



CLEAN200

CARBON CLEAN 200™: INVESTING IN A CLEAN ENERGY FUTURE

2019 Q1 PERFORMANCE UPDATE



Corporate Knights
The Company for Clean Capitalism



AS YOU SOW®

FOREWORD

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We are pleased to present the 2019 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 that was launched in the summer of 2016 we have released an updated one every six months. In that time a great deal has changed in the world. The march away from the high carbon economy has accelerated in tandem with the march toward a clean economy.

Since Trump's inauguration, a U.S. coal plant has been shut down every 15 days, with 2018 being the nation's top coal-plant closing year ever. This is happening for the same reason that China and the entire developing world installed more new renewables than fossil power last year for the first time ever and why 42 percent of global coal fleets are unprofitable: Renewables are now cheaper in many major power markets. And we're just at the beginning of the innovation S-curve for renewables and storage.

In other portents for the future, according to Accenture, 2018 likely marked the peak production of internal combustion engine vehicles which are imminently set to be made obsolete by cheaper electric and fuel cell vehicles. Meanwhile, at least nine countries including China and India have telegraphed they will be banning fossil fuel burning vehicles and other jurisdictions around the world are beginning to put policies in place to make it so. In addition, as a result of the march of technology, zero-emission vehicles will be cheaper right off-the-lot before accounting for the fuel savings and any subsidies, as soon as 2024 according to Bloomberg.

In terms of oil and gas stocks, they are rapidly fading away. In 1980, oil and gas stocks made up 25 percent of the S&P 500. By 2009, the sector had halved to 12 percent, and since 2009 they have halved again to just over 6 percent. At the current rate of decline, Energy stocks may be less than a rounding error of major benchmarks inside the next decade.

While fossil fuels have been burning out, the current crop of the Clean200™ companies has been experiencing explosive growth, with compound annual growth rates more than double that of the S&P 500 benchmark over the past ten years. For

comparison perspective, the current crop of the Clean200 companies had a collective market cap of \$1,366 billion ten years ago, about 3 percent as large as the S&P500. Today, they represent more than 15 percent of value of the S&P 500 — a 500 percent increase in relative value over just ten years.

The trendlines are clear. Fossil fuels are disappearing and carbon free business lines have stepped out of the clean energy niche and now touch the entire economy.

In line with these changes in the world, beginning in this version of the Clean200, we have adapted our methodology to reflect the broadening of this cross-sector grouping of companies. These changes mean that we are now applying a new carbon free definition that captures a larger portion of the economy beyond energy efficiency, green energy, and zero emission and hybrid vehicles. We will now include banks that are financing the low-carbon solutions; real estate companies leading the way on low-carbon buildings; forestry companies protecting carbon sinks; responsible miners of critical materials for the low carbon economy; food and apparel companies with products that are primarily made of raw materials with a significantly lower carbon footprint; and energy-hungry Information and Communications Technology (ICT) companies that are leading the way on renewable energy while also being best-in-sector according to currently accepted privacy benchmarks.

The updated criteria has broadened the Clean200 so it is now more diverse from a sector perspective and more representative of the breadth of the low carbon economic transition.

It has also resulted in what may be a surprise at the top of the Clean200 list: Alphabet, the holding company for Google.

As per the updated methodology, Internet and Data Services companies (a subset of ICT) are considered “green” or “clean” if they fulfill two tests. Number 1: They must derive 100 percent of the energy they consume from renewable sources. Number 2: They must rank in the top quartile among peers on privacy, according to the best available benchmark, [Ranking Digital Rights](#). Alphabet has invested billions of dollars over the past few years to meet its renewable energy target. Also, Google ranks number one among its peers on privacy – we acknowledge that being number one on privacy is far from perfect and are looking for ways to improve this benchmarking.

