

## **FINANCIAL IMPLICATIONS OF THE FACULTY SENATE RESOLUTION**

### **Cornell Investment and Divestment Strategies for a Sustainable Future**

The Faculty Resolution proposes a carefully constructed divestment approach that targets fossil fuel companies, which are, in fact, most likely to lose value as we move into an era where individuals, institutions, and nations reduce their use of fossil carbon. We propose this as a prudent, forward-looking financial strategy and as a way for Cornell to take a position consistent with its move to carbon neutrality—an act of moral leadership on the climate issue. These 200 publicly traded companies constitute at most 3% of Cornell’s investment portfolio and probably less. The long phase-in period will allow us to examine the financial impacts of divestment in a careful way, to reduce negative impacts in any one year, and possibly re-invest in companies that develop business plans around non-fossil carbon energy sources.

#### **Predicting the effects of divesting from the companies holding the largest fossil fuel reserves:**

The analysis below is our best estimate of the financial consequences of divestment.

#### ***1. Less than 1.5% (on average) of the endowment will be affected by the targeted divestment from now to 2035:***

- Divestment will target the publically-traded subset of the 200 companies that, according to their prospectuses, own the largest fossil-fuel reserves, the “Carbon Tracker list” [1]. (See list at end).
- The entire Cornell endowment was ~\$5.7B at the end of fiscal year [2].
- 9% was invested in “energy stocks”[3].
- 2/3 of that was invested in “private partnerships.” These do not contain large, publically traded equities---the type to be divested [3]. Therefore, at most only 3% of the endowment is in the companies proposed for divestment.
- Many energy companies are not on the list (e.g., utility and equipment companies and small-to-moderate-sized fossil fuel companies), further reducing the fraction of the endowment that would be affected.
- At most 1/20 of this fraction will be divested the first year. The time-average over the 20-year period leading up to full divestment by the end of 2035 is <1.5% of the endowment.

#### ***2. Four separate published historical tests (back-tests)<sup>a</sup> of the effect of divestment on endowment return indicate that divestment would have had a very small positive or negative effects in the past:***

- IMPAX Asset Management compared the 5- and 7-year cumulative returns (ending in April, 2013) of the MSCI World Index (a standard benchmark for large and mid-cap market investment) versus that portfolio without the fossil fuel energy sector (Fossil-Free Portfolio; Fig. 1 for 5 year analysis). For both the 5 and 7 year periods, the fossil-free portfolio had a small positive effect on returns (0.5% annually) [4].

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<sup>a</sup> In these “back-tests,” the historical financial data was used to simulate and compare the returns that would have been obtained from the specified undivested and divested portfolios over the indicated time period. Such tests are widely used in the investment industry to examine the consequences of different investment decisions.

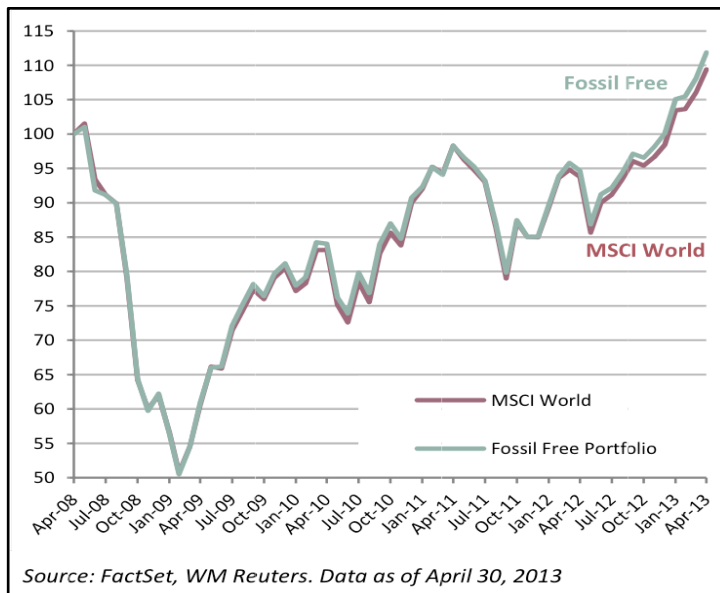


Fig. 1. Five-year cumulative returns for the MSCI World Index (red) and that index without the fossil fuel energy sector (gray; Fossil-Free Portfolio) [4].

