RESEARCH REPORT

September 23, 2018

Power & Utilities Primer & Analysis

WATTS Going On?!

The purpose of this report is to provide a deep dive into the Power & Utilities landscape by introducing the industry and explaining the key sources of power generation. The Utilities sector is often regarded as inferior in the Energy universe due to regulated returns; however, a case can be made that owning these names can provide stable return and quality yield, even in a rising interest rate environment. Considering increasing negative sentiment entering the Canadian Oil & Gas market, the E&U team decided to look into the Utilities space.

The report contains a Utilities primer, including:

i) The Utilities Value Chain

ii) Distinguishing between a Utility and an IPP

iii) An outline the different types of power generation

iv) The regulatory landscape of the Canadian/American markets

v) The political outlook for Utilities

vi) Industrywide macro trends

To conclude, the E&U team analyzed the performance of NextEra Energy Inc., an integrated Power & Utilities firm that has consistently outperformed the market in recent years. The team considers theses to explain its outperformance, as well as quantifies how much the market is willing to pay for growth in a Utility.

Energy & Utilities

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Utilities Value Chain

Generators

Generators create electrical power from various fuel sources such as coal, nuclear, natural gas, hydro, and other renewables. The best way to cost cut within this industry is to improve efficiency, as all generators operate in a commoditized industry. This beginning stage of the value chain tends to be quite capital intensive at inception, especially for hydro and nuclear plants; however, the ongoing capex is relatively minimal. For natural gas and petroleum generators, cost of fuel accounts for a large portion of costs. Such companies are therefore heavily exposed to commodity price fluctuations. Once generated, the electricity is stepped-up (voltage is increased) to allow for more efficient transport to the energy distribution lines.

Energy Transmission and Distribution Networks

Network operators transport electrical energy to substations, and generate revenue by selling access to these networks to retail service providers. Network operators are usually government companies that act as natural monopolies, given that the control system must ensure that supply exactly meets demand, or else generation plants and transmission equipment could shut-off. Regulated transmission operators have a guaranteed ROE, while merchant transmission companies rely on contracts for capacity, which has traditionally been allocated through a competitive bidding process. The most recent business model for transmission assets in the U.S. has been a REIT structure, after the IRS recognized transmission assets as real-estate.

Energy Traders and Marketers

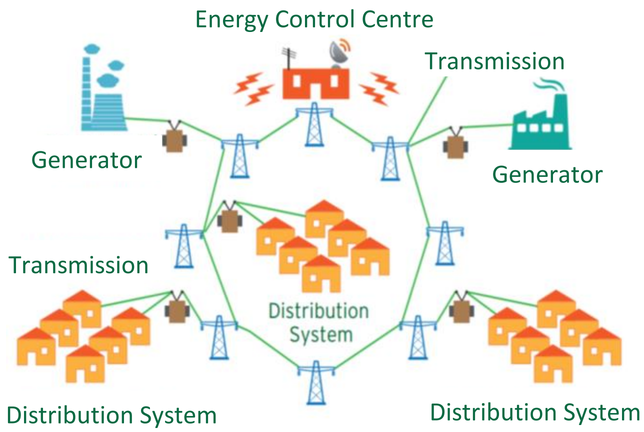
Mw of electricity can be traded as a commodity on the wholesale market. System operators predict hourly electricity demand, and generators offer an amount of energy generation capacity at a specific price. The winning bids are the lowest-priced combination of offers required to meet demand. The wholesale market is quite important as it is, in a competitive market, one of the largest predetermining factors for the electricity prices that consumers pay.

Energy Service Providers and Retailers

Energy service providers and retailers oversee the final sale of power prom provider to end-use consumer. Within regulated markets (such as BC, Saskatchewan, Manitoba, New Brunswick, Newfoundland, and Quebec), this supply is obtained through rate-based generation from a singular provincial monopoly. On the other hand, if the local market is deregulated (Ontario and Alberta) then the majority of supply comes from the wholesale market. However these deregulated markets usually have a "safety-net" option for customers who don't want to choose a competitive-market driven retailer (further examples and explanation to follow).

Exhibit I

Utilities Value Chain



Source(s): Cognizant

Utilities vs. Independent Producers

Utilities

An electric utility is a company that engages in electricity generation and distribution for sale; such sales generally occur in regulated markets. Most utilities act as government-regulated monopolies within their areas of jurisdiction. Utilities are generally vertically integrated producers and distributors of energy, and have full responsibility for the construction and maintenance of their own power plants. They make money through pre-approved rates of return that allow the companies to pass along all approved capex and expenses to consumers, as well as adding on the previously mentioned profit rate.

Exhibit II

Primary Utilities Names

Hydro Québec
Bruce Power
FORTIS INC.
BC Hydro

Source(s): Google Images

Exhibit III

Typical Utility Facility

Source(s): Google Images

Exhibit IV

Primary Independent Producer Names

3G Energy
NORTHLAND POWER
TransCanada
In business to deliver

Source(s): Google Images

Merchant Suppliers

Merchant suppliers act as speculative suppliers for the wholesale energy markets. These suppliers are not privy to the same given rate of return as typical utilities are, as they aren't selling electricity straight to consumers and therefore the customers aren't obligated to pay for the plants, capex, and expenses as they are with a typical utilities provider. Merchant suppliers typically only take on short-term contracts, and make money only by the spread between what they are able to generate the electricity for and what they can sell it for. Whenever long-term power is sold, it generally will be at a discount to the market price, so merchant suppliers tend to generate the highest IRRs but the lowest volumes.

Independent Producers

An Independent Power Producer (IPP) generates power that is purchased by an electric utility at wholesale prices. The utility then resells this power to end-use customers. Although IPPs generate power, they are not franchised utilities, government agencies or QFs. IPPs usually do not own transmission lines to transmit the power that they generate.

Exhibit V

Key Terms

Term	Description
MegaWatt Hour	Basic industrial unit for electricity pricing; one MWh is equal to 1000 kW of power continuously supplied for one hour; one kWh is equal to one-thousand watt hours
Load	The amount of electricity delivered to any specific point(s) on the electrical system
Interprovincial Trade	Transport of electricity between different provinces; distinct from intraprovincial trade and international trade, which is within a province/between countries; majority of trade in Canada is intraprovincial or international, but the majority of U.S. trade is interstate
National Energy Board (NEB)	Independent Canadian economic regulatory board; is responsible for regulation/approval of energy and gas pipelines, tolls/tariffs, national power lines, international/interprovincial trade
Federal Energy Regulatory Commission	Regulates U.S. electricity industry; oversees rates at which electricity is provided to consumers. Monitors national service standards, oversees interstate power transition; also issues licenses to new electricity developments, and reviews certain M&A transactions between electricity companies
Electric Power System	Consists of the power station (a prime mover such as a turbine that is driven by water or steam, that operates a system of electric motors and generators), transformers (raise generated power to high voltages), transmission lines, substations where power is stepped-down to the voltage used on the sub-transmission and distribution lines, and the transformers that step-down the voltage to the level used by the consumer

Source(s): QUIC Database

Understanding Power Demand

Unlike many other commodities, electricity needs to be consumed as it is generated, as there is presently no economical way to store large quantities of electricity for later use. Therefore, the supply and demand for electricity must be kept in constant balance.

Electricity is usually measured in kilowatts and megawatts. One megawatt is equal to 1,000 kilowatts and is the average consumption of a single house per month.