From a carbon emissions perspective, Google’s decision to go 100 percent renewable as compared to a business-as-usual scenario, removes five million tonnes of carbon emissions from the atmosphere every year. That is no small beans. It is equivalent to taking one million cars off the road or shutting down a quarter of Suncor’s operations, one of the largest oil sands companies in the world.

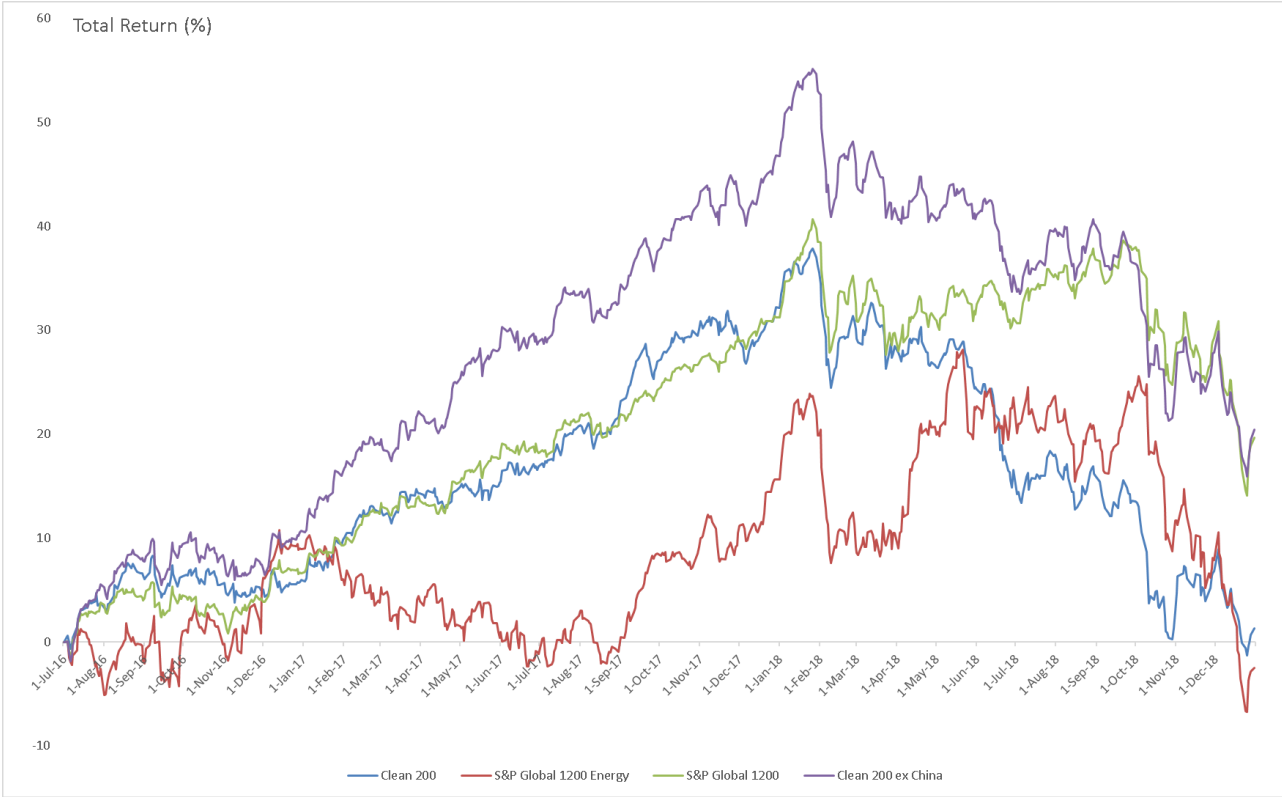
From a big picture perspective, it matters a lot what kind of energy ICT companies choose because they are projected to account for 20 percent of the entire global [electric grid by 2025](#).

We encourage and challenge all ICT companies, many of which have cash burning a hole in their pockets, to go 100 percent renewable and to up their game on privacy, which will only become more important as data replaces oil.