- MSCI ESG Research compared the 5-year cumulative returns (from 2008 to 2013) of another broad market index, the MSCI All Country World Index Investible Market Index (MSCI ACWI IMI), with the same index with (their best approximation<sup>b</sup> to) the 200 companies in the Carbon Tracker list removed over the period from 2008 to 2013 (Fig.2) [5]. In this study as well, there was a very small difference in return between the two portfolios—divestment improved annualized return by 0.22%. They also compared the 10-year cumulative returns of the MSCI ACWI IMI with the same portfolio with a slightly different approximation based on a carbon-reserve list from the California State Teachers Retirement System (MSCI ACWI IMI ex CALSTRS Fossil Fuel) (Fig. 3). The difference was again very small. In this case the divested portfolio again outperformed the undivested portfolio over the previous 5-year period but underperformed it over the 10-year period by an annualized return difference of  $-0.16\%$ .

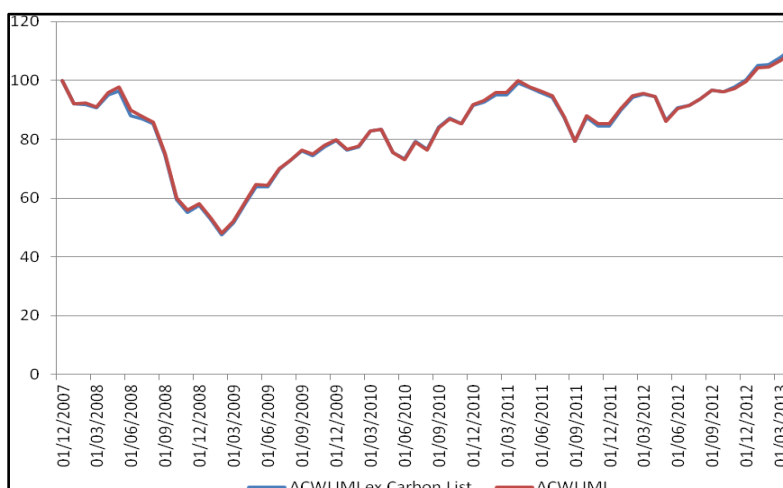


Fig. 2. Five- year cumulative returns for the MSCI All Country World Index Investible Market Index (red) and that index without the Carbon Tracker list (blue; ACWI IMI ex Carbon List) [5].

<sup>b</sup> Approximations were needed because of company mergers and changes in fossil-fuel-reserve holdings over time, changes in fossil-fuel holdings, etc.

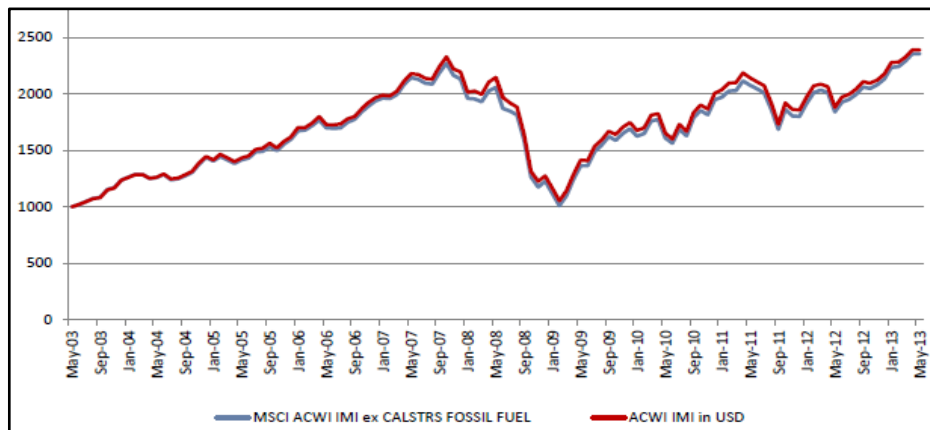


Fig. 3. Ten-year cumulative returns for the MSCI All Country World Index Investible Market Index (red) and that index without the Carbon Tracker List (blue; MSCI ACWI IMI ex CALSTRS FOSSIL FUEL) [5].