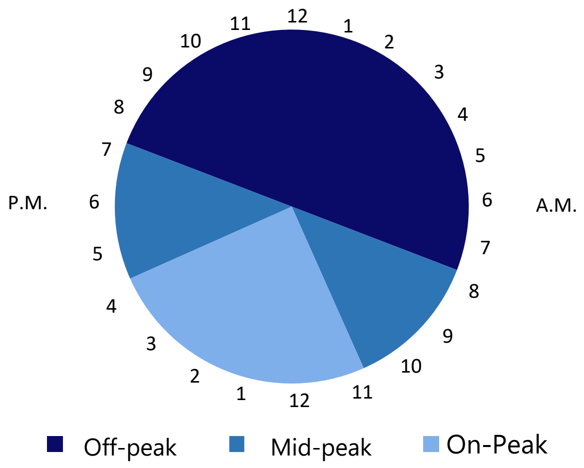
Base load vs Peak Demand

The base level demand for electricity is called the *base-load demand*. In Ontario, base load demand is ~11,000MW - 15,000MW depending on the time of the year. As people arrive home from 4p.m.-7p.m., ovens, televisions, washing machines, etc. are turned on and demand for electricity is typically the highest. (*peak demand)*. This increase can be as much as 10,000MW more than base-load demand, and can soar even higher on the hottest and coldest days.

To meet the sharp increase in electricity demand throughout the day, many states and provinces use thermal generating stations like coal, oil, and natural gas plants as well as smaller hydroelectric stations. These types of generating stations can quickly increase or decrease their power output, whereas a nuclear station is less able to vary its electricity output. As well, electricity from fossil–fueled sources has a larger impact on the environment and are therefore best to use only when demand exceeds the output of other generating sources.

Exhibit V

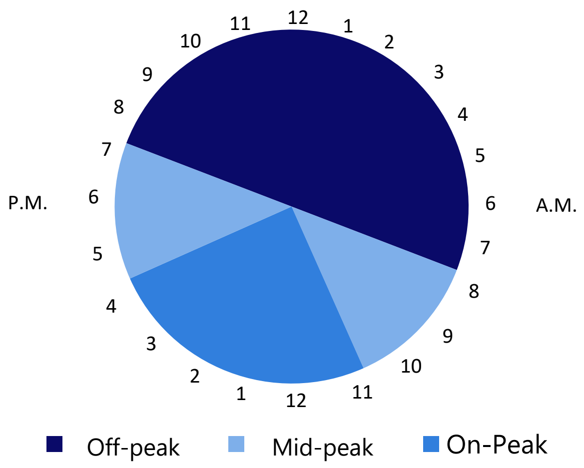
Summer Weekday Demand



Source(s): OEB

Exhibit VI

Winter Weekday Demand



Source(s): OEB

Power Sources: Nuclear Power Generation

Nuclear power plants use uranium to generate heat, with the objective of boiling water into steam. Uranium has the largest atoms of the 92 naturally-occurring elements on earth, thus making the atoms more likely to split.

When neutrons come into contact with uranium atoms, the atoms split and release heat energy. This occurs frequently in nature, but at a much slower rate. Nuclear reactors are able to greatly facilitate this process by slowing down the atoms, and increasing the likelihood that they will intersect. When uranium atoms split, they then release additional neutrons, which causes a chain reaction referred to as *nuclear fission*.

At the heart of every nuclear reactor are fuel pellets no bigger than the tip of a finger. Despite their small size, these pellets hold the potential to produce tremendous amounts of energy. The fuel pellets are inserted into tubes about half-a-meter in length that are made form zirconium alloy, a special type of metal that has a high resistance to corrosion. The tubes are welded shut and several are assembled together into what is called a fuel bundle. A single nuclear fuel pellet can power an average home for six weeks.

Thousands of fuel bundles are inserted into the core of a nuclear reactor, where the uranium atoms give off vast amounts of heat. This heat is used to boil water to create steam, which then spins a turbine and generator, thus producing electricity.

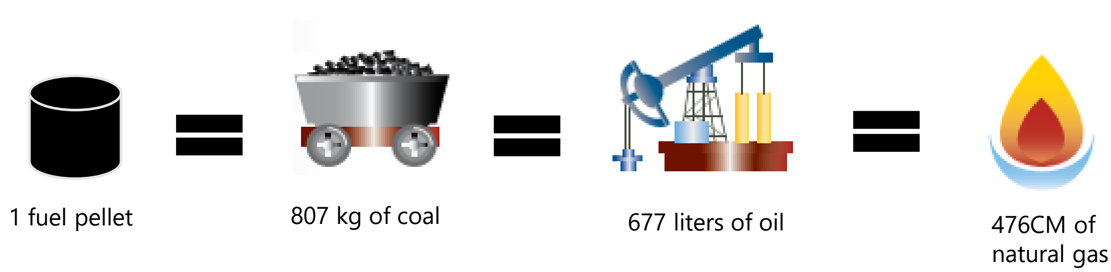
The fuel bundles that hold the uranium become highly radioactive and as such must be handled with extreme care, and be isolated from the environment for an extended period of time. Once they can no longer generate electricity, fuel bundles are placed in water-filled baths to cool down for a period of 10 years. These water-filled bays are located on the same sites as the reactors and are built using reinforced concrete, lined to prevent leaks and designed to withstand earthquakes. The water in the bays helps cool the fuel bundles as well as provide shielding from radiation.

The bundles are then removed and placed in dry storage containers made from concrete and steel. They are then welded shut and stored in highly secure warehouses located on the same sites as the power generators.

Canada's long-term plan for managing used nuclear fuel is to have a central, contained isolation facility in a deep-rock formation. The total amount of used fuel produced from Canada's nuclear power plants over the last 50 years could be stored up to the height of the boards in six hockey rinks.

Exhibit VII

Equivalent Energy Production



Source(s): Ontario Power Generation

Power Sources: Hydro and Thermal

Hydroelectric Power

North America has been using water to make electricity for over a century. In fact, some of Ontario's hydroelectric stations are over 100 years old, and are still generating electricity today. Hydroelectric power stations convert the kinetic energy of falling water into electrical energy. They do this by using either the natural drop of a waterfall, or building a dam to raise the eater level enough to create that needed drop.

Canada is the third largest producer of hydropower in the world – the source accounts for ~60% of the country's electricity generation, compared to an average of 17% globally. Hydroelectricity is one of the most economical and environmentally friendly ways of generating electricity. It produces virtually no smog or greenhouse gases, and is a renewable energy source. One of the advantages of using hydroelectric power is that although it requires a large amount of capital up-front, once the plant is operational the capital expenditures are fairly limited.

On the other side of this, one of the challenges currently facing many Canadian plants is the outdated nature of most technology integrated within the facilities. This means that a large portion of the sector is in need of an influx of capital to continue to run efficiently and provide customers with the lowest cost energy. The Canadian hydropower industry plans to spend C$55-70 billion on hydroelectric dams and upgrading facilities across the country in the next 10 to 15 years.

Thermal Power – Coal, Natural Gas, Oil

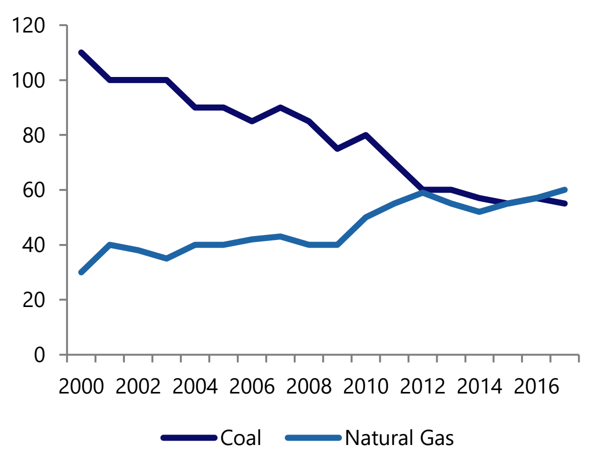
Thermal generating stations burn coal, oil, or natural gas to generate electricity. The fuel is stored in large stockpiles outside the station, and is then crushed and burned to release vast amounts of heat. This heat is transferred to water (stored in tubes) surrounding the furnaces, thus producing steam. This steam is then transferred under pressure and at high speed through large pipes to propel a turbine.