RETURNS

Since inception (July 1, 2016), the Clean200 is ahead of its fossil fuel benchmark (S&P Global 1200 Energy), but behind the broad market benchmark (S&P 1200), mostly due to sub-par China performance amidst the simmering trade war with the U.S.

When excluding the Chinese stocks from the Clean 200, the Clean200 ex-China moves into pole position ahead of its broad market benchmark.



Source: Bloomberg, Corporate Knights

Overall, the model presented in the form of the Clean200 continues to indicate that demand and market forces are driving growth for low carbon companies. Since its

inception two and a half years ago, the Clean200 has outperformed by 3.78 percent against the S&P Global 1200 Energy Index. The Clean200 ex-China which returned 20.4 percent since inception beats the S&P Global 1200 Index by 0.73 percent over the same time period. It will be very interesting to see how the trends unfold over the next few months.

GICS SECTOR	# OF CLEAN200 COMPANIES
Industrials	78
Information Technology	40
Utilities	20
Consumer Discretionary	20
Materials	18
Consumer Staples	8
Energy	5
Financials	3
Health Care	1
Communication Services	4
Real Estate	3

CLEAN 200 COMPANIES BY COUNTRY

COUNTRY	# OF CLEAN200 COMPANIES
China	36
United States of America	34
Japan	19
Germany	11
Finland	10
Korea; Republic (S. Korea)	10
Brazil	9
Canada	9
France	8
Spain	6
Switzerland	5
Netherlands	5
Hong Kong	5
Taiwan	4
Sweden	4
United Kingdom	4

COUNTRY	# OF CLEAN200 COMPANIES
Ireland; Republic of	4
Denmark	3
Belgium	2
Austria	2
Singapore	2
Italy	2
Bermuda	1
Norway	1
Luxembourg	1
India	1
Turkey	1
Mexico	1

THE CLEAN 200™ METHODOLOGY

The Clean200 are the largest 200 public companies ranked by green energy revenues. It was first calculated on July 1, 2016 and publicly released on August 15, 2016 by Corporate Knights and *As You Sow*. The current list has been updated with data through the end of 2018 (December 31, 2018).

The Clean200 companies 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 clean revenue estimate, primarily sourced from Corporate Knights Research supplemented by FactSet, Bloomberg BNEF, and FTSE Russell data. In order to be eligible, a company must have USD revenue of at least \$1 billion (most recent available fiscal yearend data) and earn more than 10% of total revenues from clean sources.

The Clean200 uses negative screens. It excludes all oil and gas companies and utilities that generate less than 50 percent of their power from green sources, the top 100 coal companies measured by reserves, the top 100 oil & gas companies as measured by reserves, as well as all fossil fuel companies, majority fossil-fired utilities, pipeline and oil field services companies, and other fossil fuel-related companies screened on *As You Sow's* [Fossil Free Funds](#). In addition, the Clean200 excludes weapons companies including major military arms manufacturers found on the SIPRI Top 100 arms-producing and military services list, as well cluster munitions, nuclear weapons, and civilian firearm manufacturers screened on *As You Sow's* [Weapon Free Funds](#). The Clean200 also exclude palm oil producers that are screened on *As You Sow's* [Deforestation Free Funds](#), companies using child or forced labor, and companies who engage in negative climate lobbying are not included. The full list of exclusionary screens is provided below.