- The Aperio Group investment company performed a back-test comparing returns from the Russell 3000 index, another broad-market benchmark, and the same index with the complete Oil, Gas & Consumable Fuels sector, which constitutes 9.6% of the Global Industry Classification Standard market capitalization and contains the companies to be divested [6]. In this case 25 different 10-year periods, ending in different years from 1997 to 2012, were analyzed (Fig. 4). Again, the conclusion was that divestment made little difference in the annualized return: the maximum increase in annualized return was +0.6%; the maximum decrease was -0.3%. The divested portfolio earned higher returns in 73% of the ten-year periods. Overall, the main effect was to increase the variation in 10-year annualized return by about  $\pm 0.2\%$ .

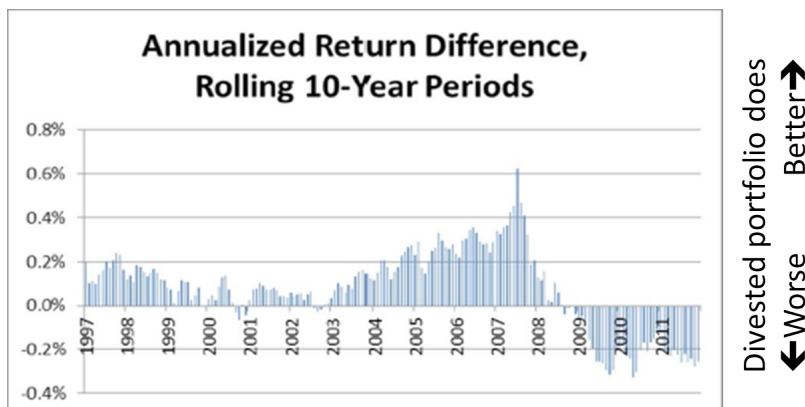


Fig. 4. Differences in ten-year annualized returns ending at the indicated times between the Russell 3000 index and that index without the complete Oil, Gas, & Consumable Fuels sector [6].

- Advisor Partners tested the effect of divestment on cumulative return of the S&P500 from 1990 to 2012 and found no significant overall impact (Fig. 5). Divestment increased the standard deviation of the S&P500 from 21.74% to 21.96% [7].

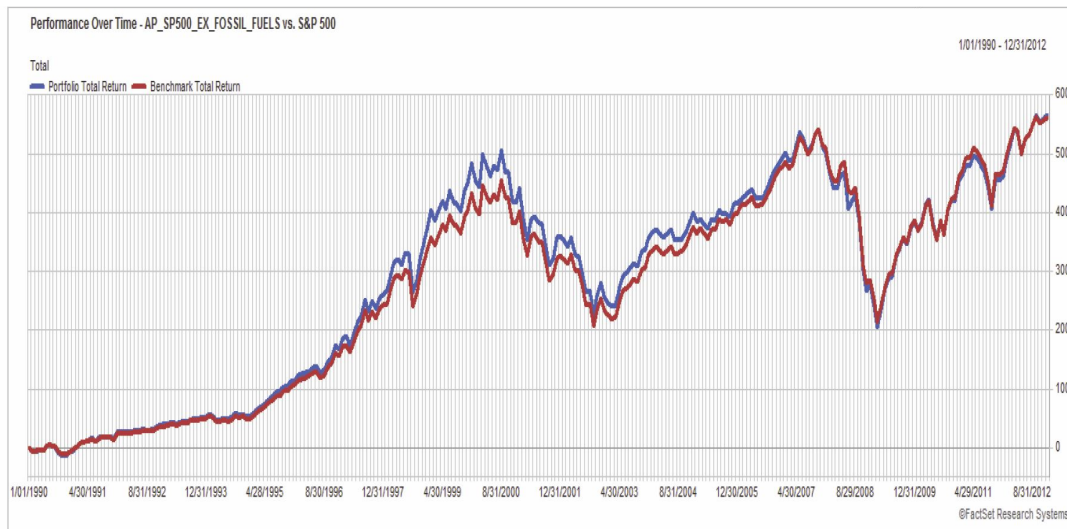


Fig. 5. Twelve-year cumulative returns for the S&P500 (red) and that index without almost all energy and utility companies (blue; a superset of the Carbon Tracker List) [7].

