Author:

Ryan O. Issakainen, CFA
Senior Vice President
Exchange-Traded Fund Strategist
First Trust Advisors L.P.

Co-author:

Andrew Hull, CFA
Vice President
Exchange-Traded Fund Strategist
First Trust Advisors L.P.

With More Renewable Projects in Limbo, Are Grid Investments Still Needed?

Over the past century, a complex system of poles, wires, substations, and transformers was developed to enable large power plants to deliver electricity to households and businesses. For power grids to meet changing energy demands over the next few decades, including a larger share of renewable energy production and rising demand for electricity, we believe massive capital investments will be required. While renewable energy developers have faced significant challenges this year, we believe companies involved in expanding and modernizing the power grid offer a compelling long-term opportunity for investors. Below, we discuss recent trends that may impact this theme, as well as the First Trust NASDAQ® Clean Edge® Smart Grid Infrastructure Index Fund (GRID).

Fiscal Spending May Partially Offset Rising Costs

High inflation and a sharp rise in borrowing costs have been key headwinds for renewable energy developers in 2023. In the U.S., more than 25% of all offshore wind projects have been cancelled this year, with developers citing both permitting delays and higher costs.[1] In our opinion, these issues may present a serious near-term threat for certain types of renewable projects, while others may be more resilient. For example, the high costs associated with offshore wind may make them more susceptible to cancellation relative to other forms of renewable energy, such onshore wind. According to Bloomberg, the levelized cost of electricity for offshore wind ($161/MWh) is more than three times higher than onshore wind ($50MWh).[2]

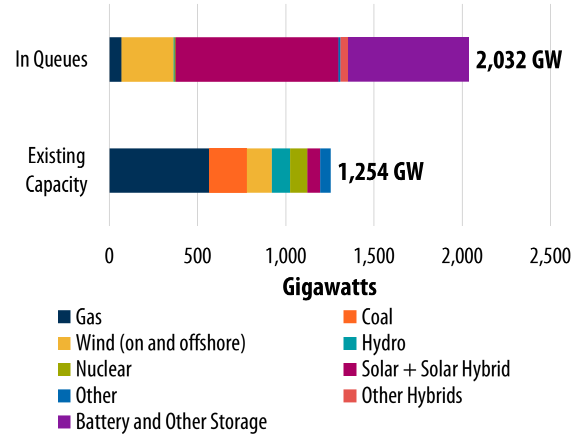
In our opinion, recently passed laws aimed at funding grid-related spending could partially offset the rising cost of renewable projects. For example, the Infrastructure Investment and Jobs Act (IIJA) provided funds for a wide range of energy related projects, including $65 billion to upgrade power infrastructure, boost grid resiliency, and develop new transmission and distribution technologies.[3] The Inflation Reduction Act (IRA) included a provision that authorizes the U.S. Department of Energy's Loan Programs Office to extend up to $250 billion in loans for projects focused on energy infrastructure.[4] Given the potential for a shift in spending priorities after next year's elections in the U.S., renewable energy and power grid projects may be incentivized to pull spending forward, in our opinion.

In Europe, recent legislation has also targeted clean energy and power grid development. In addition to the European Union's Green Deal, which facilitates over €1 trillion in funding toward clean energy goals, the European Commission recently unveiled the Green Deal Industrial Plan, which proposed that an additional €250 billion be directed to "net zero" industries.[5]

Grid Constraints Create Backlog for New Renewable Energy Projects

Renewable energy has made significant strides over the last decade, more than doubling its share of U.S. electricity production from 2010 to 2022, and a robust pipeline of new projects suggests continued growth.[6,7] However, a lack of transmission capacity has resulted in a significant backlog of new projects, threatening to derail many of the aggressive renewable energy goals of governments, corporations, and other organizations around the world, in our view. Connecting new renewable energy projects to the power grid is a lengthy process that can take an average of five years, according to the Federal Energy Regulatory Commission ("FERC").[8] Today's backlog is so severe that there is nearly twice as much capacity awaiting approval for connection than there is installed power capacity in the U.S. (see chart to the right)[9]

Proposed Energy Generation Exceeds Current Capacity of all U.S. Power Plants



Source: Lawrence Berkeley National Laboratory, 2022.