CLEAN200 NEGATIVE SCREENS	CRITERIA	NUMBER OF COMPANIES EXCLUDED
Farm Animal Welfare	Identifies company laggards (Tier 5 or 6) on Farm Animal Welfare practices, based on the Benchmark for Farm Animal Welfare.	0
Industrial Meat	Identifies meat companies, according to FactSet RBICS.	0
Corporate Fines, Penalties or Settlements	Identifies laggard companies (bottom quartile) with high monetary fines, penalties and settlements paid as a percentage of total revenue.	1
Tobacco	Identifies companies which earn more than 5% of revenue from tobacco using FactSet's RBICS.	0
Controversial Weapons	The SIPRI Top 100 arms-producing and military services companies in the world (Link); Cluster munitions and landmines, nuclear weapons, gun manufacturers screened by As You Sow Weapon Free Funds tool (Link)	1
Conventional Weapons	The SIPRI Top 100 arms-producing and military services companies in the world (Link); Cluster munitions and landmines, nuclear weapons, gun manufacturers screened by As You Sow Weapon Free Funds tool (Link)	4
Small Arms (Hand Guns)	Identifies companies which earn more than 5% of revenue from sale of handguns using FactSet's RBICS.	0

Blocking Climate Policy	Identifies laggards (scored less than E) in climate regulation readiness according to InfluenceMap.	0
Severe Environmental Damage	Identifies companies which meet NBIM exclusion for "Actions or omissions that constitute an unacceptable risk of the Fund contributing to severe environmental damages".	1
Thermal Coal	The FFI Carbon Underground Top 100 companies by coal reserves (Link); Morningstar coal industry company industry classification (Link); Companies which derive at least 30% of revenue from thermal coal as provided by Oxford Smith School, supplemented by corporate financial disclosures.	1
Non-Green Utilities	Any utility that derives less than 50% revenue from green sources; Macroclimate Top 30 public company owners of coal-fired power plants (Link)	36
Tropical Deforestation	Scores less than 2 on Forest 500 scale; Palm oil producers screened by the As You Sow/Friends of the Earth Deforestation Free Funds tool (Link)	8
For-Profit Prison	Identifies companies which own or operate private prisons according to FactSet RBICS and two aggregated private prison divestment lists, from American Friends Service Committee (Quaker) and Enlace International's National Private Prison Divestment Campaign.	0

Repressive Regime	Identifies companies which derive at least 5% of their revenue from countries listed as "worst of the worst" by Freedom House.	1
Global Compact Principles Violators	Companies identified by RepRisk Global Compact database with a "VIOLATOR_OPERATIONS" flag under either of human rights, labour, environment or anti-corruption themes.	0
Gambling	Identifies companies which earn more than 5% of revenue from gambling using FactSet's RBICS.	0
Pornography	Companies classified by "Adult Entertainment" by at least one of the cohort of large pension funds with exclusion lists that Corporate Knights monitors.	0
Excess of conventional over clean energy financing	Based on Bloomberg BNEF data and/or corporate disclosures. Companies who sum of conventional energy financing exceeds new energy financing are removed.	0
Child/Forced labour	Source: Know the Chain. Companies which scored in bottom half of Know the Chain rating are removed	9
Oil & Gas	The FFI Carbon Underground Top 100 companies by oil/gas reserves (Link);	1

Ratio of fossil cap-ex to renewables cap ex is greater than 2:1	Where an oil& gas company derives a minority of revenue from renewable energy sources, those whose capital expenditure towards renewable energy business to fossil-fuel energy business is less than 25% (or not disclosed)are removed	1
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THE CLEAN 200™ LIST

RANK	NAME	COUNTRY	SECTOR
1	Alphabet Inc	United States of America	Communication Services
2	Siemens Ag-Reg	Germany	Industrials
3	Toyota Motor Corp	Japan	Consumer Discretionary
4	Cisco Systems Inc	United States of America	Information Technology
5	Hp Inc	United States of America	Information Technology
6	Taiwan Semiconductor Manufac	Taiwan	Information Technology
7	Abb Ltd-Reg	Switzerland	Industrials
8	Telefonaktiebolaget Lm Ericsson	Sweden	Information Technology
9	Unilever Plc	United Kingdom	Consumer Staples
10	Banco Do Brasil S.A.	Brazil	Financials
11	Lg Electronics Inc	Korea; Republic (S. Korea)	Consumer Discretionary
12	Bnp Paribas	France	Financials