### 3. Divestment is expected to cause no significant change in average endowment return in the future:

- Cornell's endowment return is similar to that of other comparable institutions and varies greatly from year-to-year (Fig. 6) [8].

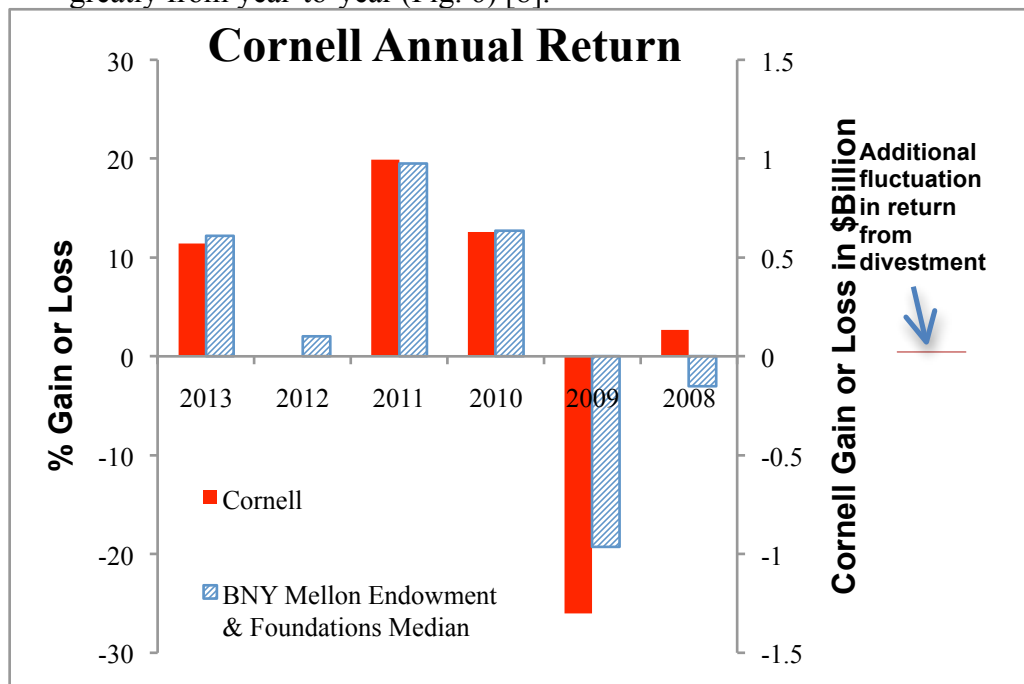


Fig. 6. Cornell endowment return. The % gain or loss is for the fiscal year ending June 30 of the indicated year [8]. The conversion to \$ is approximate and assumes a constant endowment of \$5B. The BNY Mellon Endowment & Foundations Median is a database of >100 foundations and endowments maintained by BNY Mellon.

- The primary value-added component of Cornell's portfolio is the private partnerships, which are expected to perform about 5% better than the Standard and Poor index. In particular, the energy component of the private equity portfolio is expected to outperform the S&P500 by ~8% [3]. However, the private equity component is *not affected* by the divestment resolution, which only addresses large publically traded companies.
- Numerous studies have shown that only a very small percentage of investment funds have consistently outguessed the publically traded market. No evidence has been presented that we can do better or that the publically traded companies affected by divestment will have gains outside of those that are already priced into the market. One concern raised has been that even a small limitation on our investment options might cause us to lose the "best"

investment advisors. However, there is no evidence that our current advisors are exceptionally good (Fig. 7) [2, 9, 10].



Fig. 7. Ivy League investment returns [2,9,10].

#### 4. Divestment will increase return variability by a tiny amount relative to typical variation:

- The annual *variability* in Cornell's investment return has been ~9.7% [11] (see also Fig. 6).
- The back-tests described above indicate that, assuming business-as-usual (but see below), full divestment would have *no net effect on average annual return* and that divestment of the complete energy and utilities sectors (14%) from a stock-market-only portfolio would increase the *variability* in annual return by ~0.2% [7]. However, utilities and many energy companies are scheduled to be divested and only 56% of Cornell's endowment is invested in the stock market [8], so the time-averaged divestment will be <1.5% (see above). Therefore, a rough estimate is that divestment from the 200 companies on the list would, on average, increase annual variability in return by  $\sim 0.2 \times 1.5/14 = 0.02\%$ ; i.e., an additional average gain or loss of  $\pm \$1.2\text{M}$  per year. A more precise calculation, which accounts for the gradual phasing in of divestment, the expected growth of the endowment over time, inflation, and the relationship between Cornell's equity and other ("defensive" and "real assets") investments predicts that the variability will be much less. Less than 1% of the endowment will be divested by 2021, at the soonest, and any increases in variability will only be noticeable after this time.