Similar bottlenecks exist across Europe. In October, the European Council adopted a new directive to increase renewables' share of overall energy consumption to 42.5% by 2030, more than double the level in 2021.[10,11] But it can take up to a decade to secure permits for adding new power generation to the grid in Europe. Currently, the United Kingdom, Spain, and Italy each has over 150GW of wind and solar projects in grid connection queues.[12]

Some factors that contribute to long lag times for adding new renewable energy projects to the power grid are likely unavoidable. After all, the location of the most favorable sites for wind and solar power may be far from traditional power plants and existing transmission lines. Additionally, because power generating capacity for individual renewable facilities tends to be much less than traditional power plants, many more renewable sites are usually required to generate an equivalent amount of electricity. The intermittency of renewable power (the wind isn't always blowing; the sun isn't always shining) adds another layer of complexity. Each of these issues takes time to address.

On the other hand, we believe recent steps to reduce red-tape could speed up the interconnection process. For example, in July, FERC finalized rules to streamline the process for connecting new power projects to existing interstate transmission lines in the U.S.[13] Reforms have also been made in Europe to reduce permitting delays for new transmission infrastructure.[14]

[1] Bloomberg NEF, as of 11/1/23.
[2] Bloomberg NEF, as of 5/26/23. "Levelized cost of electricity" is an estimate of the price a developer requires to recoup all project costs (capex, opex, tax, financing) and hit an investment target (cost of equity).
[3] The White House, August 2021.
[4] Department of Energy, June 2023.
[5] European Commission, February 2023.
[6] U.S. Energy Information Administration ("EIA"), October 2023. Includes wind, solar, hydro, biomass, and geothermal.
[7] EIA, June 2011.
[8] Reuters, July 2023.
[9] Lawrence Berkeley National Laboratory, 2010, 2022. While many proposed projects are not expected to come online, Berkeley suggests the high volume of current applications is indicative of strong near-term demand.
[10] European Commission, March 2023.
[11] Council of the European Union, October 2023.
[12] The Financial Times, June 2023.
[13] FERC, July 2023.
[14] European Union Commissioner for Energy, via The Financial Times, September 2023.

First Trust

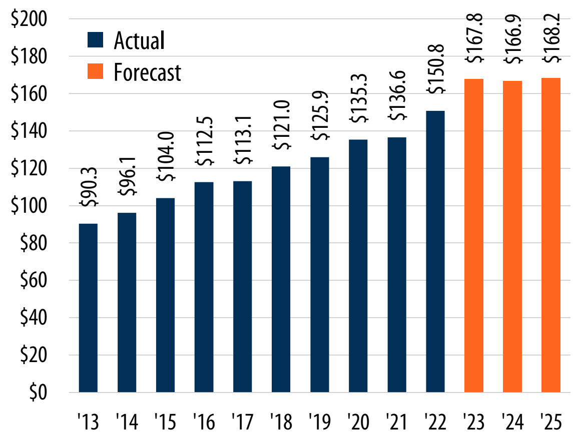
Growing Demand for Electricity

Another trend that may necessitate additional grid investments over the next several years is the expected rise in demand for electricity as consumers shift towards electric vehicles (EVs), electrical appliances, electric heat pumps, etc. Changing consumer preferences may drive some of this shift, but new regulations, such as building codes aimed at energy efficiency, may also have an impact. In May, New York became the first state in the U.S. to pass a law banning gas stoves, furnaces, and other gas appliances in new homes and apartments, beginning in 2026.[15] While we believe such laws may create political backlash, preventing or slowing widespread adoption in many parts of the country, the threat of future legislation may encourage real estate developers and builders to incorporate more electrical appliances into their projects.

