

ClearBridge Energy MLP Fund Inc.
Form N-CSRS
July 25, 2017

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM N-CSR

CERTIFIED SHAREHOLDER REPORT OF REGISTERED
MANAGEMENT INVESTMENT COMPANIES
Investment Company Act file number 811-22405

Clearbridge Energy MLP Fund Inc.
(Exact name of registrant as specified in charter)

620 Eighth Avenue, 49th Floor, New York, NY 10018
(Address of principal executive offices) (Zip code)

Robert I. Frenkel, Esq.

Legg Mason & Co., LLC

100 First Stamford Place

Stamford, CT 06902

(Name and address of agent for service)

Registrant's telephone number, including area code: (888) 777-0102

Date of fiscal year end: November 30

Date of reporting period: May 31, 2017

ITEM 1. REPORT TO STOCKHOLDERS.

The **Semi-Annual** Report to Stockholders is filed herewith.

Semi-Annual Report

May 31, 2017

CLEARBRIDGE

ENERGY MLP

FUND INC. (CEM)

INVESTMENT PRODUCTS: NOT FDIC INSURED NO BANK GUARANTEE MAY LOSE VALUE

What's inside

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Fund objective

The Fund's investment objective is to provide a high level of total return with an emphasis on cash distributions.

The Fund seeks to achieve its objective by investing primarily in master limited partnerships (MLPs) in the energy sector.

Letter from the chairman

Dear Shareholder,

We are pleased to provide the semi-annual report of ClearBridge Energy MLP Fund Inc. for the six-month reporting period ended May 31, 2017. Please read on for Fund performance information and a detailed look at prevailing economic and market conditions during the Fund's reporting period.

As always, we remain committed to providing you with excellent service and a full spectrum of investment choices. We also remain committed to supplementing the support you receive from your financial advisor. One way we accomplish this is through our website, www.lmcef.com. Here you can gain immediate access to market and investment information, including:

Fund prices and performance,

Market insights and commentaries from our portfolio managers, and

A host of educational resources.

We look forward to helping you meet your financial goals.

Sincerely,

Jane Trust, CFA

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Chairman, President and Chief Executive Officer

June 30, 2017

II ClearBridge Energy MLP Fund Inc.

Investment commentary

Economic review

The pace of U.S. economic activity fluctuated during the six months ended May 31, 2017 (the reporting period). Looking back, the U.S. Department of Commerce reported that third quarter 2016 U.S. gross domestic product (GDP) growth was 3.5%, the strongest reading in two years. However, fourth quarter 2016 GDP growth then moderated to 2.1%. Finally, the U.S. Department of Commerce's final reading for first quarter 2017 GDP growth released after the reporting period ended was 1.4%. The deceleration in growth reflected downturns in private inventory investment and personal consumption expenditures, along with more modest state and local government spending.

Job growth in the U.S. was solid overall and a tailwind for the economy during the reporting period. When the reporting period ended on May 31, 2017, the unemployment rate was 4.3%, as reported by the U.S. Department of Labor. This was the lowest unemployment rate since May 2001. The percentage of longer-term unemployed moderately declined over the period. In May 2017, 24.0% of Americans looking for a job had been out of work for more than six months, versus 24.2% when the period began.

Investment commentary (cont d)

Market review

Q. How did the Federal Reserve Board (the Fed) respond to the economic environment?

A. Looking back, after an extended period of maintaining the federal funds rateⁱⁱⁱ at a historically low range between zero and 0.25%, the Fed increased the rate at its meeting on December 16, 2015. This marked the first rate hike since 2006. In particular, the U.S. central bank raised the federal funds rate to a range between 0.25% and 0.50%. The Fed then kept rates on hold at each meeting prior to its meeting in mid-December 2016. On December 14, 2016, the Fed raised rates to a range between 0.50% and 0.75%.

After holding rates steady at its meeting that concluded on February 1, 2017, the Fed raised rates to a range between 0.75% and 1.00% at its meeting that ended on March 15, 2017. Finally, at its meeting that concluded on June 14, 2017 after the reporting period ended the Fed raised rates to a range between 1.00% and 1.25%. The Fed also said that it planned to reduce its balance sheet, saying, "The Committee is maintaining its existing policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities and of rolling over maturing Treasury securities at auction. The Committee currently expects to begin implementing a balance sheet normalization program this year, provided that the economy evolves broadly as anticipated."