#### The risks of remaining invested in the companies holding the largest fossil fuel reserves:

1. *The above analysis assumes fossil-fuel "business as usual." This is unlikely to be the case:*
  - Approximately \$7 trillion of public company assets attributable to fossil-fuel reserves cannot be burned if average global temperature rise is to remain below 2°C [12], the maximum increase consistent with non-extreme climate change.[13] Continuing "business as usual" (i.e., burning the reserves) would cause a 4.1-5.1°C temperature rise [14], which will "create a prehistoric climate...radically different from today" [1]. It is unlikely that this policy will be permitted indefinitely.
  - "Purely from a financial perspective, even the outside chance that some reserves could become 'stranded assets' if a red line is breached should prompt a hard look at the assumptions underlying the valuation of fossil fuel producers" [15].

- “Financial analysts are increasingly warning investors of the risks that tighter regulations on carbon dioxide emissions...could make fossil fuel reserves substantially less valuable” [4].
2. *The possibility of decreases in the valuation of the companies holding large fossil-fuel reserves makes divestment a prudent forward-looking financial move:*
- The head of the World Bank, one of the world’s top five financial institutions, recently called for governments to consider withdrawing their investments in oil, gas and coal companies. “The so-called ‘long-term investors’ must recognize their fiduciary responsibility to future pension holders who will be affected by decisions made today”[16].
  - The concern is serious enough that the Norwegian government is setting up an expert group to evaluate the risk of keeping its huge \$840B national trust fund invested in fossil fuels [17]. Since these funds have been generated almost entirely from Norway’s oil and gas revenues, this is a remarkable turn of events.
  - Seventeen foundations controlling \$1.8B in assets recently joined twenty-two cities and nine colleges and universities in divesting [18].
  - The British House of Commons Environment Audit Committee in March, 2014, warned Parliament and the Bank of England that the world’s financial markets could be creating a “carbon bubble” by over valuing the fossil fuel assets of large companies [19, 20]. "The UK Government and Bank of England must not be complacent about the risks of carbon exposure in the world economy," said Committee chair Joan Walley MP [21].