RANK	NAME	COUNTRY	SECTOR
13	Schneider Electric Se	France	Industrials
14	Tesla Motors Inc	United States of America	Consumer Discretionary
15	Vestas Wind Systems A/S	Denmark	Industrials
16	Umicore Sa	Belgium	Materials
17	Upm-Kymmene Oyj	Finland	Materials
18	Air Liquide Sa	France	Materials
19	Lenovo Group Ltd	China	Information Technology
20	Bombardier Inc-B	Canada	Industrials
21	Adidas Ag	Germany	Consumer Discretionary
22	Canadian Natl Railway Co	Canada	Industrials
23	Innogy Se	Germany	Utilities
24	Kering	France	Consumer Discretionary
25	Koninklijke Kpn Nv	Netherlands	Communication Services
26	Panasonic Corp	Japan	Consumer Discretionary
27	Siemens Gamesa R	Spain	Industrials
28	Csx Corp	United States of America	Industrials
29	Solvay Sa	Belgium	Materials
30	Signify Nv	Netherlands	Industrials

RANK	NAME	COUNTRY	SECTOR
31	Telus Corp	Canada	Communication Services
32	Kone Oyj-B	Finland	Industrials
33	Orsted	Denmark	Utilities
34	Ecolab Inc	United States of America	Materials
35	Nokia Group	Finland	Information Technology
36	Johnson Controls	Ireland; Republic of	Industrials
37	Ball Corp	United States of America	Materials
38	Ricoh Co Ltd	Japan	Information Technology
39	Electrolux Ab-Ser B	Sweden	Consumer Discretionary
40	Lg Chem Ltd	Korea; Republic (S. Korea)	Materials
41	Air Products & Chemicals Inc	United States of America	Materials
42	Samsung Sdi Co	Korea; Republic (S. Korea)	Information Technology
43	Ingersoll-Rand Plc	Ireland; Republic of	Industrials
44	Neste Corporation	Finland	Energy
45	Dassault Systemes Sa	France	Information Technology
46	Eaton Corp Plc	Ireland; Republic of	Industrials

RANK	NAME	COUNTRY	SECTOR
47	Praxair Inc	United States of America	Materials
48	Verbund Ag	Austria	Utilities
49	Kingspan Group	Ireland; Republic of	Industrials
50	Osram Licht Ag	Germany	Industrials
51	Jinkosolar Holding Co-Adr	China	Information Technology
52	Capitaland Ltd	Singapore	Real Estate
53	Acciona Sa	Spain	Utilities
54	Xinjiang Goldwind Sci&Tech-A	China	Industrials
55	China Longyuan Power Group-H	China	Utilities
56	Akzo Nobel	Netherlands	Materials
57	Green Plains Inc	United States of America	Energy
58	Gcl-Poly Energy	Hong Kong	Information Technology
59	Byd Co Ltd-H	China	Consumer Discretionary
60	Acuity Brands	United States of America	Industrials
61	Nordex Se	Germany	Industrials
62	Emerson Elec Co	United States of America	Industrials

RANK	NAME	COUNTRY	SECTOR
63	Spie Sa	France	Industrials
64	Canadian Solar I	Canada	Information Technology
65	Mccormick & Co-Non Vtg Shrs	United States of America	Consumer Staples
66	City Developments Ltd	Singapore	Real Estate
67	Andritz Ag	Austria	Industrials
68	Nidec Corp	Japan	Industrials
69	Companhia Energetica De Minas Gerais Cemig	Brazil	Utilities
70	Shin-Etsu Chem	Japan	Materials
71	Contemporary Amperex Techn-A	China	Industrials
72	First Solar Inc	United States of America	Information Technology
73	Doosan Heavy	Korea; Republic (S. Korea)	Industrials
74	Natura Cosmeticos Sa	Brazil	Consumer Staples
75	Workday Inc-Class A	United States of America	Information Technology
76	Prologis Inc	United States of America	Real Estate
77	Wacker Chemie Ag	Germany	Materials

