CLEAN200

CARBON CLEAN 200™: INVESTING IN A CLEAN ENERGY FUTURE

2017 Q1 PERFORMANCE UPDATE

Corporate Knights
The Company for Clean Capitalism

AS YOU SOW®

ABOUT THE AUTHORS

TOBY HEAPS is the chief executive officer and co-founder of Corporate Knights. He spearheaded the first global ranking of the world's 100 most sustainable corporations in 2005, and in 2007 coined the term "clean capitalism." He sits on the Ashoka Canada Board and the University of Toronto's Environment and Finance Committee. Toby has been published in the Financial Times, Wall Street Journal, and the Globe and Mail. In 1998, he played centerfield for the Yugoslav National Baseball Team.

MICHAEL YOW is Director of Research of Corporate Knights, responsible for corporate sustainability data integrity and benchmarking. He is the research lead for the Global 100 Most Sustainable Corporations in the World (Global 100) index, as well as the Sustainable Countries Index and the Sustainable Stock Exchanges Global Benchmarking Study.

ANDREW BEHAR is the CEO of *As You Sow*. Previously, Andrew founded a clean-tech start-up developing innovative fuel cell technologies for grid-scale energy storage. He is on the board of US Social Investing Forum (US-SIF) and was named one of 30 "Eco Rock Stars and Environmental Mavericks" in Origin Magazine's August 2015 issue. His book, *The Shareholder Action Guide* was published in November 2016.

ABOUT CORPORATE KNIGHTS: Founded in 2002, Corporate Knights seeks to provide information that empowers people to harness markets for a better world. The company has a media and research division, which includes the award-winning business and society magazine Corporate Knights. The research division produces corporate rankings, research reports and financial product ratings based on corporate sustainability performance including Cleancapitalist.com and Decarbonizer.co. Its best-known rankings include the Best 50 Corporate Citizens in Canada and the Global 100 Most Sustainable Corporations. In June 2013, Corporate Knights was named Magazine of the Year by Canada's National Magazine Awards Foundation.

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For more information about Corporate Knights, please visit www.corporateknights.com

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AS YOU SOW®

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FOREWARD BY THE AUTHORS

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We are happy to present the 2017 Q1 Carbon Clean 200™ list of publicly traded companies that are leading the way with solutions for the transition to a clean energy future.

Since our first report was launched on August 15, 2016, a great deal has changed in the world. The UK had just voted to leave the European Union, the planet experienced "the hottest year ever" for the third year in a row, air pollution in China continued to exacerbate a health crisis, demand for fossil fuels kept declining, and the cost of renewables was on track to beat projections. And then came the U.S. election. The Clean200, it turns out, has been an insightful window into how the stock markets view the new administration and its relationship to a clean energy future.

Over its first live performance period from August 15, 2016 to January 31, 2017, the Clean200 generated a 2.9% total return, underperforming the S&P 1200 by 1.26%.

The US election contributed to gyrations in the Clean200 vs. S&P 1200. In the lead up to the election from August 15 to November 8, when a Trump win was viewed as improbable, the Clean200 outperformed the S&P 1200 by a full percentage point. After Trump's upset, there was a bump in the lead up to the January 20th inauguration, but the Clean200 lagged. In the brief window between the inauguration and the end of January, the Clean200 bounced back, turning in 2% (more than triple the 0.6% of the S&P 1200 for the same period).

But the real takeaway is that the clean energy story is global. While the stock market gyrates in the short term, the long term clean energy economic expansion continues afoot, regardless of what happens in the White House. A new report by Carbon Tracker and the Grantham Institute at the Imperial College of London, using the latest available data, makes a powerful case for the likelihood that we're probably underestimating how quickly electric vehicles and solar will disrupt the oil and electricity markets. The report's key findings:

- Solar PV (with associated energy storage costs included) could supply 29% of global power by 2040, leaving natural gas with just a 1% market share (Exxon sees all renewables supplying just 11% of global power by 2040);
- Electric vehicles could account for approximately 35% of the road transport market by 2035 (BP put this figure at just 6% in its 2017 energy outlook);
- Coal and oil demand will peak in 2020 and gas demand growth will be curtailed.