Q. What factors impacted the U.S. stock market during the reporting period?

A. While there were periods of volatility, the U.S. stock market rose sharply and posted strong results during the reporting period as a whole. The market rallied over the first three months of the period and reached several new all-time highs. This was driven by expectations for improving economic growth, an increase in fiscal spending and a rollback for certain government regulations under President Donald Trump's administration. After largely treading water in March 2017, the market again rallied in April and May 2017, as first quarter 2017 corporate profits were generally better than expected. All told, for the six months ended May 31, 2017, the S&P 500 Index^{iv} gained 10.81%.

Looking at the U.S. stock market more closely, large-cap stocks, as measured by the Russell 1000 Index^v, generated the strongest returns, as they gained 10.55% over the reporting period. In contrast, small-cap stocks, as measured by the Russell 2000 Index^{vi}, generated the weakest results, returning 4.33%, whereas mid-cap stocks, as measured by the Russell Midcap Index^{vii}, returned 8.14%. From an investment style perspective, growth and value stocks, as measured by the Russell 3000 Growth^{viii} and Russell 3000 Value^{ix} Indices, returned 15.10% and 5.19%, respectively, during the six months ended May 31, 2017.

Looking at the energy master limited partnership (MLP) market, over the six-month reporting period ended May 31, 2017, the Alerian MLP Index^x returned 2.28%. Oil prices rose from late-November 2016 into December 2016 to the mid-\$50 range following the Organization of Petroleum Exporting Countries (OPEC) agreement to curb output, contributing to early outperformance by MLP stocks (as measured using the Alerian MLP Index) relative to the S&P 500 Index. The unexpected victory of

Donald Trump in November's U.S. presidential election also boosted energy stocks, as Donald Trump's presidency potentially has positive implications for MLP stocks over the next four years. However, the price of oil began to falter somewhat later in the reporting period as expectations of an increase in U.S. production began to grow, outweighing the extension of production cuts by OPEC and non-OPEC countries in May 2017. This may have contributed to the relative underperformance of the MLP market versus the broader U.S. stock market in the later part of the six-month reporting period ended May 31, 2017.

Performance review

For the six months ended May 31, 2017, ClearBridge Energy MLP Fund Inc. returned 1.98% based on its net asset value (NAV) and 6.88% based on its New York Stock Exchange (NYSE) market price per share. The Lipper Energy MLP Closed-End Funds Category Average returned -0.36% over the same time frame. Please note that Lipper performance returns are based on each fund's NAV.

During this six-month period, the Fund made distributions to shareholders totaling \$0.71. As of May 31, 2017, the Fund estimates that all of the distributions constituted a return of capital*. The performance table shows the Fund's six-month total return based on its NAV and market price as of May 31, 2017. **Past performance is no guarantee of future results.**

Performance Snapshot as of May 31, 2017 (unaudited)

Price Per Share	6-Month Total Return**
\$16.03 (NAV)	1.98%
\$15.68 (Market Price)	6.88%

All figures represent past performance and are not a guarantee of future results. Performance figures for periods shorter than one year represent cumulative figures and are not annualized.

**** Total returns are based on changes in NAV or market price, respectively. Returns reflect the deduction of all Fund expenses, including management fees, operating expenses, and other Fund expenses. Returns do not reflect the deduction of brokerage commissions or taxes that investors may pay on distributions or the sale of shares.**

Total return assumes the reinvestment of all distributions, including returns of capital, if any, at NAV.

Total return assumes the reinvestment of all distributions, including returns of capital, if any, in additional shares in accordance with the Fund's Dividend Reinvestment Plan.

Looking for additional information?

The Fund is traded under the symbol CEM and its closing market price is available in most newspapers under the NYSE listings. The daily NAV is available on-line under the symbol XCEMX on most financial websites. *Barron's* and the *Wall Street Journal's* Monday edition both carry closed-end fund tables that provide additional information. In addition, the Fund issues a quarterly press

*These estimates are not for tax purposes. The Fund will issue a Form 1099 with final composition of the distributions for tax purposes after year-end. A return of capital is not taxable and results in a reduction in the tax basis of a shareholder's investment. For more information about a distribution's composition, please refer to the Fund's distribution press release or, if applicable, the Section 19 notice located in the press release section of our website, www.lmcef.com (click on the name of the Fund).