In Europe, electrification trends are well under way. Three million electric heat pumps were sold last year, and one out of every four new vehicles purchased in Europe was an EV.[16] Some forecasts suggest that Europe's electricity consumption could increase by as much as 60% by the end of the decade, and as much as 100% in the US by 2050.[17,18]

To meet growing demand for electricity and a changing mix of power consumption, utilities are expected to invest heavily in additional capacity. Analysis from Bloomberg suggests that nearly 50 million miles of new power lines may be installed globally by 2050, more than enough to replace the entire global grid today.[19] According to Edison Electric Institute, U.S. utilities may invest over $165 billion annually from 2023-2025, an 80% increase compared to investments made a decade ago (see chart to the right).[20] Similarly, power grid investments in Europe may reach €584 billion by 2030 to achieve their renewable energy targets, according to the European Commission.[21]

U.S. Electric Utility Industry Capex at Record Levels (USD, Billions)



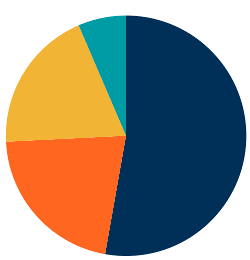
Source: Edison Electric Institute. Data from 2013-2022. There is no guarantee that past trends will continue or projections will be realized.

First Trust NASDAQ® Clean Edge® Smart Grid Infrastructure Index Fund (GRID)

In our opinion, companies involved in the expansion and modernization of power grids around world may provide a compelling long-term opportunity for investors. Despite today's headwinds for many renewable energy projects, we believe capital investments in the power grid may be more resilient, bolstered by significant fiscal-spending allocated by recent laws, commitments to increase renewable energy production, and long-term growth in electricity demand.

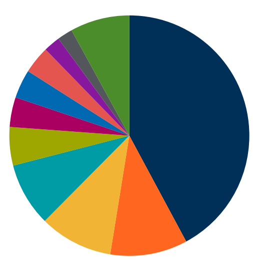
We believe the First Trust NASDAQ® Clean Edge® Smart Grid Infrastructure Index Fund (GRID) is a compelling strategy for investing in companies that may benefit from these trends. GRID is an index-based exchange traded fund comprised of stocks selected for their involvement in grid infrastructure, smart meters, energy management, connected mobility, and related activities. The underlying index methodology assigns an 80% weight to companies classified as "pure plays," those that derive more than half of their revenue from grid-related activities, and 20% to "diversified" stocks, which generate less than half of their revenue from grid-related activities.

GRID Sector Allocation as of 10/31/2023



Industrials	52.77%
Utilities	21.41%
Information Technology	19.38%
Consumer Discretionary	6.42%
Materials	0.03%

GRID Geographical Allocation as of 10/31/2023



United States	42.14%
United Kingdom	10.41%
France	9.90%
Switzerland	8.54%
Italy	5.17%
Ireland	4.00%
Brazil	3.85%
South Korea	3.70%
Canada	2.22%
Spain	2.07%
Other	8.00%

Source for Pie Charts: Bloomberg.

You should consider a fund's investment objectives, risks, and charges and expenses carefully before investing. Contact First Trust Portfolios L.P. at 1-800-621-1675 or visit www.ftportfolios.com to obtain a prospectus or summary prospectus which contains this and other information about a fund. The prospectus or summary prospectus should be read carefully before investing.

[15] Wall Street Journal, May 2023.

[16] International Energy Agency, March 2023.

[17] European Union Commissioner for Energy, via The Financial Times, September 2023.

[18] Wall Street Journal, May 2021.

[19] Bloomberg NEF, March 2023.

[20] Edison Electric Institute, July 2023.

[21] European Union Commissioner for Energy, June 2023.

Performance Summary (%) as of 9/29/23

GRID Performance*	3 Month	YTD	1 Year	3 Year	5 Year	10 Year	Since Fund Inception
Net Asset Value (NAV)	-10.26	8.60	26.39	15.56	15.80	12.04	9.76
Market Price	-10.53	8.56	26.39	15.46	15.58	12.08	9.75
Index Performance**							
Nasdaq Clean Edge Smart Grid Infrastructure Index™	-10.02	9.42	26.72	16.47	16.82	12.92	10.66
MSCI World Industrials Index	-5.19	8.22	27.56	8.10	5.52	7.33	8.74
S&P Composite 1500® Industrials Index	-4.94	6.41	25.78	12.44	7.72	10.27	12.08
Russell 3000® Index	-3.25	12.39	20.46	9.38	9.14	11.28	12.17

Performance data quoted represents past performance. Past performance is not a guarantee of future results and current performance may be higher or lower than performance quoted. Investment returns and principal value will fluctuate and shares when sold or redeemed, may be worth more or less than their original cost. You can obtain performance information which is current through the most recent month-end by visiting www.ftportfolios.com.