Thermal plants are incredibly useful, as their output can be easily increased to help meet periods of peak demand and provide backup for intermittent sources like wind and solar. However, burning fossil fuels produces a copious amount of emissions, and governments are therefore constantly searching for alternatives.

Biomass energy is one of the solutions being looked at as a possible alternative to the burning of fossil fuels. Biomass energy is a form of renewable energy generated form the burning of plant material such as wood pellets. This fuel provides climate change benefits because the amount of carbon dioxide released while burning is equal to the amount absorbed by the plant while it's being grown. Another advantage is that the turnover time between biomass and coal would be minimized, as plants can immediately switch form burning one to the other with no need for plant or equipment modifications.

Exhibit VIII

Canadian Electricity Generation (terawatt hours)



Source(s): Conference Board of Canada

Power Sources: Wind and Solar

Wind turbines that generate electricity operate in much the same way as other plants, as it's simply the wind turning the turbine in this scenario. Wind power currently provides ~2% of Canada's electricity but is the fastest growing energy source in the world (estimated to make up 16% of the world's energy production by 2030).

The amount of energy that a wind turbine can produce depends on the strength and consistency of the wind at any given time. Generally, the wind needs to be blowing at 14km/h for a wind turbine to start producing electricity. When increasing the wind speed, the power output increases to a maximum at 50km/h. Typically the wind is stronger at night than during the day, and stronger in the winter than in the summer. Because of this, wind cannot always be relied upon to help meet peak energy demand (in Ontario the wind is strong enough to generate power ~20% of the time).

Understanding CO2 Emissions

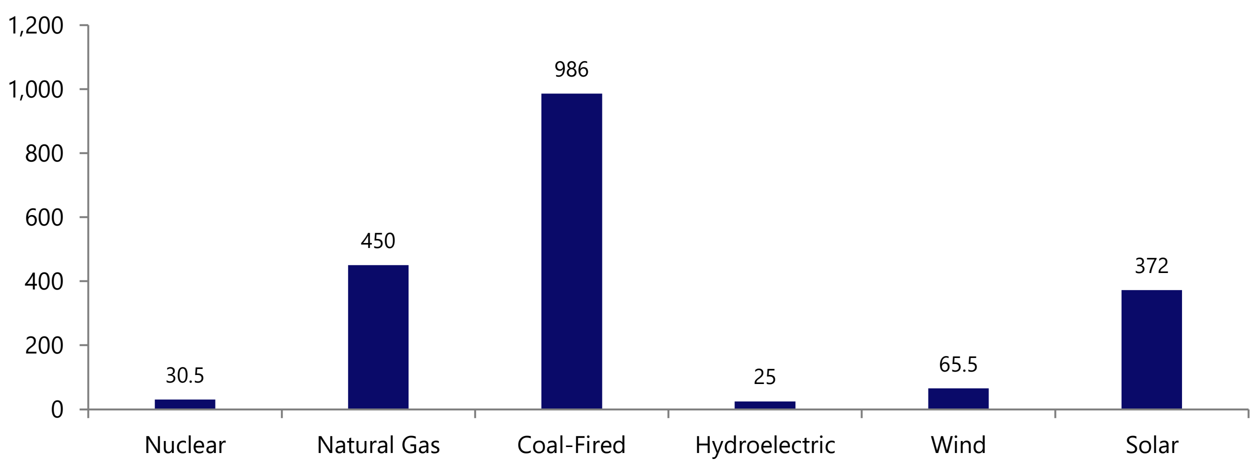
Thermal generating stations that use coal, oil or natural gas to create electricity burn their fuels to give off heat, thus resulting in the release of greenhouse gases into the atmosphere. Other generating sources like wind turbines, solar panels and nuclear power facilities do not give off any greenhouse gas emissions when converting their energy sources into electrical energy.

While the aforementioned sources do not produce any emissions when they are producing electricity, the process for manufacturing and installing the facilities does emit greenhouse gases. In order to understand how much CO2 different forms of electricity produce, all these factors need to be taken into consideration. This is commonly referred to as LIFE CYCLE EMISSIONS because it takes into consideration all emissions resulting from a facility's operations, from construction to demolition.

Exhibit IX shows life cycle emissions for different forms of electricity generation. The CO2 emissions are measured in grams per kilowatt of electricity.

Exhibit IX

Life Cycle CO2 Emissions (g/kW)



Source(s): IEA

The Canadian Utilities Landscape: History & Regulatory Overview

Ontario

Within Ontario, the provincial government is involved in the acquisition of much of the region's energy supply, while independent competitors are permitted to acquire/sell energy. 90% of Ontario consumers are served by regulated utility companies; the remainder purchase from retailers.

For much of Ontario's history, Ontario Hydro was the generator/supplier of electricity, and 100% of the province's consumer rates were government-controlled. When the 1998 Energy Competition Act was passed, Ontario Hydro was split into Hydro One, Ontario Power Generation, Independent Electricity Systems Operator, Electrical Safety Authority, and Ontario Electricity Financial Corporation.

In 2002, the Ontario retail electricity market was deregulated, which allowed consumers to take advantage of services offered by competitive companies. However, in 2005, the Regulated Price Plan was introduced. The aforementioned bill set forth the implementation of a predictable energy plan that has regulated rates for individuals who wish to continue receiving electricity from his or her local utility (versus shopping on the retail market).

Within Ontario, the natural gas market is slightly more regulated than is the electricity market. Prior to 1985, the Canadian government regulated the purchase of natural gas, as it desired to have stockpiles of the commodity in case an energy crisis occurred. TRP possessed a monopoly over interprovincial gas lines; thus, gas distributors lacked the ability to determine their own rates for the gas that they delivered. However, in 1985, Canada's natural gas sector was deregulated and in 1992, the retail natural gas market was made available to consumers.

Today, the transmission of natural gas is still regulated; the Ontario Energy Board regulates fees charged for natural gas distribution, transmission, and storage; such fees are then passed-on to consumers without markup. The OEB also regulates natural gas rates charged by Ontario utilities, and updates these rates quarterly. Rates are based upon the current market rate for natural gas, and projections for future costs.

Alberta

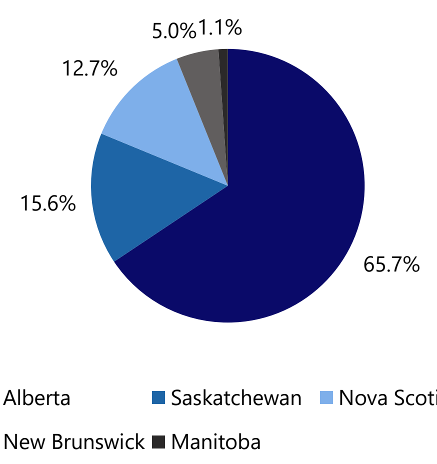
Alberta's utilities industry is unique, in that coal generates over half of the province's electricity. Much of this coal comes from the Powder River Basin, and is very inexpensive.

The province is Canada's most lightly-regulated jurisdiction, with the Alberta Utilities Commission overseeing the operations and charged rates for electricity, water and natural gas - any company that is involved with the transmission, delivery or sale of the aforementioned commodities is regulated by the AUC.