While the rhetoric and some of the cabinet appointments of the current White House seem incongruent with the above three points, President Trump's recently released top 50 infrastructure projects is short on fossil fuels and long on clean energy, with 33 of the projects qualifying as clean energy.

Beyond America, global growth is now being driven by emerging economies, which account for 80% of economic growth. This was one of the points made by the Chinese President's Xi Jinping in his keynote address/coming out party as emerging superpower this January at the World Economic Forum in Davos. While not widely picked up in press reports, President Xi also made a point emphasizing "Our efforts to pursue green development are paying off." Indeed they are. Among the 2017 Clean200 companies, Greater China takes the crown, with 71 companies versus 41 from the U.S., despite the U.S. stock market being more than twice the size of Greater China's.

Being on the vanguard of the clean energy transition is at once an economic, political (cleaner air), and geopolitical imperative as it relates to China's role as a leading nation in the 21st century, a point made in a recent report by the Institute for Energy Economics and Financial Analysis, which found China's dominance in renewables is rapidly spreading overseas, with the country accelerating its foreign investment in renewable energy and supporting technologies.

The key takeaway is that China continues to lead by investing in the clean energy future while the U.S. risks being left behind as the new administration looks to the past and talks up investing in coal and other fossil fuels. The clean energy "space-race" is on. It remains to be seen which country and which investors will prosper from it.

Toby Heaps

Andrew Behar

THE CARBON CLEAN 200:
THE BIGGEST 200 PUBLIC COMPANIES RANKED BY GREEN ENERGY REVENUES

Over the past six years, and growing dramatically leading up to and post-Paris COP 21 and Marrakesh COP 22, a movement of institutional and individual investors representing more than $5tn in assets under management have divested a portion of their fossil fuel investments and committed to divesting the balance in the next five years. The corollary of divesting fossil fuels is re-investing in the clean energy future. As an invitation to a larger discussion of how we can invest in a clean energy future, we created the Carbon Clean 200 (Clean200™)—a list of the 200 largest companies worldwide ranked by their total clean energy revenues.

The Clean200 is intended as the clean energy inverse of the Carbon Underground 200™. Where the Carbon Underground 200 (which evolved from the seminal Carbon Tracker Initiative report, *Unburnable Carbon: Are the World's Financial Markets Carrying a Carbon Bubble?*[1]), ranks the largest publicly listed companies by the carbon intensity of their coal, oil, and gas reserves, the Clean200 ranks the largest publicly listed companies by their total clean energy revenues, with a few additional screens to help ensure the companies are indeed building the infrastructure and services needed for what Lester Brown and many others have called "The Great Energy Transition[2]" in a just and equitable way.

The moral case for divesting from fossil fuels has been well argued, but for many, the economic case is less clear. However, as clean energy growth rates take off and demand growth for fossil fuels flatlines, it is probable that divesting from fossil fuels in favor of a clean energy future does not have to come at a sacrifice to long-term investment returns.

On the risk side, divesting is about not getting stuck holding stranded fossil fuel assets that cannot be burnt if the world is to adhere to a given carbon budget, a topic on which Mark Carney, governor of the Bank of England, has expressed concerns in a landmark speech to global insurer Lloyd's of London.[3] On the opportunity side, investing in the transition from a high-carbon to a low-carbon economy represents "the largest economic opportunity of the 21st century," according to John Doerr[4] a major venture capitalist at Kleiner-Perkins in Silicon Valley. It might seem counterintuitive for an investor to sell their fossil fuel stocks when most people are still driving internal combustion cars and burning fossil fuels every day. However, the point and the power dynamic of investing is that, as an investor, you have the power to bet and capitalize on the creation of the world that you want to see. If you are wrong, you will lose money. If you are right, you will profit from and add momentum to the change you believe in. While many mission-driven investors believe that the arc of history bends towards justice — that companies which create positive rather than negative externalities will prevail — in the case of climate-friendly investing, it may actually be true. Many investors have found this out the hard way. Indeed, in a world of limited capital, every investment holds opportunity cost. When people vote with their investment dollars in favor of clean energy over dirty, it sends a message as powerful as any ballot box that the time has come to stop using the atmosphere as a free dumping ground.