Inception Date: 11/16/2009. Gross expense ratio: 0.58%. Net expense ratio: 0.58%. Expenses are capped contractually at 0.70% per year, at least through January 31, 2024. The Investment Advisor has implemented fee breakpoints, which reduce the fund's investment management fee at certain asset levels. Please see the fund's Statement of Additional Information for full details.

***NAV** returns are based on the fund's net asset value which represents the fund's net assets (assets less liabilities) divided by the fund's outstanding shares. **Market Price** returns are determined by using the midpoint of the national best bid offer price ("NBBO") as of the time that the fund's NAV is calculated. Returns are average annualized total returns, except those for periods of less than one year, which are cumulative. The fund's performance reflects fee waivers and expense reimbursements, absent which performance would have been lower.

**Performance information for each listed index is for illustrative purposes only and does not represent actual fund performance. Indexes do not charge management fees or brokerage expenses, and no such fees or expenses were deducted from the performance shown. Indexes are unmanaged and an investor cannot invest directly in an index.

Risks

You could lose money by investing in a fund. An investment in a fund is not a deposit of a bank and is not insured or guaranteed. There can be no assurance that a fund's objective(s) will be achieved. Investors buying or selling shares on the secondary market may incur customary brokerage commissions. Please refer to each fund's prospectus and Statement of Additional Information for additional details on a fund's risks. The order of the below risk factors does not indicate the significance of any particular risk factor.

Unlike mutual funds, shares of the fund may only be redeemed directly from a fund by authorized participants in very large creation/redemption units. If a fund's authorized participants are unable to proceed with creation/redemption orders and no other authorized participant is able to step forward to create or redeem, fund shares may trade at a premium or discount to a fund's net asset value and possibly face delisting and the bid/ask spread may widen.

Changes in currency exchange rates and the relative value of non-US currencies may affect the value of a fund's investments and the value of a fund's shares.

Current market conditions risk is the risk that a particular investment, or shares of the fund in general, may fall in value due to current market conditions. As a means to fight inflation, the Federal Reserve and certain foreign central banks have raised interest rates and expect to continue to do so, and the Federal Reserve has announced that it intends to reverse previously implemented quantitative easing. Recent and potential future bank failures could result in disruption to the broader banking industry or markets generally and reduce confidence in financial institutions and the economy as a whole, which may also heighten market volatility and reduce liquidity. In February 2022, Russia invaded Ukraine which has caused and could continue to cause significant market disruptions and volatility within the markets in Russia, Europe, and the United States. The hostilities and sanctions resulting from those hostilities have and could continue to have a significant impact on certain fund investments as well as fund performance and liquidity. The COVID-19 global pandemic, or any future public health crisis, and the ensuing policies enacted by governments and central banks have caused and may continue to cause significant volatility and uncertainty in global financial markets, negatively impacting global growth prospects.

A fund is susceptible to operational risks through breaches in cyber security. Such events could cause a fund to incur regulatory penalties, reputational damage, additional compliance costs associated with corrective measures and/or financial loss.

Depositary receipts may be less liquid than the underlying shares in their primary trading market and distributions may be subject to a fee. Holders may have limited voting rights, and investment restrictions in certain countries may adversely impact their value.

Equity securities may decline significantly in price over short or extended periods of time, and such declines may occur in the equity market as a whole, or they may occur in only a particular country, company, industry or sector of the market.

Political or economic disruptions in European countries, even in countries in which a fund is not invested, may adversely affect security values and thus the fund's holdings. A significant number of countries in Europe are member states in the European Union, and the member states no longer control their own monetary policies. In these member states, the authority to direct monetary policies, including money supply and official interest rates for the Euro, is exercised by the European Central Bank. The implications of the United Kingdom's withdrawal from the European Union are difficult to gauge and cannot yet be fully known.

