.COM

GREEN UTILITIES REPORT

EI NEW ENERGY TOP 100 GREEN UTILITIES

TOP 100 RANKINGS BASED ON CARBON EMISSIONS AND RENEWABLE ENERGY

Rank 2020	Rank 2019	Points	Company	Country	Capacity (GW)
1	1	172	Acciona	Spain	10.1
2	4	158	Iberdrola	Spain	45.7
3	3	158	China General Nuclear (CGN)	China	58.3
4	2	158	E.On	Germany	9.3
5	7	150	Orsted	Denmark	7.5
6	5	144	NextEra Energy	US	51.7
7	6	142	China Three Gorges	China	75.0
8	8	139	Energias de Portugal (EDP)	Portugal	26.7
9	12	137	China National Nuclear Corp. (CNNC)	China	25.6
10	11	136	Enel	Italy	84.4
11	10	133	Invenergy	US	6.1
12	9	130	EDF	France	128.7
13	15	117	Copel	Brazil	6.4
14	16	115	State Power Investment (SPIC)	China	151.1
15	13	115	Statkraft	Norway	19.7
16	17	114	Vattenfall	Sweden	28.0
17	26	113	Engie	France	61.7
18	14	110	Exelon	US	31.6
19	20	109	SSE	UK	9.3
20	19	106	Verbund	Austria	9.7
21	18	105	Eletrobras	Brazil	51.1
22	23	105	Axpo	Switzerland	9.4
23	21	104	Cemig	Brazil	6.0
24	24	104	NHPC	India	6.4
25	39	104	Energie Baden-Wurttemberg (EnBW)	Germany	13.8
26	22	103	Ontario Power Generation	Canada	17.0
27	78	101	Chubu Electric Power Co.	Japan	9.1
28	25	100	NPCIL	India	6.8
29	27	100	Hidroelectrica	Romania	6.4
29	27	100	Rosatom	Russia	30.3
31	29	100	Energoatom	Ukraine	14.2
32	30	100	Hydro-Quebec	Canada	37.2
33	31	100	BC Hydro	Canada	12.1
34	79	100	Tokyo Electric Power Co. (Tepco)	Japan	22.6
35	40	97	Naturgy	Spain	16.9
36	32	97	PG&E	US	7.7
37	34	96	Berkshire Hathaway Energy	US	31.8
38	33	95	NY Power Authority (NYPA)	US	5.9
39	35	93	Dominion Energy	US	29.4
40	38	93	Fortum	Finland	14.2
41	36	92	China Energy Investment	China	245.9
42	37	92	Alpiq	Switzerland	5.2
43	67	90	RWE	Germany	42.9
44	41	87	Public Service Ent. Group (PSEG)	US	11.5
45	42	87	A2A	Italy	11.7
46	44	87	China Datang	China	144.2
47	43	87	EuroSibEnergo	Russia	19.5
48	45	85	China Huaneng	China	182.8
49	46	85	Southern Co.	US	45.8
50	60	81	Sembcorp Industries	Singapore	9.6
51	47	79	Duke Energy	US	53.4
52	50	78	Electricity Supply Board (ESB)	Ireland	5.6
53	83	78	Elektrik Uretim AS (EUAS)	Turkey	19.8
54	68	78	China Resources	China	40.4
55	48	77	RusHydro	Russia	38.5
56	49	77	China Huadian	China	153.0
57	51	76	CEZ	Czech Rep.	14.6
58	53	74	Entergy	US	25.9
59	70	74	Egyptian Electricity Holding (EEHC)	Egypt	56.3
60	61	73	Egco	Thailand	5.5
61	63	73	Dubai Elec. & Water Authority (Dewa)	UAE	11.4
62	55	72	Corpoelec	Venezuela	24.0
63	59	72	Kyushu Electric Power Co.	Japan	18.5
64	65	71	Tata Power	India	12.3
65	52	70	Calpine	US	26.1
66	64	70	Bulgarian Energy Holding (BEH)	Bulgaria	6.3
67	73	70	Xcel Energy	US	18.7
68	58	70	Comision Federal de Electricidad (CFE)	Mexico	42.0
69	54	69	Acwa Power	Saudi Arabia	12.6
70	66	68	Kansai Electric Power Co.	Japan	32.2
71	62	67	Tennessee Valley Authority (TVA)	US	33.7
72	NA	67	Capital Power	Canada	6.2
73	96	65	Alliant Energy	US	6.7
74	84	64	EPH	Czech Rep.	13.3
75	71	63	Pinnacle West Capital	US	6.2
76	56	63	Vietnam Electricity	Vietnam	28.2
77	69	62	Talen Energy	US	14.3
78	89	62	Emera	Canada	9.2
79	92	60	Shikoku Electric Power Co.	Japan	5.4
80	72	60	AES	US	19.5
81	80	59	Korea Electric Power Corp. (Kepco)	S. Korea	83.7
82	74	58	OGE Energy	US	7.8
83	76	57	Inter Rao UES	Russia	31.9
84	81	57	Uniper	Germany	34.4
85	NA	56	Jera	Japan	76.6
86	90	55	Taiwan Power	Taiwan	35.1
87	87	55	TransAlta	Canada	8.1
88	85	54	CLP Holdings	China	19.2
89	88	52	Tohoku Electric Power Co.	Japan	16.6
90	86	52	Taqa	UAE	10.0
91	82	52	Tenaga Nasional Berhad (TNB)	Malaysia	15.1
92	91	52	Egat	Thailand	15.1
93	99	51	WEC Energy	US	8.6
94	94	51	Sonelgaz	Algeria	16.7
95	97	51	DTE Energy	US	11.5
96	75	50	American Electric Power (AEP)	US	28.4
97	NA	49	Bangladesh Power Dev. Board	Bangladesh	9.6
98	93	47	Tavanir	Iran	38.5
99	98	47	Vistra Energy	US	38.5
100	95	46	Hokuriku Electric Power Co.	Japan	8.1