Take coal, which accounts for over 40% of global greenhouse gas emissions.[5] The industry is declining rapidly in value, especially in the United States. Peabody Energy, the largest private sector coal company in the world, filed for Chapter 11 bankruptcy protection last April, following Arch and Alpha. The Dow Jones Coal Index dropped 82% over the past five years. Oil companies are facing similar problems. Fifty-two have filed for bankruptcy since 2015, and over a third of the world's biggest oil and gas companies have crushing debt loads (over $150 billion) and cash flows depressed by low oil prices, according to the Deloitte Center for Energy Solutions[6] and a recent study by *As You Sow*.[7] According to an IEEFA report, "ExxonMobil has experienced a 45% drop in company revenue over the past five years, a growing reliance on long-term debt to cover shareholder dividend payments, and declines in capital expenditures, end-of-year cash balances, and free cash flow — call signs of significant deterioration. ExxonMobil's stock performance in the meantime has trailed the S&P 500 for 10 quarters in a row."[8]

Major investment indices are now only half as exposed to the fossil fuel sector (1.5% to coal, 7% to oil and gas) as they were five years ago. This is not due to any active decision to divest, but rather because fossil fuel stocks have lagged while other sectors have produced healthy returns. While fossil fuel stock performance stagnates, clean energy is taking off. The world is currently adding twice as much clean power capacity as coal, oil, and gas combined, according to *Bloomberg New Energy Finance* (BNEF).[9] Wind's market share of power generation has doubled four times in the past 15 years, and solar has doubled seven times. It's also getting cheaper to make power from wind and solar, thanks to technology, better financing and economies of scale. Increased demand for a technology generally reduces prices, whereas increased demand for a commodity increases prices. This basic calculus has driven the price of a renewable kilowatt of energy ever downward, making the choice of energy an economic one. Companies which make a significant amount of their revenue from environmental solutions now make up 5% of global investment indices; the Clean200 list of companies have a collective value over $1 trillion.

In the next 10 years, McKinsey[10] expects oil demand growth to flatten due to growing fuel efficiencies and competitive technologies such as the electric car. Battery prices fell 35% last year, and electric car sales rose by 60%. By 2022, BNEF estimates electric vehicles will cost the same as their internal combustion counterparts, and if growth continues at the current pace, oil displacement by electric cars will reach 2 million barrels per day by 2023 — the size of the current oil glut and enough to drive global oil prices to record lows. Factoring in autonomous cars and ride-sharing services, electric cars could reach 50% of new car sales by 2040, according to BNEF, 50 times higher than what OPEC is projecting.[11, 7]

None of this portends an imminent conclusion to our fossil fuel age, but it does suggest an end to fossil fuels as a long-term growth market and the beginning of a long run expansion of clean energy demand. This sentiment has been ratified, sanctified, and tallied by the political, moral, and financial bellwethers of our time, from the Paris climate talks (195 countries committed to phase out fossil fuels this century) to the Vatican (Pope Francis has made moral invocations to drastically reduce use of fossil fuels in the encyclical *Laudato Si'*[12]) to the Bank of England (the bank's governor Mark Carney has warned not to get stuck holding a bag of stranded fossil fuel assets).