With regard to electricity: the AUC regulates the prices associated with services provided by transmission and distribution companies, and the tariffs collected to compensate such businesses. However, the Commission plays no role in the prices charged by competitive electricity retailers; rather, it regulates what are called the "RRO providers." When a resident does not sign a contract with a retailer, he or she is

Exhibit X

Canadian Coal Generating Capacity Breakdown



Source(s): NRCan

The Canadian Utilities Landscape: History & Regulatory Overview

automatically supplied power by a designated RRO provider. On a monthly basis, the AUC determines the RRO price for electricity, based on current market prices, and external forces such as weather, etc.

With regard to natural gas: the fossil fuel is overseen at three levels (transmission, distribution, and sale) by the AUC. For transmission and distribution, the AUC's role is to approve the construction of new pipelines, and to determine the tolls/tariffs collected from consumers. Until a few decades ago, the natural gas market was controlled by vertically-integrated monopolies, which oversaw the entire process (extraction to final sale) in the supply chain. However, under the current deregulatory landscape, natural gas providers and utilities now purchase natural gas from producers, and then sell the commodity to the general public. Such providers/retailers operate on a competitive basis, and dictate the prices that they sell gas (on contract) to consumers. The AUC has no role in retail pricing but much like what it does for the electricity market, the AUC determines the monthly regulated rate for natural gas; designated utility companies must then sell natural gas at the regulated rate to consumers who do not purchase from competitive retail providers.

B.C., Saskatchewan, Manitoba, New Brunswick, Newfoundland, Quebec

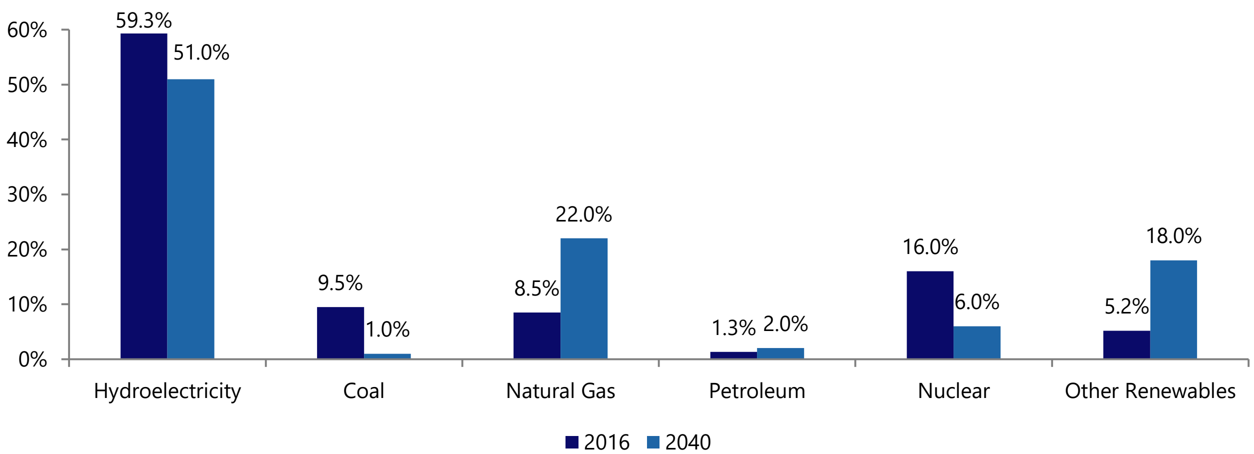
All six highlighted provinces operate under a similar utilities model. Each respective government is the owner of a dominant electricity company/Crown Corporation (BC Power, SaskPower, Manitoba Hydro, NB Power, Newfoundland and Labrador Power, Hydro-Quebec), and uses its ownership interest to advance its various provincial energy objectives and plans.

BC Hydro, SaskPower, Manitoba Hydro and Hydro-Quebec each dominate all phases of electricity provision services in their respective provinces, and own/operate the majority of their jurisdiction's generation, transmission and distribution assets.

The electricity markets in the aforementioned six provinces have very small competitive sectors at the wholesale and retail markets.

Exhibit XI

Canadian Energy Mix – Historical and Projected



Source(s): TSP

The American Utilities Landscape: History & Regulatory Overview

The U.S. utilities industry truly commenced in 1901; between then and 1931, growing economies of scale heightened growth and consolidation in the sector. For much of the U.S.' history, a public utilities commission (PUC)-regulated model was utilized. As the electricity industry grew, PUC's were enacted to regulate electricity and natural gas companies; eventually, some cities chose to operate their own electricity/natural gas operations, whilst others left such responsibilities in the hands of for-profit businesses.

Under the PUC model, power companies could request rate hikes in order to fund capex and the construction of new plants. Commissions usually granted the hikes, as such allowed extra capacity to be developed, thus reducing long-run rates. However, by the 1980s, construction costs escalated to the point that rate hikes (to cover the costs of such construction) would not result in reduced long-term rates. Thus, it was decided to de-regulate the industry, and to introduce competition.

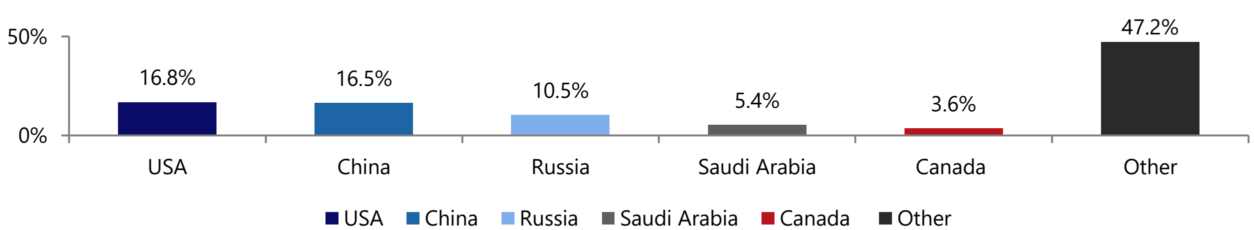
In 1992, the Energy Policy Act was passed. This bill created a new type of company: *exempt wholesale generators*. These corporations were permitted to generate electricity through the utilization of any method at their disposal and were deemed exempt from the Act's energy efficiency rules. Further, the Act forced existing utilities companies to open their transmission systems to other corporations, who then acted as wholesale brokers. These brokers took the shape of new departments within pre-existing power companies, or as independent power brokers/power marketers (who sold cheaper power from one locale of the country to another, or re-sold electricity to large manufacturers). All of the aforementioned electricity sales channels created by the Energy Policy Act were designed to be executed on a wholesale basis. No further regulations have been put into place to expand the model, and include retail-based sales

In essence, the electric power/utilities sector has moved from being comprised of highly-regulated local monopolies (that provided customers with a total package of all electric services), to becoming a web of deregulated/competitive companies whom provide electricity, whilst utilities continue to provide transmission and/or distribution services that are regulated by the FERC/state governments. However, many companies own and operate non-regulated generating plants, and then provide power to consumers via the regulated distribution components of their respective corporations. The vast majority of generating capacity and retail revenue is conducted by privatized corporations; however, publicly-owned electric utilities (non-profit local government agencies designed to provide services to their communities at-cost) do still have a fairly sizeable presence. Further, *cooperative utilities* (owned by their members, and operate in rural areas) comprise a small part of the U.S. generating capacity and retail-based revenue.