Investment commentary (cont d)

release that can be found on most major financial websites as well as www.lmcef.com (click on the name of the Fund).

In a continuing effort to provide information concerning the Fund, shareholders may call 1-888-777-0102 (toll free), Monday through Friday from 8:00 a.m. to 5:30 p.m. Eastern Time, for the Fund's current NAV, market price and other information.

Thank you for your investment in ClearBridge Energy MLP Fund Inc. As always, we appreciate that you have chosen us to manage your assets and we remain focused on achieving the Fund's investment goals.

Sincerely,

Jane Trust, CFA

Chairman, President and

Chief Executive Officer

June 30, 2017

***RISKS:** The Fund is a non-diversified, closed-end management investment company designed primarily as a long-term investment and not as a trading vehicle. The Fund is not intended to be a complete investment program and, due to the uncertainty inherent in all investments, there can be no assurance that the Fund will achieve its investment objective. The Fund's common stock is traded on the New York Stock Exchange. Similar to stocks, the Fund's share price will fluctuate with market conditions and, at the time of sale, may be worth more or less than the original investment. Shares of closed-end funds often trade at a discount to their net asset value. Because the Fund is non-diversified, it may be more susceptible to economic, political or regulatory events than a diversified fund. The Fund's investments are subject to a number of risks such as stock market risk, MLP risk, market events risk and portfolio management risk. MLP distributions are not guaranteed and there is no assurance that all distributions will be tax deferred. Investments in MLP securities are subject to unique risks. The Fund's concentration of investments in energy-related MLPs subjects it to the risks of MLPs and the energy sector, including the risks of declines in energy and commodity prices, decreases in energy demand, adverse weather conditions, natural or other disasters, changes in government regulation, and changes in tax laws. Leverage may result in greater volatility of NAV and the market price of common shares and increases a shareholder's risk of loss. The Fund may make significant investments in derivative instruments. Derivative instruments can be illiquid, may disproportionately increase losses and have a potentially large impact on Fund performance. The Fund may invest in small capitalization or illiquid securities which can increase the risk and volatility of the Fund.*

All investments are subject to risk including the possible loss of principal. Past performance is no guarantee of future results. All index performance reflects no deduction for fees, expenses or taxes. Please note that an investor cannot invest directly in an index.

The information provided is not intended to be a forecast of future events, a guarantee of future results or investment advice. Views expressed may differ from those of the firm as a whole.

- ⁱ Gross domestic product (GDP) is the market value of all final goods and services produced within a country in a given period of time.
- ⁱⁱ The Federal Reserve Board (the Fed) is responsible for the formulation of U.S. policies designed to promote economic growth, full employment, stable prices and a sustainable pattern of international trade and payments.
- ⁱⁱⁱ The federal funds rate is the rate charged by one depository institution on an overnight sale of immediately available funds (balances at the Federal Reserve) to another depository institution; the rate may vary from depository institution to depository institution and from day to day.
- ^{iv} The S&P 500 Index is an unmanaged index of 500 stocks and is generally representative of the performance of larger companies in the U.S.
- ^v The Russell 1000 Index measures the performance of the large-cap segment of the U.S. equity universe. It is a subset of the Russell 3000 Index and includes approximately 1,000 of the largest securities based on a combination of their market cap and current index membership. The Russell 1000 represents approximately 92% of the U.S. market. The Russell 3000 Index measures the performance of the 3,000 largest U.S. companies based on total market capitalization, which represents approximately 98% of the U.S. equity market.
- ^{vi} The Russell 2000 Index measures the performance of the small-cap segment of the U.S. equity universe. The Russell 2000 is a subset of the Russell 3000 Index representing approximately 10% of the total market capitalization of that index. It includes approximately 2,000 of the smallest securities based on a combination of their market cap and current index membership.
- ^{vii} The Russell Midcap Index measures the performance of the mid-cap segment of the U.S. equity universe. The Russell Midcap is a subset of the Russell 1000 Index. It includes approximately 800 of the smallest securities based on a combination of their market cap and current index membership. The Russell Midcap represents approximately 31% of the total market capitalization of the Russell 1000 companies.
- ^{viii} The Russell 3000 Growth Index measures the performance of the broad growth segment of the U.S. equity universe. It includes those Russell 3000 Index companies with higher price-to-book ratios and higher forecasted growth values. (A price-to-book ratio is the price of a stock compared to the difference between a company's assets and liabilities.)
- ^{ix} The Russell 3000 Value Index measures the performance of the broad value segment of the U.S. equity value universe. It includes those Russell 3000 Index companies with lower price-to-book ratios and lower forecasted growth values.
- ^x The Alerian MLP Index is a composite of the fifty most prominent energy master limited partnerships (MLPs) and is calculated using a float-adjusted, capitalization-weighted methodology.
- ^{xi} Net asset value (NAV) is calculated by subtracting total liabilities, including liabilities associated with financial leverage (if any), from the closing value of all securities held by the Fund (plus all other assets) and dividing the result (total net assets) by the total number of the common shares outstanding. The NAV fluctuates with changes in the market prices of securities in which the Fund has invested. However, the price at which an investor may buy or sell shares of the Fund is the Fund's market price as determined by supply of and demand for the Fund's shares.
- ^{xii} Lipper, Inc., a wholly-owned subsidiary of Reuters, provides independent insight on global collective investments. Returns are based on the six-month period ended May 31, 2017, including the reinvestment of all distributions, including returns of capital, if any, calculated among the 24 funds in the Fund's Lipper category.