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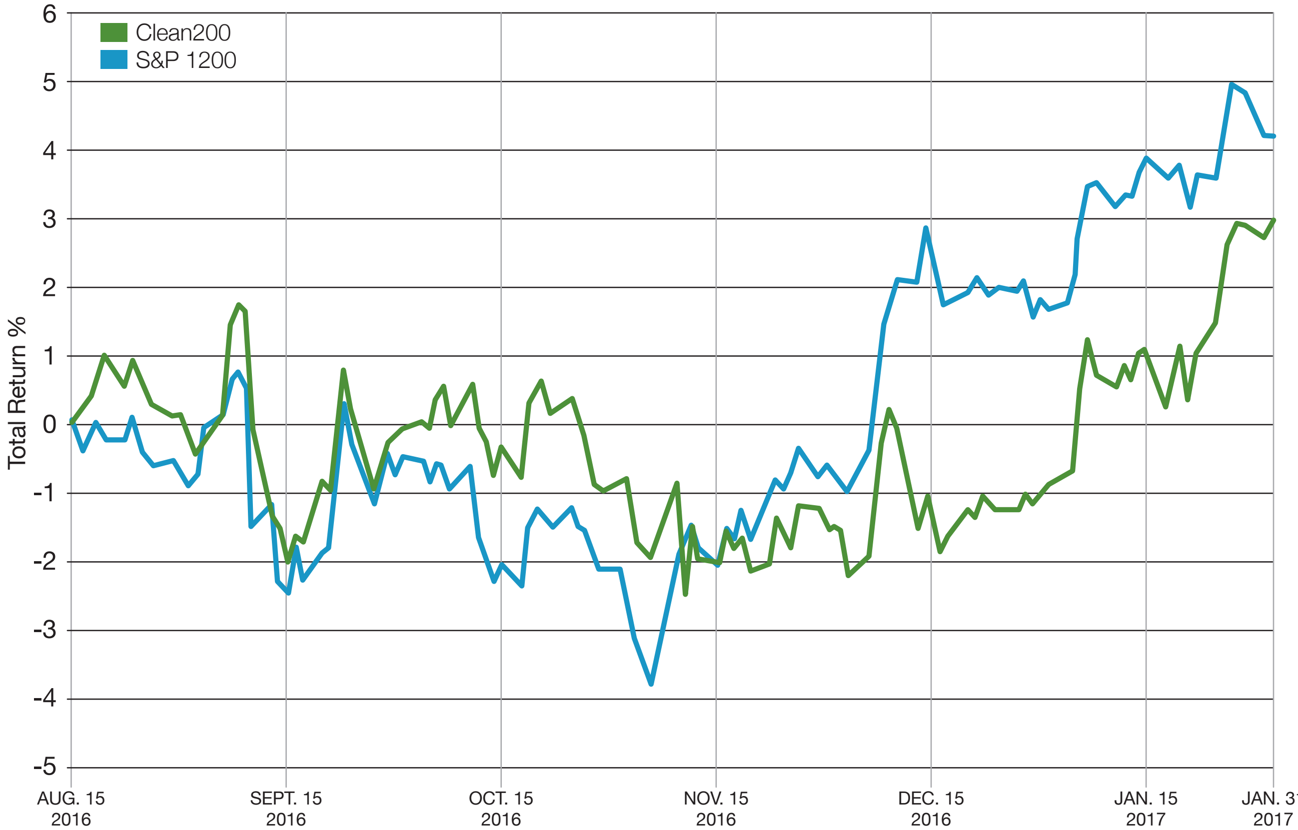
Clean200 vs. S&P 1200



Source: Bloomberg (total USD returns from August 15, 2016 to January 31, 2017)

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Some big investors are already adapting:

- PFZW, the $183 billion Dutch pension fund, has pledged to halve its carbon footprint by 2020 while increasing its investments in climate solutions fourfold.
- CalSTRS committed $2.5 billion to a Low-Carbon Index as part of a multi-faceted approach to align its portfolio with the market realities emerging from climate change.
- Irish lawmakers voted to require the U.S. $9bn Irish Strategic Investment Fund to divest from all direct or indirectly held fossil fuel assets.

The Clean200 Sector Breakdown

GICS Sector	# of Clean200 companies
Industrials	95
Information Technology	40
Utilities	23
Consumer Discretionary	17
Materials	15
Consumer Staples	5
Energy	2
Financials	2
Healthcare	1

Source: Bloomberg (total USD returns from August 15, 2016 to January 31, 2017)

- AXA divested from all coal holdings (mining companies and electric utilities deriving over 50% of their turnover from coal) and committed to triple its green investments by 2020.