As-of-late, increases in the cost of building materials/labour have made construction more expensive. Such upticks have been exacerbated by inflationary pressures with regard to operating/maintenance expenses. However, so far, most of the aforementioned costs have been passed-on to consumers. Currently, coal remains the primary electricity generator in the U.S. - a stark contrast to the 1930s, when hydroelectric power was responsible for the majority of the nation's electricity supply. Overall, fossil fuels comprise 70% of the American energy supply.

Exhibit XII

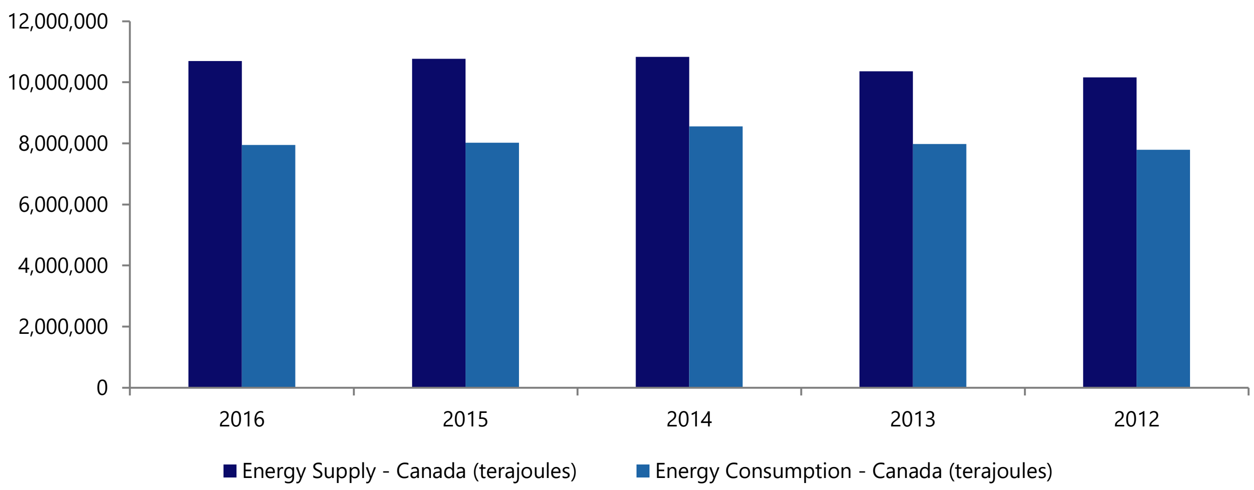
Share of Global Primary Energy Production



Source(s): TSP

Exhibit XIII

Canadian Supply and Demand



Source(s): Statistics Canada

Political Outlook for Utilities

United States

At the end of Obama's tenure, the outlook for utilities was clear-cut: carbon budgets would continue to be cut, thus clearing the way for increasingly-economical renewable and natural gas powered energy.

As-of-late, President Trump has made energy policy a key priority for his political agenda. He has cited a desire to keep ageing coal and nuclear power plants in operation; thus far, EPA regulations on carbon and methane have been relaxed, and wholesale market reforms that benefit the aforementioned two power sources have been pushed. Subsidies for both nuclear and coal-fired power plants have also been proposed by the Trump administration, much to the chagrin of the utilities industry. Such actions will likely lead to increased electricity prices for U.S. consumers (costs for consumers could rise by up to $11.8B per year), as well as reduced profitability for utility providers. Natural gas is now plentiful and inexpensive, largely due to the stunning rise of fracking technology. Overall, the bailout of the nuclear and coal industries could cost up to $16.7B annually, according to preliminary estimates.

With regard to renewables: Trump has voiced his criticism of the source, citing the fact that it is expensive and dependent on government support.

Canada

The Canadian political landscape has been headlined by the recent actions of Premier Ford. He has expressed a desire to terminate over 750 renewable power contracts – thus saving Ontario customers $790MM. He has also pledged to eliminate the province's cap-and-trade program, eliminate subsidies for clean energy sources, and renegotiate electricity contracts.

Canadian Utilities Trends and Macro Drivers

Economy

Domestic economic activity is a major driver of the electricity generation sector, as almost 90% of electricity produced in the country is used domestically. With high household debt and slower employment gains, growth in consumer spending will likely be subdued. Meanwhile, export growth is expected to be weighed down by uncertainty about NAFTA negotiations. Growth in Canada's economy will be more modest this year, with real GDP forecast to expand by 1.9%, down from 3.0% in 2017.

Domestic Demand

Last year, Canada's implied electricity demand was estimated at 585 terawatthours (TWh), an increase of 4.5% over 2016. Among the most important factors affecting that growth were the recovery of the oil and gas sector, a colder-than-usual winter in British Columbia, and solid economic growth in general. However, the weaker economic growth expected across the country in 2018 will also weigh on electricity demand.

Export Demand

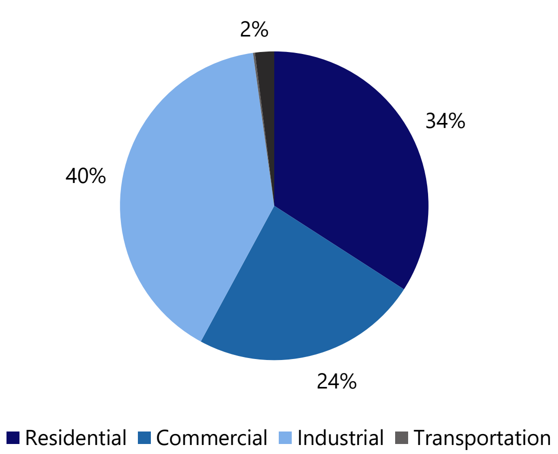
Canada's electricity trade with the United States has been expanding rapidly in recent years. From 2010 to 2017, net electricity exports increased at an average annual rate of 14%. In 2017, about 12% of electricity generated in Canada was destined for the U.S. market.

Transition Towards Natural Gas & Renewables

Between 2006 and 2016, installed capacity of natural gas power generation has increased by 4.5% a year on average, almost entirely at the expense of coal-fired stations. Natural gas is an abundant energy source in Western Canada, and ample supply in North America has put downward pressure on prices. This fact, combined with its relatively weaker CO_2 impact, natural gas provides compelling reasons for its growing use. By 2030, natural gas–fired generating capacity in Canada is forecasted to increase by approximately 75%, therefore suggesting that it will feasibly account for between 19% and 22% of total generating capacity in Canada.

Exhibit XIV

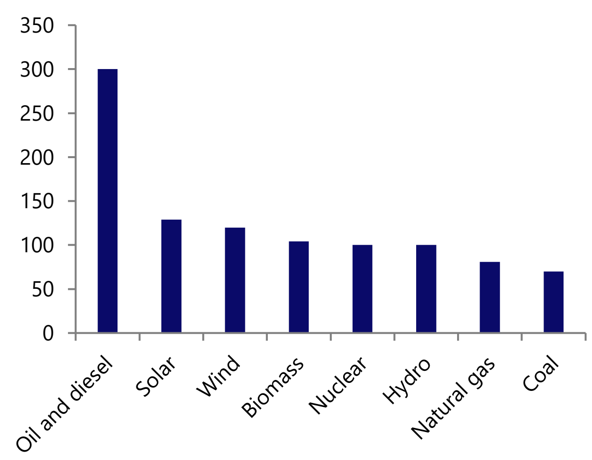
Electricity Usage in Canada



Source(s): NRCan

Exhibit XV

Levelized cost, $/MWh



Source(s): National Energy Board

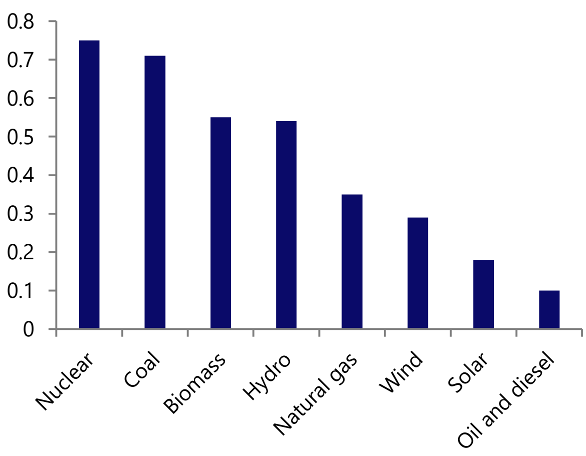
Canadian Utilities Trends and Macro Drivers (Continued)