Renewable Growth Drives Pure Players Higher

To achieve their ambitious emissions reduction targets, power generators around the world are shifting their portfolios to add renewables and phase out fossil fuels. Last year, wind, solar and hydropower accounted for over 70% — or 56 gigawatts — of new capacity added by companies in Energy Intelligence's annual ranking of 100 of the world's top "green" utilities and independent power producers (IPPs). This was instrumental in reducing the average carbon dioxide emissions intensity of the companies to 425 kilograms per megawatt hour, down from 441 kg/MWh in 2018 and 564 kg/MWh in 2011 when the ranking was established. This is largely due to the progressive switch of large incumbents' capacity to renewables and, among fossil fuels, to more gas at the expense of coal. But it's also due to the rise in the ranking of specialized renewable companies, such as Acciona, the Spanish infrastructure conglomerate and IPP, which tops the table for the sixth year in succession, and the US' Invenergy, an IPP operating a mix of renewable and gas capacity, which ranks 11th. They could soon be joined by new entrants such as Indian developer Greenko and, based on their very ambitious renewable targets, European oil companies (NE Oct.15'20).

Emissions intensity in the ranking has decreased by around 3% per year over the past decade. This is remarkable but insufficient to achieve many company ambitions, which typically involve a 50% reduction by 2030 and 80%-100% by 2050 (NE Apr.30'20). Indeed, while European generators in the ranking cut fossil fuel capacity by 20 GW last year, companies in China, the rest of Asia and the Middle East added a further 41 GW. Chinese companies are the most carbon intensive in the ranking, at 621 kg/MWh. By contrast, European companies only emitted 208 kg/MWh last year, down 17% from 249 kg/MWh in 2018, while generators from Latin America, Canada and the former Soviet Union are below 200 kg/MWh, thanks to their large hydro and nuclear capacity.

The 100 companies in the ranking represent approximately 45% of the world's power capacity. By technology, they account for almost 90% of global nuclear plants, which all belong to a small number of large operators, but less than 30% of wind and solar generation where hundreds of small IPPs and millions of "prosumers" are involved alongside large companies. Since the first ranking, the total capacity has increased by 10% to 3,187 GW, up from 2,867 GW, while non-hydro renewables have more than tripled to 378 GW or 12% of total capacity, up from 116 GW or 4%. Meanwhile, fossil fuels dropped from 65% to 56%, while hydropower and nuclear remained stable.