Corporate Knights and *As You Sow* are committed to updating this list on annual basis with quarterly performance updates and ensuring that it remains in the Creative Commons[13] as a public good. We invite anyone to make it better and share any new ideas to improve the methodology for the next quarter. It can be downloaded at www.clean200.org.

Clean200 Companies by Country

Country	2017
Greater CHINA	71
UNITED STATES	41
JAPAN	20
GERMANY	8
INDIA	8
CANADA	6
SOUTH KOREA	6
SWITZERLAND	4
DENMARK	4
SPAIN	4
SWEDEN	4
NETHERLANDS	3
BRAZIL	3

Country	2017
FRANCE	2
UNITED KINGDOM	2
FINLAND	2
NEW ZEALAND	2
AUSTRALIA	2
THAILAND	2
BELGIUM	1
AUSTRIA	1
IRELAND	1
ITALY	1
TURKEY	1
PHILIPPINES	1

THE CLEAN200 METHODOLOGY

The Clean200: The biggest 200 public companies ranked by green energy revenues, was first published on August 15, 2016 by Corporate Knights and *As You Sow* and now updated with data through the end of 2016.

The Clean200 are listed by their estimated green revenues in USD. The dataset is developed by multiplying a company's most recent year-end revenues by its BNEF New Energy Exposure Rating mid-point. In cases where companies disclosed their clean energy revenues, this number was verified to ensure consistency and, in some cases, used to override the BNEF data. In order to be eligible, a company must have a market capitalization greater than $1 billion (end of Q4 2016) and earn more than 10% of total revenues from New Energy[14] sources.

The Clean200 uses negative screens. It excludes all oil and gas companies and utilities that generate less than 50% of their power from green sources, as well as the top 100 coal companies measured by reserves, top 100 weapons producers, as well as laggards on tropical deforestation[15], and child or forced labor and companies who engage in negative climate lobbying.

Clean200 Negative Screens	Criteria	Number of Companies Excluded
Oil and Gas	SASB SICS Subsector = oil & gas	3
Coal 100	Top 100 companies by coal reserves	2
Non-Green Utilities	Any utility that derives less than 50% revenue from green sources	57
Top 100 Weapons	The SIPRI Top 100 arms-producing and military services companies in the world	4
Tropical Forest Harm	Scores less than 4 on Forest 500 scale or are on the *As you Sow*/Friends of the Earth Deforestation Free Funds Tool	10
Child/Forced Labor Risk	Scores in bottom half of Know the Chain rating	1
Negative Climate Lobbying	Scores E or lower on Influence Map rating	0

THE CLEAN200 LIST
FEBRUARY 15, 2017

Rank	Name
1	SIEMENS AG-REG
2	TOYOTA MOTOR
3	SCHNEIDER ELECTR
4	ABB LTD-REG
5	JOHNSON CONTROLS INTERNATIONAL PLC
6	PANASONIC CORP
7	VESTAS WIND SYST
8	BOMBARDIER INC -B
9	SSE PLC
10	PHILIPS LIGHTING
11	EMERSON ELEC CO
12	KONINKLIJKE PHIL
13	DONG ENERGY A/S
14	UMICORE
15	XINJIANG GOLD -A
16	EATON CORP PLC
17	SHARP CORP
18	OSRAM LICHT AG
19	TESLA MOTORS
20	GAMESA
21	FIRST SOLAR INC
22	ANDRITZ AG
23	GCL-POLY ENERGY
24	SAMSUNG SDI CO