RANK	NAME	COUNTRY	SECTOR
78	Autodesk Inc	United States of America	Information Technology
79	Eletrobras	Brazil	Utilities
80	Rexel Sa	France	Industrials
81	Koninklijke Philips Nv	Netherlands	Health Care
82	Kao Corp	Japan	Consumer Staples
83	China Everbr Int	Hong Kong	Industrials
84	Brookfield Renew	Bermuda	Utilities
85	China Agri-Indus	Hong Kong	Consumer Staples
86	Engie Brasil Energia Sa	Brazil	Utilities
87	Hyosung Corp	Korea; Republic (S. Korea)	Industrials
88	Sumitomo Forest	Japan	Consumer Discretionary
89	Norsk Hydro Asa	Norway	Materials
90	Longi Green Energy Technol-A	China	Information Technology
91	Republic Svcs	United States of America	Industrials
92	Sandvik Ab	Sweden	Industrials
93	Ebara Corp	Japan	Industrials
94	Nibe Industrie-B	Sweden	Industrials

RANK	NAME	COUNTRY	SECTOR
95	Borgwarner Inc	United States of America	Consumer Discretionary
96	Hanwha Q Cel-Adr	Korea; Republic (S. Korea)	Industrials
97	Renewable Energy	United States of America	Energy
98	Quanta Services	United States of America	Industrials
99	Gcl System Integration Tec-A	China	Information Technology
100	Senvion Sa	Luxembourg	Industrials
101	Prysmian Spa	Italy	Industrials
102	Konica Minolta Inc	Japan	Information Technology
103	Tianneng Power Intl Ltd	China	Consumer Discretionary
104	Sino-American	Taiwan	Information Technology
105	Ls Corp	Korea; Republic (S. Korea)	Industrials
106	Hella Gmbh & Co	Germany	Consumer Discretionary
107	Hanwha Chem Corp	Korea; Republic (S. Korea)	Materials
108	Sunpower Corp	United States of America	Information Technology
109	Suedzucker Ag	Germany	Consumer Staples

RANK	NAME	COUNTRY	SECTOR
110	Edp Renovaveis S	Spain	Utilities
111	Legrand Sa	France	Industrials
112	Nari Technology Co Ltd-A	China	Industrials
113	Emcor Group Inc	United States of America	Industrials
114	Landis+Gyr Group	Switzerland	Information Technology
115	Guodian Technology & Envir-H	China	Industrials
116	Zhejiang Chint Electrics-A	China	Industrials
117	Xinte Energy Co Ltd-H	China	Industrials
118	Risen Energy Co Ltd-A	China	Information Technology
119	Sekisui Chemical Co Ltd	Japan	Consumer Discretionary
120	Abengoa -CI A	Spain	Industrials
121	Delta Elec	Taiwan	Information Technology
122	Pacific Ethanol	United States of America	Energy
123	Dic Corp	Japan	Materials
124	Oci Co Ltd	Korea; Republic (S. Korea)	Materials
125	Huaneng Renewables Corp-H	China	Utilities

RANK	NAME	COUNTRY	SECTOR
126	Xuji Electric Co Ltd-A	China	Industrials
127	Outotec Oyj	Finland	Industrials
128	Cree Inc	United States of America	Information Technology
129	Shunfeng International Clean	China	Information Technology
130	Wartsila Oyj Abp	Finland	Industrials
131	Kanematsu Corp	Japan	Industrials
132	Owens Corning	United States of America	Industrials
133	Xiangtan Electric Manufact-A	China	Industrials
134	Global Pvg Se	Germany	Information Technology
135	Tianjin Zhonghuan Semicond-A	China	Information Technology
136	Jiangsu Zhongli Group Co L-A	China	Industrials
137	Hitachi High Tec	Japan	Information Technology
138	Avangrid Inc	United States of America	Utilities
139	Itron Inc	United States of America	Information Technology
140	Stmicroelectronics Nv	Switzerland	Information Technology