The rankings are calculated using a system in which each company is awarded up to 200 points, 100 of which are based on emissions intensity, or kg CO2/MWh generated. The other 100 points are based on non-hydro renewable capacity, in absolute and relative terms, which mostly consists of wind and solar and reflects generators' efforts to decarbonize (NE Jul.9'20). The main table lists all 100 companies with points — in whole numbers, even though actual points are fractional — along with their rank in 2020 and 2019, and their total capacity as an indication of size. Three other tables show the top 20 performers under each criterion — emissions intensity, size of renewable capacity in GW, and the 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. 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 carbon intensity and share of renewable capacity. Firms with large bubbles in the upper right corner of the graphic rank highest.

The top 10 include six European and three Chinese firms plus one US company, together owning close to 300 GW or 74% of carbon-free capacity — including 31% of non-hydro renewables, 27% hydropower and 16% nuclear. These companies boast average emissions of 123 kg/MWh. All of them have between half and all of their generating capacity in carbon-free technologies. Acciona and Denmark's Orsted (5) mostly rely on wind and solar, while Spain's Iberdola (2), China Three Gorges (7), Portugal's EDP (8) and Italy's Enel (10) also own considerable hydro capacity. China's CGN (3) and CNNC (9), Germany's E.On (4) and the US' NextEra Energy (6) combine renewables with nuclear, a controversial but carbon-free form of energy (NE Apr.12'18). While most of the lowest-ranking companies own little or no renewable capacity, some of them such as the US' AEP (96), Hong Kong's CLP Holdings (88) and Canada's TransAlta (87) have significant renewable assets but perform poorly in terms of emissions, due to substantial coal generation.

POWER CAPACITY CHANGES BY REGION SINCE 2011

(GW)	Renewables	Hydro	Nuclear	Fossil Fuels	Total
China	156.9	89.0	42.6	248.2	536.7
Other Americas	3.9	14.0	-1.4	8.3	24.9
FSU	0.2	4.4	12.7	-0.3	17.0
Other Asia-Pacific	4.9	7.1	10.0	-17.8	4.2
Japan	0.7	-13.3	-13.8	-11.4	-37.8
Mideast-Africa	3.4	1.7	-0.9	-53.6	-49.4
Europe	58.1	16.5	-4.4	-124.8	-54.6
US	33.1	-2.0	-11.6	-140.5	-120.9
Total	**261.4**	**117.4**	**33.1**	**-91.9**	**320.1**

Change in generation capacity in the Top 100 ranking from 2011-19, 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 ONE YEAR

(GW)	Renewables	Fossil Fuels	Hydro	Nuclear	Total
China	26.3	22.2	1.8	4.1	54.4
Mideast-Africa	1.2	10.2	0.2	0.0	11.6
Other Asia-Pacific	1.3	8.4	-0.4	0.8	10.0
US	4.4	2.2	0.9	-0.6	6.9
Other Americas	0.8	-0.9	3.0	0.0	2.9
FSU	0.0	-2.1	0.5	0.2	-1.4
Japan	0.4	-2.8	0.0	-0.6	-2.9
Europe	14.5	-19.6	1.0	-0.4	-4.5
Total	**48.9**	**17.6**	**7.1**	**3.5**	**77.1**

Net generation capacity added in 2019 by companies in the ranking, in gigawatts. Source: Energy Intelligence

TOP 10 GENERATORS BASED ON CARBON EMISSIONS AND RENEWABLE ENERGY

Rank	Company	Country	Emissions (kg CO2/MWh)	Renewables (GW)	(% of Total)
1	Acciona	Spain	1	9.2	91%
2	Iberdrola	Spain	110	18.8	41
3	China General Nuclear (CGN)	China	109	21.0	36
4	E.On	Germany	0	5.5	59
5	Orsted	Denmark	65	4.6	62
6	NextEra Energy	US	219	18.0	35
7	China Three Gorges	China	31	10.7	14
8	Energias de Portugal (EDP)	Portugal	217	10.8	41
9	China National Nuclear Corp. (CNNC)	China	0	4.6	18
10	Enel	Italy	269	20.1	24%

New additions this year include Canadian IPP Capital Power (72), Japan's Jera (85) and the Bangladesh Power Development Board (97). They replace the US' FirstEnergy and Tenaska, and Japan's J-Power.