Rank	Name
25	ACUITY BRANDS
26	DOOSAN HEAVY
27	CHINA LONGYUAN -H
28	SVENSKA CELL -B
29	KINGSPAN GROUP
30	SPIE SA
31	GREEN PLAINS INC
32	TBEA CO LTD -A
33	WACKER CHEMIE AG
34	BYD CO LTD -H
35	KYOCERA CORP
36	TE CONNECTIVITY
37	NORDEX SE
38	HYOSUNG CORP
39	APPLIED MATERIAL
40	ROCKWOOL INTL -B
41	SHIN-ETSU CHEM
42	CHINA AGRI-INDUS
43	NIDEC CORP
44	BROOKFIELD RENEW
45	COVANTA HOLDING
46	SUNPOWER CORP
47	REPUBLIC SVCS
48	NOVOZYMES-B SHS

THE CLEAN200 LIST (continued)

Rank	Name
49	LS CORP
50	EBARA CORP
51	SUMITOMO FOREST
52	ITRON INC
53	PRYSMIAN SPA
54	BORGWARNER INC
55	EDP RENOVAVEIS S
56	QUANTA SERVICES
57	INFINEON TECH
58	CREE INC
59	HANWHA CHEM CORP
60	HELLA KGAA HUECK
61	SUEDZUCKER AG
62	NIBE INDUSTRIE -B
63	CHINA HIGH-SPEED
64	DIC CORP
65	EMCOR GROUP INC
66	XIANGTAN ELEC -A
67	CHINA EVERBR INT
68	SUZLON ENERGY
69	DELTA ELEC
70	TIANNENG POWER
71	CAVERION CORP
72	AZBIL CORP
73	MERCURY NZ LTD
74	DONGFANG ELECT -A

Rank	Name
75	OWENS CORNING
76	HUADIAN FUXIN -H
77	HITACHI HIGH TEC
78	HUANENG RENEWA -H
79	XJ ELECTRIC -A
80	OCI CO LTD
81	GCL SYSTEM INT -A
82	HAREON SOLAR T -A
83	ANDERSONS INC
84	ZHONGLI SCIENC -A
85	XIAN LONGI SIL -A
86	ZHEJIANG CHINT -A
87	KINDEN CORP
88	BHARAT HEAVY ELE
89	ARCADIS NV
90	TOFAS
91	RISEN ENERGY -A
92	REGAL BELOIT COR
93	ATLANTICA YIELD
94	EGING PHOTOVOL -A
95	ANALOG DEVICES
96	SANAN OPTOELEC -A
97	STANLEY ELEC CO
98	ENERGY DEVELOPME
99	NARI TECHNOLOG -A
100	SACYR SA

THE CLEAN200 LIST *(continued)*

Rank	Name
101	VALMET OYJ
102	SUNGROW POWER -A
103	GS YUASA CORP
104	WEG SA
105	ZHEJIANG YANKO -A
106	HONGFA TECHNOL -A
107	ROHM CO LTD
108	SAO MARTINHO
109	NINGBO SANXING -A
110	SHENZHEN DESAY -A
111	TIMKEN CO
112	OC OERLIKON CORP
113	TERRAFORM POWE -A
114	TATA CHEMICALS
115	XINYI SOLAR HLDS
116	ZHONGTIAN TECH -A
117	ORMAT TECHNOLOGI
118	TOKUYAMA CORP
119	SMITH (A.O.)CORP
120	BAONENGYUAN -A
121	SHENZHEN KAIFA -A
122	TELLHOW SCI-TE -A
123	KAIDI ECOLOGIC -A
124	KYOWA EXEO CORP
125	HANGZHOU FIRST -A
126	BEIJING SIFANG -A

Rank	Name
127	TRIMBLE INC
128	PERKINELMER INC
129	JIANGSU AKCOME -A
130	COFCO BIOCHEM -A
131	CHINA XD ELEC -A
132	VEECO INSTRUMENT
133	NEXTERA ENERGY P
134	BADGER METER INC
135	WOODWARD INC
136	CPFL ENERGIAS RE
137	SUMCO CORP
138	TETRA TECH INC
139	HEXCEL CORP
140	FAR EAST SMART -A
141	THERMAX LTD
142	JIANGSU SUNRAI -A
143	CSR LTD
144	CHINA BAOAN -A
145	JM AB
146	HANERGY TFP
147	MERIDIAN ENERGY
148	COMFORT SYSTEMS USA INC
149	SHENZHEN CLOU -A
150	NEW FLYER INDUST
151	TECO ELEC & MACH
152	TITAN WIND -A