Fund at a glance (unaudited)

Investment breakdown (%) as a percent of total investments

The bar graph above represents the composition of the Fund's investments as of May 31, 2017 and November 30, 2016. The Fund is actively managed. As a result, the composition of the Fund's investments is subject to change at any time.

Schedule of investments (unaudited)

May 31, 2017

ClearBridge Energy MLP Fund Inc.

	Shares/ Units	Value
Security		
Master Limited Partnerships 152.3%		
<i>Diversified Energy Infrastructure 46.1%</i>		
Energy Transfer Partners LP	6,016,159	\$ 130,911,620
Enterprise Products Partners LP	6,189,308	165,935,348
Genesis Energy LP	2,923,073	91,170,647
ONEOK Partners LP	2,328,795	113,901,363
Plains GP Holdings LP, Class A Shares	607,751	16,208,719
<i>Total Diversified Energy Infrastructure</i>		<i>518,127,697</i>
<i>Gathering/Processing 30.0%</i>		
Antero Midstream Partners LP	906,167	31,389,625
Blueknight Energy Partners LP	53,989	375,224
CONE Midstream Partners LP	1,663,080	35,307,188
DCP Midstream LP	1,452,372	49,061,126
Dominion Energy Midstream Partners LP	300,000	8,595,000
Enable Midstream Partners LP	1,426,301	22,007,824
EnLink Midstream Partners LP	4,270,315	72,467,246
Hess Midstream Partners LP	442,000	10,272,080 *
Rice Midstream Partners LP	695,930	17,057,244
Tallgrass Energy Partners LP	403,950	20,035,920
Western Gas Partners LP	1,270,866	70,825,362
<i>Total Gathering/Processing</i>		<i>337,393,839</i>
<i>General Partner 2.5%</i>		
Tallgrass Energy GP LP	1,068,720	27,540,914
<i>Global Infrastructure 11.7%</i>		
Brookfield Infrastructure Partners LP	3,243,436	131,359,158
<i>Liquids Transportation & Storage 42.8%</i>		
Buckeye Partners LP	1,660,570	106,276,480
Enbridge Energy Partners LP	3,469,218	57,450,250
Holly Energy Partners LP	869,872	28,497,007
Magellan Midstream Partners LP	1,561,161	113,324,677
NuStar Energy LP	1,006,105	45,858,266
PBF Logistics LP	1,463,970	28,693,812
Plains All American Pipeline LP	2,472,926	65,483,080
Tesoro Logistics LP	653,965	34,647,066
<i>Total Liquids Transportation & Storage</i>		<i>480,230,638</i>
<i>Natural Gas Transportation & Storage 11.4%</i>		
Spectra Energy Partners LP	206,180	8,894,605
TC Pipelines LP		