The ongoing energy transition has had its most striking impact on European utilities. Those in the ranking since 2011 have added 47 GW of wind and solar capacity in less than a decade while retiring a staggering 148 GW of fossil fuel assets. This resulted in a 22% decline in total generation, a 48% drop in emissions intensity and a 60% fall in total emissions. Iberdrola, EDP, Enel and France's EDF (12) and Engie (17) are among the top renewable developers globally. Orsted, the leading offshore wind company globally, is committed to carbon neutrality by 2025, while Germany's RWE (43) wants to cut emissions by 70% over 2018-30 and reach carbon neutrality by 2040 despite its big coal-fired capacity. To help achieve this, it has acquired E.On's renewable business in exchange for a 15% stake in that company, which will completely exit generation — except for its soon-to-be-retired nuclear assets (NE Feb.6'20). E.On, like major US utilities such as New York's Consolidated Edison and California's Sempra Energy, will focus solely on grids and retail supply. By contrast, Eastern European companies such as the Czech Republic's CEZ (57) and EPH (74) or Bulgaria's BEH (66) remain coal-heavy — but are also working on reducing emissions.

The switch from coal to gas and from fossil fuels to renewables among US utilities has also been remarkable. US companies in the original ranking have added 33 GW of renewables and retired 46 GW of fossil fuel capacity since 2011, resulting in a 41% drop in carbon emissions. US companies in the latest ranking emitted 392 kg/MWh last year, roughly the level of a combined-cycle gas turbine (CCGT), down 7% from 421 kg/MWh in 2018 and 37% from 620 kg/MWh in 2011.

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 and fully decarbonized by 2050. Many US companies have committed to at least 50% emissions reduction by 2030 from a baseline around 2000-10, and to 80%-100% by 2050. NextEra Energy plans to reduce emissions intensity by 67% over 2005-25, which equates to a near 40% reduction in absolute emissions despite the expected doubling in generation. Examples of companies targeting 2050 neutrality include high performers in the ranking such as Dominion Energy (39), PSEG (44), Southern (49) and Duke Energy (51), but also lower-ranking coal-intensive generators such as Vistra Energy (99), AEP, DTE Energy (95) and WEC Energy (93). AES (80), another carbon-intensive company, wants to cut its emissions intensity by 70% over 2016-30.

Mideast generators tend to rank poorly because they invest little in renewables while a large chunk of their generating fleets consist of inefficient steam-cycle plants — rather than CCGTs. Large operators such as Saudi Electricity Co. and Kuwait's MEW, formerly part of the ranking have now fallen out of it, while companies such as Iran's Tavanir (98), Algeria's Sonelgaz (94), Malaysia's Tenaga Nasional (91) and the United Arab Emirate's Taqa (90) rank low. Meanwhile Dubai's Dewa (61) and Saudi Arabia's Acwa Power (69) achieve reasonably low emissions and comparatively good rankings thanks to modern CCGTs — often associated with seawater desalination — and increasing involvement in renewable projects (NE Oct.22'20).

Among oil and gas producing countries, Egypt's EEHC (59), Venezuela's Corpoelec (62) and Mexico's CFE (68) benefit from large hydro resources while suffering from very little investment made in other renewables. Hydropower also enables Norway's Statkraft (13), Brazil's Copel (13), Eletrobras (21) and Cemig (23), Austria's Verbund (20), India's NHPC (24), Romania's Hidroelectrica (29), and Canada's Hydro-Quebec (32) and BC Hydro (33) to achieve very low emissions and higher rankings. Russia's EuroSibEnergo (47) and RusHydro (48) rank lower because they also operate significant fossil fuel assets. While undoubtedly renewable, hydropower is excluded from the "renewables" category in the ranking — and, quite often, in official statistics — because many large dams are socially and environmentally controversial.