Renewables

Generation from biomass, wind, and solar power has increased significantly over the past few years. Between 2006 and 2016, the combined capacity of those sources increased more than sevenfold, from less than 2% of the current total to 11.5%. One measure that helps one to understand the role of these renewable energies is the capacity factor, which is defined as the ratio of actual electricity generation to the full capacity potential. A value of 1 would mean that an energy source is working at full capacity at all times. In reality, no generation technology achieves a 100 per cent capacity factor. Those technologies that have relatively high capacity factors, such as nuclear, coal, and hydro are generally favored for baseload generation. Renewables such as wind and solar, however, have low capacity factors and are typically better suited to meet peaking or intermittent spikes in demand. The intermittent nature of renewables implies that Canada will continue to rely on combustible energy generation for many years to come.

Exhibit XVI

Capacity Factors



Source(s): Conference Board of Canada

However, There is evidence that increased adoption of electricity from solar, wind, and biomass is likely to decrease average costs due to larger economies of scale and increased competition from the entry of new firms. As well, technological advances and refinements in design capabilities and deployment strategies have considerably pushed down renewables' generation costs since their inception.

Smart Grid

There is enormous potential for saving electricity by managing demand more effectively. This requires a modernization of the electricity infrastructure toward a more decentralized model, and the creation of smart grids.

Smart grids are electricity supply networks that use digital communications technology to detect and react to local changes in usage. This translates to the utilization of a two-way communication between users and suppliers of electricity. Such would allow providers to do things such as use excess solar power from houses when they're not in use, automatically turn off air conditioners, or give customers a warning during peak usage times. This would contribute to less peaks and troughs of demand, and lower electricity bills at the end of the month.

In January 2018, the Government of Canada, through the Ministry of Natural Resources, committed $100 million in funding toward the development of smart grids across the country, and even though this is very new technology, almost every province has at least launched studies or pilot projects, while some have started implementing aspects of smart grid technology in stages. The most advanced smart grid infrastructure is found in Central Canada and British Columbia.

NextEra Energy Inc.: Company Overview

The E&U team decided to apply our learnings into practice and analyze an equity that has had seamless outperformance over the last 5 years: NextEra Energy Inc. (NYSE:NEE) ("NextEra").

NextEra's roots trace back nearly a century, when Florida Power & Light Company was created on December 28, 1925. In the beginning, they owned power plants, water facilities, gas plants, ice companies, laundry services, and even an ice cream business. In its first year, the company served approximately 76,000 customers in 58 communities and had a generating capacity of 70 megawatts.

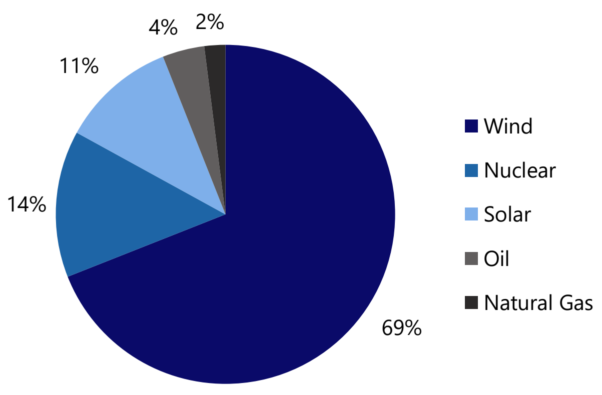
Today, NextEra Energy, Inc. is a S&P 100-listed power generation and utilities firm with about 46,790 MW of net generating capacity, revenues of over $17.2 billion, and about 14,000 employees through the United States, Canada, and Spain. Headquartered in Juno Beach, Florida, NextEra's principal subsidiaries are Florida Power & Light Company ("FLP") and NextEra Energy Resources ("NER"). FLP serves approximately 5 million customer accounts in Florida and is one of the largest rate-regulated electric utilities in the United States. NEP together with its affiliated entities is the world's largest generator of renewables energy from the wind and sun. In the past, the company has been recognized often by third parties for its efforts in sustainability, corporate responsibility, ethics and compliance, and diversity.

Over the past decade, NextEra has created tremendous shareholder value. Since 2005, it has grown Adjusted EPS, and Dividends per Share at a CAGR of 8.1% and 8.9%, respectively. In addition to their growth in both earnings and dividends, NextEra's total return to shareholders since 2008 has been 221%, which is astoundingly higher than the S&P Utility Index, and the S&P 500, which have returned 85% and 126%, respectively.

Due to this superior performance, the E&U team selected NextEra to analyze the root causes of this performance. Additionally, the team looked in the asset base and the unlevered IRR cases of Utilities in order to determine how much investors are willing to pay for growth in the Power & Utilities universe.

Exhibit XVII

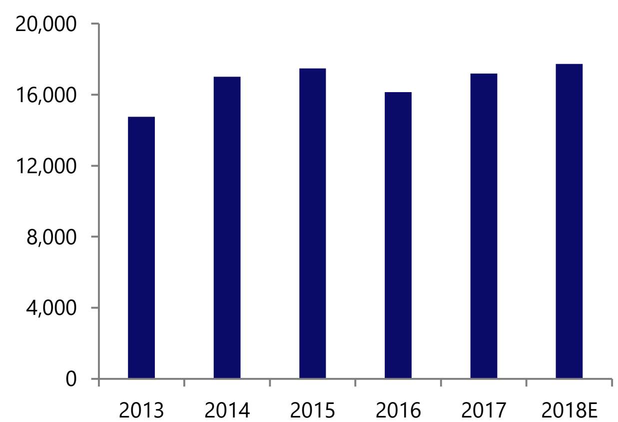
Net Generation Capacity, by Fuel Type



Source(s): Company Reports

Exhibit XVIII

Annual Revenue, in $US



Source(s): Company Reports

NextEra Energy Inc.: Reasons for Outperformance

Outperformance Thesis I: Elite Yieldco Model

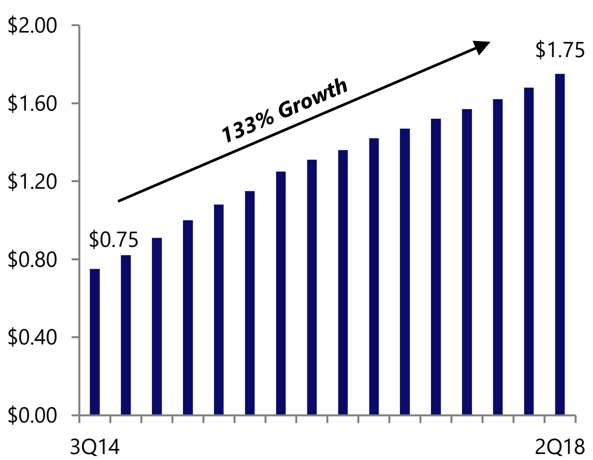
In 2014, NextEra spun off a public company called NextEra Energy Partners LP (NYSE:NEP) ("NextEra Yieldco") through an IPO. A yieldco is created when a group of assets that are producing stable, predictable cash flows are spun off into a separate, publicly traded company. Generally exclusive to the renewables space, this structure separates the risky projects still under development and the de-risked projects that have already been created. Since returns for utilities projects are capped at a low rate of return, it takes years for a firm to rejuvenate its capital base to reinvest in other projects. By dropping down assets into the yieldco, the parent company is able to get immediate financing to invest in other projects and grow its business.