An index fund will be concentrated in an industry or a group of industries to the extent that the index is so concentrated. A fund with significant exposure to a single asset class, or the securities of issuers within the same country, state, region, industry, or sector may have its value more affected by an adverse economic, business or political development than a broadly diversified fund.

A fund may be a constituent of one or more indices or models which could greatly affect a fund's trading activity, size and volatility.

There is no assurance that the index provider or its agents will compile or maintain the index accurately. Losses or costs associated with any index provider errors generally will be borne by a fund and its shareholders.

Industrials and producer durables companies are subject to certain risks, including the general state of the economy, intense competition, consolidation, domestic and international politics, excess capacity and consumer demand and spending trends. They may also be significantly affected by overall capital spending levels, economic cycles, technical obsolescence, delays in modernization, labor relations, and government regulations.

This material is not intended to be relied upon as investment advice or recommendations.

Information technology companies are subject to certain risks, including rapidly changing technologies, short product life cycles, fierce competition, aggressive pricing and reduced profit margins, loss of patent, copyright and trademark protections, cyclical market patterns, evolving industry standards and regulation and frequent new product introductions.

Large capitalization companies may grow at a slower rate than the overall market.

Market risk is the risk that a particular security, or shares of a fund in general may fall in value. Securities are subject to market fluctuations caused by such factors as general economic conditions, political events, regulatory or market developments, changes in interest rates and perceived trends in securities prices. Shares of a fund could decline in value or underperform other investments as a result. In addition, local, regional or global events such as war, acts of terrorism, spread of infectious disease or other public health issues, recessions, natural disasters or other events could have significant negative impact on a fund.

A fund faces numerous market trading risks, including the potential lack of an active market for fund shares due to a limited number of market makers. Decisions by market makers or authorized participants to reduce their role or step away in times of market stress could inhibit the effectiveness of the arbitrage process in maintaining the relationship between the underlying values of a fund's portfolio securities and a fund's market price.

An index fund's return may not match the return of the index for a number of reasons including operating expenses, costs of buying and selling securities to reflect changes in the index, and the fact that a fund's portfolio holdings may not exactly replicate the index.

A fund classified as "non-diversified" may invest a relatively high percentage of its assets in a limited number of issuers. As a result, a fund may be more susceptible to a single adverse economic or regulatory occurrence affecting one or more of these issuers, experience increased volatility and be highly concentrated in certain issuers.

Securities of non-U.S. issuers are subject to additional risks, including currency fluctuations, political risks, withholding, lack of liquidity, lack of adequate financial information, and exchange control restrictions impacting non-U.S. issuers.

A fund and a fund's advisor may seek to reduce various operational risks through controls and procedures, but it is not possible to completely protect against such risks. The fund also relies on third parties for a range of services, including custody, and any delay or failure related to those services may affect the fund's ability to meet its objective.

A fund that invests in securities included in or representative of an index will hold those securities regardless of investment merit and the fund generally will not take defensive positions in declining markets.

High portfolio turnover may result in higher levels of transaction costs and may generate greater tax liabilities for shareholders.

The market price of a fund's shares will generally fluctuate in accordance with changes in the fund's net asset value ("NAV") as well as the relative supply of and demand for shares on the exchange, and a fund's investment advisor cannot predict whether shares will trade below, at or above their NAV.

Securities of small- and mid-capitalization companies may experience greater price volatility and be less liquid than larger, more established companies.

Smart grid companies can be negatively affected by high costs of research and development, high capital requirements for implementation, government regulations, limited ability of industrial and utility companies to implement new technologies and uncertainty of the ability of new products to penetrate established industries.

Trading on an exchange may be halted due to market conditions or other reasons. There can be no assurance that a fund's requirements to maintain the exchange listing will continue to be met or be unchanged.

First Trust Advisors L.P. (FTA) is the adviser to the funds. FTA is an affiliate of First Trust Portfolios L.P., the funds' distributor.

Not FDIC Insured • Not Bank Guaranteed • May Lose Value