Similarly, while nuclear energy is carbon free, nuclear capacity is not directly earning points for companies in the ranking. But it contributes to lowering emissions intensity, which is fully recognized in the carbon side of the calculation even though nuclear energy is highly criticized on safety grounds. Pure nuclear specialists such as India's NPCIL (28), Russia's Rosatom (29) and Ukraine's Energoatom (31) perform well. So do Sweden's Vattenfall (16), Switzerland's Axpo (22) and Alpiq (42), Canada's Ontario Power Generation (26) and Finland's Fortum (40), which combine significant nuclear and hydro capacity.

China's CGN and CNNC rank better because they combine their nuclear core business with a sizable renewable diversification. Likewise, hydro specialist China Three Gorges is investing in wind and solar. The other Chinese generators are also big in renewables, but they are much bigger in coal. This causes their emissions intensity to be high, at 600-800 kg/MWh, and rankings mediocre, from 41st for China Energy Investment to 56th for China Huadian. SPIC (14) is different as it operates a unique and relatively balanced mix of fossil fuels (54%), wind and solar (26%), hydropower (16%) and nuclear (5%).

Japanese utilities used to be in the second half of the ranking but the recent transfer by Chubu Electric (27) and Tokyo Electric (34) of over 60 GW of thermal capacity to their 50-50 subsidiary Jera left them with mostly carbon-free capacity, raising them into the first third of the ranking. Other Japanese companies continue to rank deep in the second half, from Kyushu Electric (63) to Hokuriku Electric (100). Renewable generation accounts for a considerable 12% of total production in Japan, but most of it belongs to small IPPs rather than utilities. South Korea's Kepco (81) and Taiwan Power (86) have similar lowly rankings as they own almost no renewable capacity. By contrast, Singapore's Sembcorp (50), Thailand's Egco (60) and India's Tata Power (64) keep growing their wind and solar assets — and progressing up the ranking.

How We Rank the Top 100 Green Utilities

For the ranking, Energy Intelligence selected some 150 power generators from around the world with a capacity of at least 5 gigawatts. Important countries such as Australia are hardly represented in the selection because their power sector is fragmented. Similarly, and sometimes simultaneously, most power generation has been taken over by foreign companies in countries such as the UK and Chile. Since power consumption remains very small in most African countries, there is no sub-Saharan African company in the ranking.

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, Poland's Tauron, at just over 1,000 kg/MWh. 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 425 kg/MWh, ranging from zero for nine companies to 857 kg/MWh for the US' AEP, a mostly coal-based generator.

- The second and third criteria measure a company's renewable energy capacity in GW and in proportion to its total capacity. These criteria exclude hydropower because large dams are often controversial and thus excluded from the "renewables" category in many official statistics. The firm with the greatest renewable capacity, China Energy Investment, earned 50 points in the second criterion, while 10 companies without renewable generation received no points and an additional 21 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 obviously 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. China Huaneng for example owns a huge 24 GW in renewables which only amounts to a relatively modest 13% of its total capacity. Conversely, the US' Invenergy's 50% in renewable capacity only represents 3 GW.

China's SPIC, with 39 GW in renewables accounting for 26% of its total fleet, is the company with the highest combined score under the second and third criteria. But its huge coal capacity causes average emissions to reach a substantial 612 kg/MWh. This prevented the company, which is 14th in the ranking, from making it into the top 10.