### Attachment: Top 200 listed companies by estimated carbon reserves

Rank	Coal Companies	COAL (GtCO <sub>2</sub> )	Oil & Gas Companies	OIL (GtCO <sub>2</sub> )	Gas (GtCO <sub>2</sub> )
1	Severstal JSC	141.60	Lukoil Holdings	42.59	0.97
2	Anglo American PLC	16.75	Exxon Mobil Corp.	38.14	2.89
3	BHP Billiton	16.07	BP PLC	32.68	1.92
4	Shanxi Coking Co. Ltd.	14.98	Gazprom OAO	14.87	13.96
5	Exxaro Resources Ltd.	13.37	Chevron Corp.	20.11	1.11
6	Xstrata PLC	11.60	ConocoPhillips	18.11	1.03
7	Datang International Power Generation Co. Ltd.	11.21	Total S.A.	16.90	1.12
8	Peabody Energy Corp.	10.23	Royal Dutch Shell PLC	14.11	2.09
9	Mechel OAO	8.90	Petrobras	11.45	0.17
10	Inner Mongolia Yitai Coal Co. Ltd.	7.78	Rosneft	10.70	0.08
11	China Shenhua Energy Co. Ltd.	6.91	ENI S.p.A.	7.51	0.53
12	Coal India Ltd.	6.69	Occidental Petroleum Corp.	7.36	0.22
13	Arch Coal Inc.	5.57	Bashneft	7.25	0.01
14	Rio Tinto	5.23	SINOPEC Shandong Taishan Petroleum Co. Ltd.	6.61	0.22
15	Evrast Group S.A.	4.86	Canadian Natural Resources Ltd.	4.35	0.14
16	Public Power Corp. S.A.	4.56	Devon Energy Corp.	3.77	0.42
17	Consol Energy Inc.	4.50	Suncor Energy Inc.	3.74	0.07
18	Yanzhou Coal Mining Co. Ltd.	4.46	Apache Corp.	3.32	0.33
19	Mitsubishi Corp.	4.31	Anadarko Petroleum Corp.	3.14	0.33
20	Datong Coal Industry Co. Ltd.	4.30	Hess Corp.	3.01	0.12
21	Bumi Resources	3.28	Repsol YPF S.A.	2.75	0.29
22	United Co. Rusal PLC	3.02	BG Group PLC	2.29	0.48
23	Vale SA	3.01	Marathon Oil Corp.	2.51	0.12
24	Pingdingshan Tianan Coal Mining Co. Ltd.	2.97	Inpex Corp.	2.44	0.10
25	Tata Steel Ltd.	2.96	Statoil ASA	2.23	0.25
26	Teck Resources Ltd.	2.70	BHP Billiton	1.82	0.20
27	Banpu PCL	2.55	CNOOC Ltd.	1.85	0.09
28	Sasol Ltd.	2.51	Husky Energy Inc.	1.76	0.06
29	United Industrial Corp. Ltd.	2.48	YPF S.A.	1.68	0.12
30	Polyus Gold OAO	2.47	Novatek	-	1.73
31	Alpha Natural Resources Inc.	2.29	Talisman Energy Inc.	1.47	0.19
32	Magnitogorsk Iron & Steel Works	2.20	Pioneer Natural Resources Co.	1.50	0.11
33	Raspadskaya OJSC	2.09	SK Holdings Co. Ltd.	1.56	-
34	Kuzbassenergo	2.03	Petroleum Development Corp.	-	1.51
35	RWE AG	1.94	Cenovus Energy Inc.	1.40	0.06
36	Massey Energy Co.	1.93	Nexen Inc.	1.40	0.02
37	Eurasian Natural Resources Corp. PLC	1.93	EOG Resources Inc.	0.97	0.38
38	Wesfarmers Ltd.	1.86	Noble Energy Inc.	1.04	0.12
39	Churchill Mining PLC	1.74	OMV AG	1.02	0.06
40	Idemitsu Kosan Co. Ltd.	1.58	Chesapeake Energy Corp.	0.39	0.57
41	Tata Power Co. Ltd.	1.49	Penn West Petroleum Ltd.	0.91	0.03
42	Alliance Resource Partners L.P.	1.47	Oil Search Ltd.	0.91	-
43	NACCO Industries Inc. (CIA)	1.33	Woodside Petroleum Ltd.	0.54	0.27
44	Novolipetsk Steel OJSC	1.30	Canadian Oil Sands Ltd.	0.78	-
45	New Hope Corp. Ltd.	1.30	Imperial Oil Ltd.	0.75	0.01
46	TransAlta Corp.	1.23	Murphy Oil Corp.	0.69	0.03
47	Sheritt International Corp.	1.15	Whiting Petroleum Corp.	0.70	0.01
48	PT Bayan Resources	1.14	EnCana Corp.	0.24	0.47
49	New World Resources N.V.	1.07	Plains Exploration & Production Co.	0.67	0.04
50	Mitsui & Co. Ltd.	1.03	Newfield Exploration Co.	0.53	0.11