THE CLEAN200 LIST (continued)

Rank	Name
153	XINYI GLASS
154	SGL CARBON SE
155	ARCPLUS GROUP -A
156	EXIDE INDUS LTD
157	PATTERN ENER
158	HEXING ELECTRI -A
159	IDFC LTD
160	SUZHOU DONGSHA -A
161	DELTA ELEC THAI
162	HENGDIAN DMEGC -A
163	DIALOG SEMICOND
164	SWECO AB -B
165	SHENZHEN JIAWE -A
166	GUANGDONG EAST -A
167	ESCO TECH INC
168	BEIJING NEW BU -A
169	ENERGY ABSOLUTE
170	HAVELLS INDIA
171	CSG HOLDING CO -B
172	INNERGEX RENEWAB
173	SICHUAN CHENG -A
174	ZHONGTONG BUS -A
175	UNIVERSAL DISPLA
176	HONGLI ZHIHUI -A

Rank	Name
177	BEIJING JINGYU -A
178	TRANSALTA RENEWA
179	HITACHI CAPITAL
180	CLEANAWAY WASTE
181	GIBRALTAR INDUST
182	CHINA NORTHERN -A
183	FOSHAN ELEC -B
184	APOGEE ENTERPR
185	SINOVEL WIND -A
186	SCHWEITER TEC -BR
187	CECEP WIND POW -A
188	NISSIN ELECTRIC
189	ZHEJIANG DUN'A -A
190	BORALEX INC -A
191	CHINA SHIPBUIL -A
192	ARGAN INC
193	GENTHERM INC
194	CAMEL GROUP CO -A
195	DIODES INC
196	SJVN LTD
197	ZHUZHOU KIBING -A
198	ZHEJIANG NARAD -A
199	TONGYU HEAVY -A
200	HUNAN CORUN NE -A

DISCLAIMER

The aggregated data comprising the Clean200™ represents a snapshot of the top-ranked "clean" companies as measured by total green energy revenue based on a methodology developed by Corporate Knights and *As You Sow* from data in the Bloomberg New Energy Finance database. The list should not be considered current or complete, or a substitute for financial data provided by a licensed financial advisor. Estimation methodologies are subject to limitations in modelling and measurement.

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ENDNOTES

1 http://www.carbontracker.org/report/carbon-bubble/
2 http://www.earth-policy.org/books/tgt
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13 https://creativecommons.org/
14 Bloomberg New Energy Finance's estimate of the percent of an organization's value that is attributable to its activities in renewable energy, energy smart technologies, carbon capture and storage (CCS), and carbon markets. To arrive at its estimate, Bloomberg New Energy Finance assesses an organization's sectors and subactivities within these clean energy areas, and then calculates an estimate using reported segmented revenues (as the preferred metric), along with any other available metrics such as segmented Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA), GWh breakdown of energy production and megawatt breakdown of generation assets.
Bloomberg New Energy Finance's exposure estimate is presented as one of these units:
A1 Main driver (50-100% of value) 50 to 100% of the organisation's value is estimated to derive from this activity
A2 Considerable (25-49% of value) 25 to 49% of the organisation's value is estimated to derive from this activity
A3 Moderate (10-24% of value) 10 to 24% of the organisation's value is estimated to derive from this activity
A4 Minor (<10% of value) Less than 10% of the organisation's value is estimated to derive from this activity
15 www.deforestationfreefunds.org

Corporate Knights
The Company for Clean Capitalism

147 Spadina Ave, Ste. 206 • Toronto, ON M5V2L7 • 416.203.4674
www.corporateknights.com

AS YOU SOW®

1611 Telegraph Ave., Ste. 1450 • Oakland, CA 94612 • 510.735.8158
www.asyousow.org