The ranking uses the latest available full-year data, usually fiscal year 2019, mostly from official company sources. While companies

TOP GREEN POWER GENERATORS: CARBON-FREE GENERATION CAPACITY (GW)

Rank	Company	Country	Nuclear	Hydro	Renewables	Total CO2-free	CO2-free /Total %
1	Acciona	Spain	0.0	0.9	9.2	10.1	100%
1	China National Nuclear Corp. (CNNC)	China	19.1	1.9	4.6	25.6	100
1	Chubu Electric Power Co.	Japan	3.6	5.5	0.0	9.1	100
1	E.On	Germany	3.8	0.0	5.5	9.3	100
1	Rosatom	Russia	30.3	0.0	0.0	30.3	100
6	Energoatom	Ukraine	13.8	0.3	0.0	14.2	100
7	Tokyo Electric Power Co. (Tepco)	Japan	12.6	9.9	0.1	22.5	100
8	Hydro-Quebec	Canada	0.0	36.7	0.0	36.7	99
9	BC Hydro	Canada	0.0	11.9	0.0	11.9	99
10	Eletrobras	Brazil	2.0	46.3	1.0	49.3	96
11	China Three Gorges	China	0.0	59.7	10.7	70.4	94
12	Verbund	Austria	0.0	8.2	0.4	8.6	89
13	Statkraft	Norway	0.0	15.9	1.4	17.3	88
14	China General Nuclear (CGN)	China	27.1	0.1	21.0	48.3	83
15	Ontario Power Generation	Canada	5.7	8.1	0.2	14.1	83
16	EDF	France	74.1	22.5	9.8	106.4	83
17	Axpo	Switzerland	2.7	4.3	0.7	7.7	82
18	RusHydro	Russia	0.0	29.7	0.3	30.0	78
19	EuroSibEnergo	Russia	0.0	15.1	0.0	15.1	77
20	Iberdrola	Spain	3.2	13.2	18.8	35.1	77%

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 2019. Source: Energy Intelligence

are getting more open about disclosing information on CO2 emissions, data often remain hard to obtain, especially outside 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.

The capacity of the 100 companies in the ranking ranges from 246 GW for China Energy Investment and over 100 GW for four other Chinese companies plus France's EDF, to just over 5 GW for Switzerland's Alpiq. Non-hydro renewable capacity ranges from 43 GW at China Energy Investment and over 10 GW for another 11 companies — including six Chinese ones — to 100 megawatts or less for 24 companies. In all, they total 3,187 GW or 43% of the world's total generating capacity, based on 2019 data from the International Energy Agency. This includes 58% of capacity in Japan, 55% in China, 49% in Europe, 43% in the US, 40% in the former Soviet Union and 36% in the rest of the Americas, but only 24% in the Mideast and Africa and 21% in the rest of the Asia-Pacific region. Some large utilities in terms of sales, such as New York's Consolidated Edison, are not included, as they only supply power without generating it. Conversely, independent power producers without retail customers, such as Spain's Acciona, are included.

TOP POWER GENERATORS RANKED BY RENEWABLES CAPACITY (%)

Rank	Points	Renewables % of Total	Company	Country
1	48	91%	Acciona	Spain
2	41	62	Orsted	Denmark
3	40	59	E.On	Germany
4	37	50	Invenergy	US
5	34	41	Iberdrola	Spain
6	34	41	Energias de Portugal (EDP)	Portugal
7	32	36	China General Nuclear (CGN)	China
8	31	35	NextEra Energy	US
9	31	34	Berkshire Hathaway Energy	US
10	27	27	SSE	UK
11	26	26	State Power Investment (SPIC)	China
12	26	25	Tata Power	India
13	25	24	Sembcorp Industries	Singapore
14	25	24	Enel	Italy
15	25	23	China Resources	China
16	23	20	RWE	Germany
17	22	18	TransAlta	Canada
18	22	18	China National Nuclear Corp. (CNNC)	China
19	21	17	China Energy Investment	China
20	21	17%	Capital Power	Canada

Ranking of top 20 generators based only on % share of renewable power (excluding hydropower) in total generating capacity. 100 points = 100% renewables; 0 point = 0% renewables. Latest available data, usually 2019. Source: Energy Intelligence

TOP GENERATORS RANKED BY RENEWABLES CAPACITY (VOLUME)