Rank	Coal Companies	COAL (GtCO2)	Oil & Gas Companies	OIL (GtCO2)	Gas (GtCO2)
51	Kazakhmys PLC	0.99	Denbury Resources Inc.	0.60	0.00
52	African Rainbow Minerals Ltd.	0.95	Continental Resources Inc. Oklahoma	0.54	0.02
53	International Coal Group Inc.	0.95	Linn Energy LLC	0.49	0.03
54	Patriot Coal Corp.	0.94	Pacific Rubiales Energy Corp.	0.50	0.02
55	Aston Resources Pty Ltd.	0.93	Crescent Point Energy Corp.	0.47	0.00
56	AGL Energy	0.89	Concho Resources Inc.	0.44	0.02
57	Tokyo Electric Power Co. Inc.	0.89	Quicksilver Resources Inc.	0.36	0.08
58	Cloud Peak Energy Inc.	0.85	PTT PCL	0.33	0.12
59	CLP Holdings Ltd.	0.83	Berry Petroleum Co. (CIA)	0.40	0.03
60	Polo Resources Ltd.	0.82	Range Resources Corp.	0.27	0.11
61	Whitehaven Coal Ltd.	0.79	Energen Corp.	0.34	0.04
62	Mongolian Mining Corp.	0.75	Enerplus Corp.	0.34	0.03
63	PT Adaro Energy	0.74	Tullow Oil PLC	0.36	0.01
64	Allete Inc.	0.72	Ecopetrol S.A.	0.35	0.01
65	Optimum Coal Holdings Ltd.	0.67	Santos Ltd.	0.19	0.17
66	ArcelorMittal	0.62	SandRidge Energy Inc.	0.33	0.03
67	Coal of Africa Ltd.	0.59	Cairn Energy PLC	0.35	0.00
68	James River Coal Co.	0.57	Arc Resources Ltd.	0.30	0.03
69	Westmoreland Coal Co.	0.56	El Paso Corp.	0.23	0.10
70	Aquila Resources Ltd.	0.53	Pengrowth Energy Corp.	0.30	0.02
71	Macarthur Coal Pty Ltd.	0.53	Lundin Petroleum AB	0.31	0.00
72	FirstEnergy Corp.	0.50	Petrobank Energy & Resources Ltd.	0.31	0.00
73	Western Coal Corp.	0.49	Baytex Energy Corp.	0.30	0.00
74	Cliffs Natural Resources Inc.	0.47	Forest Oil Corp.	0.22	0.07
75	Wescoal Holdings Ltd.	0.46	Mariner Energy	0.27	0.02
76	Walter Energy, Inc.	0.45	ATP Oil & Gas Corp.	0.24	0.01
77	Huolinhe Opencut Coal Industry Corp. Ltd.	0.41	Bankers Petroleum Ltd.	0.25	-
78	Gujarat NRE Coke Ltd.	0.40	Soco International PLC	0.25	-
79	Straits Asia Resources Ltd.	0.39	Zhaikunai L.P.	0.22	0.01
80	Capital Power Corp.	0.38	Cimarex Energy Co.	0.18	0.05
81	Fushan International Energy Group Ltd.	0.34	Questar Corp.	0.12	0.11
82	Noble Group Ltd	0.34	GDF Suez S.A.	0.17	0.05
83	Itochu Corp.	0.34	Swift Energy Co.	0.20	0.01
84	Jizhong Energy Resources Co. Ltd.	0.30	Compania Espanola de Petroleos S.A.	0.21	-
85	Northern Energy Corp. Ltd.	0.29	PetroBakken Energy Ltd.	0.21	0.00
86	NTPC Ltd.	0.28	Premier Oil PLC	0.18	0.03
87	Prophecy Resource Corp.	0.28	Bonavista Energy Corp	0.18	0.03
88	Mitsui Matsushima Co. Ltd.	0.28	MOL Hungarian Oil and Gas Plc	0.19	0.01
89	Fortune Minerals Ltd.	0.28	SM Energy Co.	0.17	0.02
90	Black Hills Corp.	0.27	Williams Cos.	-	0.18
91	Jindal Steel & Power Ltd.	0.26	EQT Corp.	0.01	0.17
92	Grupo Mexico S.A.B. de C.V.	0.26	Oil & Natural Gas Corp. Ltd.	-	0.18
93	Gansu Jingyuan Coal Industry & Electricity Power	0.26	Global Energy Development PLC	0.17	0.00
94	Bandanna Energy Ltd.	0.25	Oil India Ltd.	0.16	0.01
95	Irkutskenergo	0.23	Venoco Inc.	0.16	0.01
96	Alcoa Inc.	0.23	INA-Industrija Nafta	0.17	-
97	Homeland Energy Group Ltd.	0.23	PA Resources AB	0.16	-
98	Neyveli Lignite Corp. Ltd.	0.19	Ultra Petroleum Corp.	-	0.16
99	Zhengzhou Coal Industry & Electric Power Co. Ltd.	0.15	Resolute Energy Corp.	0.16	0.00
100	Gujarat NRE Coking Coal Ltd.	0.12	Southwestern Energy Co.	0.00	0.16
Grand Total		389.19	Grand Total	319.13	37.34



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