Additionally, the yieldco structure allows large businesses the ability to provide clarity for its investor base. Dividend-seeking investors, which are a dime-a-dozen in the Utilities space, will be guided to the yieldco as its focus on aggressively growing CAFD, and inherently, its dividend; meanwhile, investors seeking a risker, growth business will herd to the parent company. Splitting up the firm will generally alter valuations, as it typically removes any conglomerate discount overhang due to clarity of the direction of the business as investors will have a better understanding of what they are paying for. Furthermore, the parent company will trade up due to the risker, growth-based, nature of its asset base.

NextEra has effectively implemented this model by providing quality renewable assets to NextEra Yieldco, including a pending sale of 1.4GW of assets which is expected to close in 4Q18. NextEra Yieldco possesses 4,700MW of renewables and 4Bcf of natural gas pipeline capacity in the United States, which has been supported by NextEra. NextEra owns ~61% of NextEra Yieldco. Since the IPO, NextEra and NextEra Yieldco have been able to grow NextEra Yieldco's distribution by 133% and delivered total unitholder return of 126%.

EXHIBIT XIX

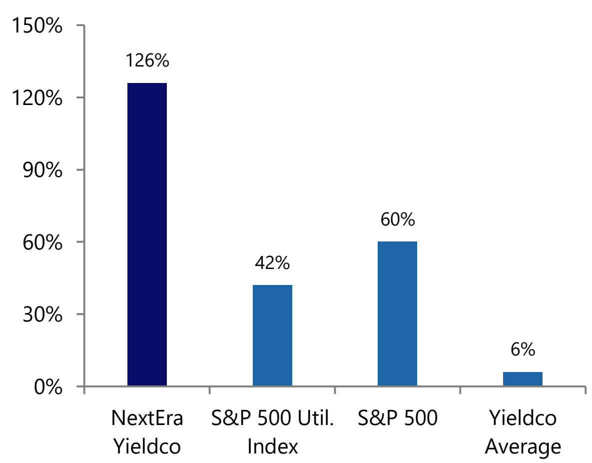
Total Unitholder Distribution since IPO



Source(s): Company Reports

EXHIBIT XX

Total Unitholder Return since NextEra Yieldco IPO



Source(s): Company Reports

NextEra Energy Inc.: Reasons for Outperformance

Outperformance Thesis II: Scale from Every Corner

NextEra has been able to acquire scale through its positioning with both its Florida Power & Lights Company ("FPL") and NextEra Energy Resources ("NEEP") segments. With FPL as the largest Utility in the United States by retail MWh sales, NextEra has been able to acquire the lowest Operational & Maintenance costs among all major utilities at $12.44/MWh relative to the top quartile of its competitors being nearly double.

Additionally, NEEP is the world leader in electricity generated from the wing and sum, with 20GW of generation in operation and 8Bcf of natural gas pipeline capacity operating or under development. This size has allowed NEEP to scale its wind O&M costs by 10% over the last two years, to place itself in the top decile of efficiency among producers.

However, NEEP is not just relying on scale for outperformance. It is expected to be the 4th largest capital spender this year at $25B, growing into 2,600MW of Power Purchasing Agreements backlog.

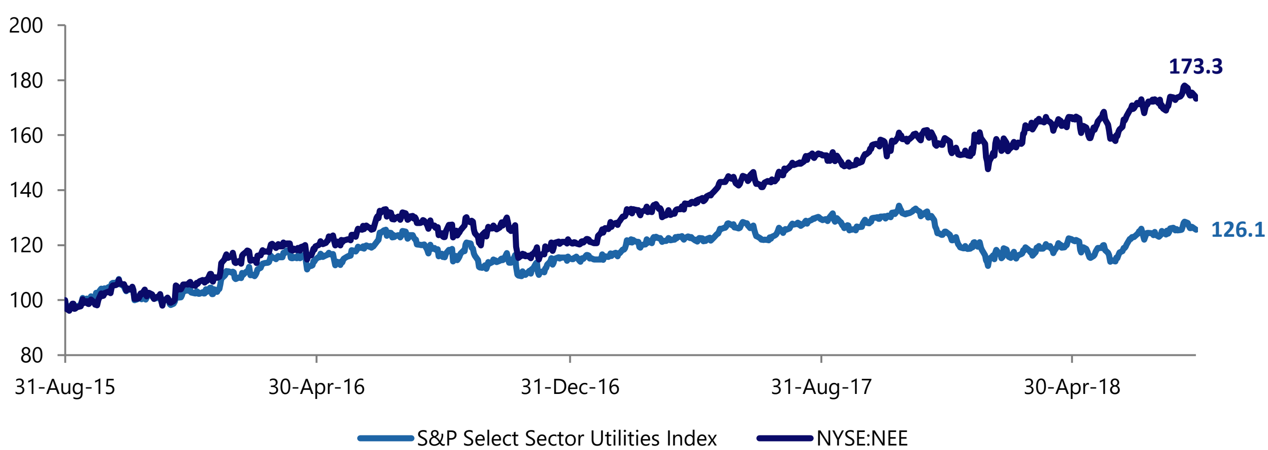
Outperformance Thesis III: Accretive M&A Record

In May 2018, NextEra agreed to acquire Gulf Power and other gas assets from Southern Company for $6.5B. The acquisition consists of regulated electricity assets and natural gas assets that will strategically integrate with NextEra's prominence in Florida. Management guided EPS accretion of $0.15 and $0.20 in 2020 and 2021, respectively, and analysts seemed to agree as the stock has only traded up since then, which is not typically common in precedent transactions.

Moving forward, should NextEra decide to use the acquisition to grow its rate base, regulatory accounting practices will allow them to free up $5-7B for further acquisitions.

EXHIBIT XXI

Relative Performance Chart as of September 20, 2018



Source(s): S&P Capital IQ

NextEra Energy Inc.: What is the Price Investors are Paying for Growth?

As previously mentioned, investors in NextEra ("NEE") have bid up the price of the stock because of its peer-leading growth profile. Unlike other utilities, NextEra has been able to provide investors with consistent capital appreciation, more than doubling the price of its shares since 2014. To further illustrate the positive sentiment for the name, the current EV/EBITDA multiple trades at ~13.5x – over 3 turns greater than its 10 year historical average.

To determine if the current premium is justified, the E&U team analyzed the name in several different ways. The first method involved taking the difference between NEE's current EV and the value of their fixed assets in place (FAIP). FAIP can be thought of as a proxy for enterprise value, assuming that into perpetuity the company invested nothing more back into itself. This figure illustrates the PV of all of the future cash flows that its current assets would generate should management not invest another dollar back into the business. After calculating this figure, we compared it to NextEra's current EV. By taking the difference between the two, we can assume that this value is the price in which investors are currently pricing in for growth. The result of this analysis suggests that ~52.2% of NEE's current EV is attributed to future growth prospects. As a utility name, we feel that this split between current assets in place and future growth assets is too heavily weighted on the latter given the strong regulatory forces limiting growth in this industry and sheer size of NEE which limits its ability to find attractive opportunities to deploy its capital in this industry.