Rank	Points	Renewables (GW)	Company	Country
1	50	42.6	China Energy Investment	China
2	48	38.6	State Power Investment (SPIC)	China
3	39	24.0	China Huaneng	China
4	37	21.0	China General Nuclear (CGN)	China
5	36	20.1	Enel	Italy
6	36	19.9	China Datang	China
7	35	18.8	Iberdrola	Spain
8	34	18.0	NextEra Energy	US
9	34	17.4	China Huadian	China
10	26	10.8	Berkshire Hathaway Energy	US
11	26	10.8	Energias de Portugal (EDP)	Portugal
12	26	10.7	China Three Gorges	China
13	25	9.8	EDF	France
14	24	9.2	Acciona	Spain
15	24	9.1	China Resources	China
16	23	8.7	RWE	Germany
17	21	7.3	Engie	France
18	17	5.5	E.On	Germany
19	16	4.8	Southern Co.	US
20	15	4.6	China National Nuclear Corp. (CNNC)	China

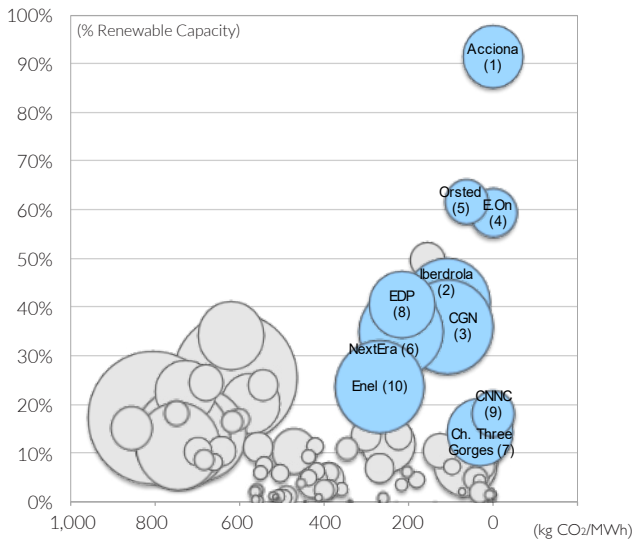
Ranking of top 20 generators based only on volume of renewable power generating capacity (excluding hydropower) in gigawatts. 100 points = greatest volume of renewables; 0 points = smallest volume. Latest available data, usually 2019. Source: Energy Intelligence

TOP POWER GENERATORS RANKED BY CARBON EMISSIONS

Rank	Points	Emissions (kg CO2/MWh)	Company	Country
1	100	0	China National Nuclear Corp. (CNNC)	China
1	100	0	Chubu Electric Power Co.	Japan
1	100	0	E.On	Germany
1	100	0	Hidroelectrica	Romania
1	100	0	NHPC	India
1	100	0	NPCIL	India
1	100	0	Rosatom	Russia
8	100	0	Energoatom	Ukraine
9	100	0	Copel	Brazil
10	100	1	Acciona	Spain
11	100	1	Hydro-Quebec	Canada
12	100	2	BC Hydro	Canada
13	100	4	Cemig	Brazil
14	99	8	Ontario Power Generation	Canada
15	99	11	Tokyo Electric Power Co. (Tepco)	Japan
16	98	24	Statkraft	Norway
17	97	31	China Three Gorges	China
18	97	32	Eletrobras	Brazil
19	97	32	Verbund	Austria
20	96	44	Exelon	US

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 2019. Source: Energy Intelligence

TOP 10 GREEN UTILITIES



Energy Intelligence top 10 green power generators are represented in blue, with ranking. The other 90 are in gray. 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

Energy Transition Service

Intelligence, analysis and guidance on how the low-carbon energy transition is unfolding, and which companies and countries are best-placed to survive and adapt.

We deliver succinct insight and analysis on the progress and outlook of the Energy Transition, addressing the crucial questions and decisions for oil and gas companies as they develop effective and profitable strategies to adapt to a rapidly changing energy world. Our access to a wide range of primary sources allows us to deliver critical actionable intelligence, helping clients closely monitor key developments and make informed business decisions.

The Deliverables:

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- *Direct Engagement & Advisory from our Experts* – our experts are available to answer situation-specific questions and provide guidance via phone, email, quarterly briefings or structured workshops
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Learn more about what Energy Intelligence can do for you by contacting one of our representatives:

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