RANK	NAME	COUNTRY	SECTOR
141	Stantec Inc	Canada	Industrials
142	Sungrow Power Supply Co Lt-A	China	Industrials
143	Metso Oyj	Finland	Industrials
144	Suzlon Energy Ltd	India	Industrials
145	Bj Ent Clean	Hong Kong	Utilities
146	Caverion Oyj	Finland	Industrials
147	Chr Hansen Holding A/S	Denmark	Materials
148	Yingli Green Energy Hold-Adr	China	Information Technology
149	Erg S.P.A	Italy	Utilities
150	Huadian Fuxin Energy Corp - H	China	Utilities
151	Sanan Optoelectronics Co L-A	China	Information Technology
152	Xinyi Solar Holdings Ltd	China	Information Technology
153	China High-Speed	Hong Kong	Industrials
154	Mls Co Ltd-A	China	Information Technology
155	Cogeco Communications Inc	Canada	Communication Services
156	Transcontinental Inc	Canada	Industrials

RANK	NAME	COUNTRY	SECTOR
157	Suzhou Dongshan Precision-A	China	Information Technology
158	Tofas	Turkey	Consumer Discretionary
159	Delphi Technolog	United Kingdom	Consumer Discretionary
160	Biosev Sa	Brazil	Consumer Staples
161	Clearway Energ-A	United States of America	Utilities
162	China Datang Corp Renewabl-H	China	Utilities
163	Cnpc Capital Co Ltd-A	China	Industrials
164	Kinden Corp	Japan	Industrials
165	Dongfang Electric Corp Ltd-A	China	Industrials
166	Cropenergies Ag	Germany	Energy
167	Nemak Sab De Cv	Mexico	Consumer Discretionary
168	Atlantica Yield	United Kingdom	Utilities
169	Sma Solar Techno	Germany	Information Technology
170	Cargotec Oyj-B Share	Finland	Industrials
171	Shenzhen Desay Battery Tec-A	China	Industrials
172	Jiangsu Zhongtian Technolo-A	China	Industrials

RANK	NAME	COUNTRY	SECTOR
173	Stanley Elec Co	Japan	Consumer Discretionary
174	Energias Do Bras	Brazil	Utilities
175	Wuxi Taiji Indus Co Ltd-A	China	Information Technology
176	Resolute Forest	Canada	Materials
177	Gs Yuasa Corp	Japan	Industrials
178	Andersons Inc	United States of America	Consumer Staples
179	Hubbell Inc	United States of America	Industrials
180	Hitachi Capital	Japan	Financials
181	Chaowei Power Holdings Ltd	China	Consumer Discretionary
182	Arcadis Nv	Netherlands	Industrials
183	Rohm Co Ltd	Japan	Information Technology
184	Sig Plc	United Kingdom	Industrials
185	Valmet Oyj	Finland	Industrials
186	Light Sa	Brazil	Utilities
187	Sacyr Sa	Spain	Industrials
188	Geberit Ag-Reg	Switzerland	Industrials
189	Wsp Global Inc	Canada	Industrials
190	Hitachi Zosen	Japan	Industrials

RANK	NAME	COUNTRY	SECTOR
191	China Shipbuilding Industr-A	China	Consumer Discretionary
192	Regal Beloit Cor	United States of America	Industrials
193	Global Wafers	Taiwan	Information Technology
194	Amadeus It Group Sa	Spain	Information Technology
195	Chongqing Sokon Industry G-A	China	Consumer Discretionary
196	Timken Co	United States of America	Industrials
197	Smith (A.O.)Corp	United States of America	Industrials
198	Weg Sa	Brazil	Industrials
199	Oc Oerlikon Corp	Switzerland	Industrials
200	Wooree Lighting	Korea; Republic (S. Korea)	Industrials

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