The next method of dissection involves back-solving for an estimated annual EBITDA CAGR from an unlevered IRR formula derived from a unlevered return proof, which states: ($\mathrm{UIRR} = UFCFY + EBITDA\ CAGR + Annual\ Mult.Appreciaiton$). Through defining UIRR as the UFCF yield of a business, plus its annual EBITDA CAGR and annual multiple appreciation (expressed as a percentage), we can begin to asses whether or not we would be comfortable underwriting certain assumptions. Using NEE's financials, we can determine that their current UFCF yield is ~0.80%. In the spirit of conservativism, we will assume that NEE's multiple doesn't appreciate. Using NEE's prior 10 year annual share price CAGR of 11.83% as a proxy for our required UIRR, NEE would need to achieve an annual EBITDA CAGR of ~11.3% to satisfy this equation. Given that historically, EBITDA has only grown at a CAGR of ~5%, we do not feel comfortable underwriting an 11% annual growth rate and thus, by this method of analysis, feel that NEE is overvalued.

The third and final way we looked at how investors are pricing growth into NEE is through using the growing perpetuity formula. We set NEE's EV/EBITDA multiple equal to the value of the perpetuity, plugged in the company's WACC and back solved for the implied perpetual growth rate. We assumed a weighted average cost of capital of 7.44%, which is the industry standard for American integrated utilities as calculated by NYU Professor Aswath Damodaran.

EXHIBIT XXII

Historical EV/LTM EBITDA vs. 10 Yr. Average

	EBIT	Tax Rate	NOPAT	WACC	FAIP	EV	EV Growth Premium / (Discount)	% of EV
NextEra Energy, Inc.	$5,985	31.6%	$4,093.7	*7.44%*	$55,023.4	$115,067.5	$60,044.14	*52.18%*
Peers								
American Electric Power Company, Inc.	$3,431	*33.45%*	$2,283	7.44%	$30,690	$59,384	$28,694	48.32%
Duke Energy Corporation	$6,099	*28.04%*	$4,389	7.44%	$58,993	$113,176	$54,183	47.87%
Edison International	$2,231	*34.06%*	$1,471	7.44%	$19,773	$38,815	$19,042	49.06%
PPL Corporation	$3,068	*41.00%*	$1,810	7.44%	$24,328	$42,788	$18,460	43.14%
FirstEnergy Corp.	$2,578	*34.70%*	$1,683	7.44%	$22,627	$37,078	$14,451	38.97%
Public Service Enterprise Group Incorporated	$1,467	*36.70%*	$929	7.44%	$12,481	$40,608	$28,126	69.26%

Source(s): S&P Capital IQ

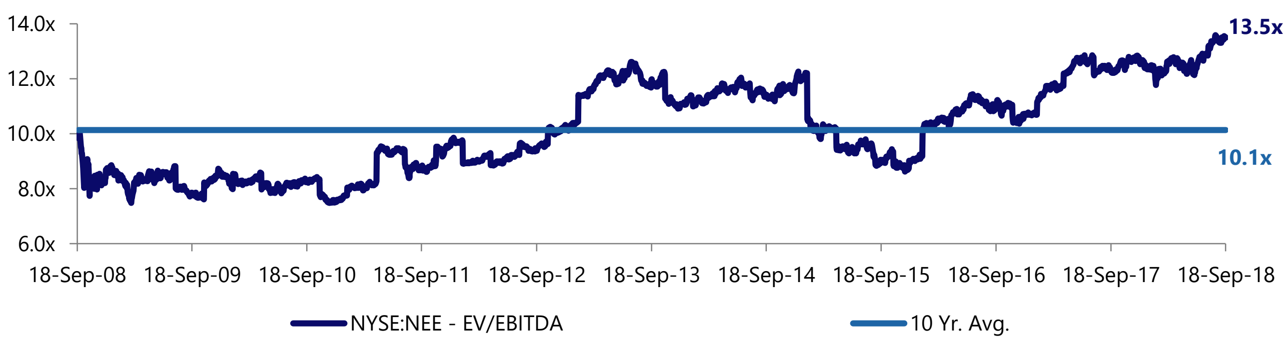
NextEra Energy Inc.: What is the Price Investors are Paying for Growth?

Using NEE's current EV/EBITDA multiple of 13.4x,, we can set this equal to the statement on the right hand side of the equation and using the companies WACC, can solve for what the current multiple is implying EBITDA to grow at into perpetuity. This analysis yields a perpetual growth rate of ~0.03%. Given a utility's largely regulated nature, and macro growth drivers, we feel that a near 0% perpetual growth rate for EBITDA is too low, and by assigning a perpetual growth rate more in line with that of the U.S. GDP, we can arrive at a more accurate multiple. In fact, if we assume a perpetual growth rate of 1.5% and combine that with the NEE's current WACC of 7.44%, it is implied that NEE's EV/EBITDA multiple should be trading closer to ~17.2x. Contrary to the other two methods used, if investors view NEE through this lens, the stock would appear to be trading at a discount. The E&U team has more conviction in the other two methods as there may be several accounting discrepancies baked into EBITDA that we don't fully understand at this point in time.

In short, as our initial analyses suggest overvaluation, it is clear to us that investors are currently paying too much for growth. Despite this, we like NEE's fundamentals and will add the name to our watchlist.

EXHIBIT XXIII

Historical EV/LTM EBITDA vs. 10 Yr. Average



Source(s): S&P Capital IQ

EXHIBIT XXIV

Implied EBITDA Perpetual Growth Rate

Implied EBITDA Pepetual Growth Rate

EV / EBITDA Multiple	WACC 5.0%	5.5%	6.0%	6.5%	7.0%	7.5%	8.0%	8.5%	9.0%
11.4x	(3.47%)	(3.01%)	(2.55%)	(2.09%)	(1.63%)	(1.17%)	(0.71%)	(0.25%)	0.21%
11.9x	(3.14%)	(2.68%)	(2.22%)	(1.76%)	(1.29%)	(0.83%)	(0.37%)	0.09%	0.55%
12.4x	(2.84%)	(2.37%)	(1.91%)	(1.45%)	(0.99%)	(0.52%)	(0.06%)	0.40%	0.87%
12.9x	(2.55%)	(2.09%)	(1.63%)	(1.16%)	(0.70%)	(0.23%)	0.23%	0.69%	1.16%
13.4x	(2.29%)	(1.83%)	(1.36%)	(0.90%)	(0.43%)	0.03%	0.50%	0.97%	1.43%
13.9x	(2.05%)	(1.58%)	(1.11%)	(0.65%)	(0.18%)	0.29%	0.75%	1.22%	1.68%
14.4x	(1.82%)	(1.35%)	(0.88%)	(0.42%)	0.05%	0.52%	0.99%	1.45%	1.92%
14.9x	(1.60%)	(1.14%)	(0.67%)	(0.20%)	0.27%	0.74%	1.21%	1.68%	2.14%
15.4x	(1.40%)	(0.93%)	(0.46%)	0.01%	0.48%	0.95%	1.41%	1.88%	2.35%

EXHIBIT XXV

UIRR Walkthrough

Assumptions:

$\text{UIRR} = 11.83\%$ $\quad$ $\text{UFCFy} = 0.80\%$

$\text{Annual Mult. Appreciation} = 0.00\%$

$$\text{UIRR} = UFCFy + Annual\ EBITDA\ CAGR + Annual\ Mult.Appreciation$$

$$11.83\% = 0.80\% + Annual\ EBITDA\ CAGR + 0\%$$

$$\textbf{Required Annual EBITDA CAGR} = \mathbf{11.03\%}$$

References

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