Unique Diversification Benefits of Utilities

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I have been working in the utilities industry since 1999, principally as a consultant. Because of my work with energy utilities as well as my firm's focus in equity analysis, I have spent considerable effort analyzing utilities as investment opportunities. While utilities have traditionally been regarded as fairly boring investments, the last decade has brought substantial changes that have revitalized the utilities industry. Utilities have delivered superior returns in recent years, along with the rest of the energy industry. Part of the investor interest in utilities derives from the fact that we are in a commodities boom and many classes of 'hard assets' have been performing well, but utilities have some special features for investors that bear consideration in determining the appropriate allocation to this sector.

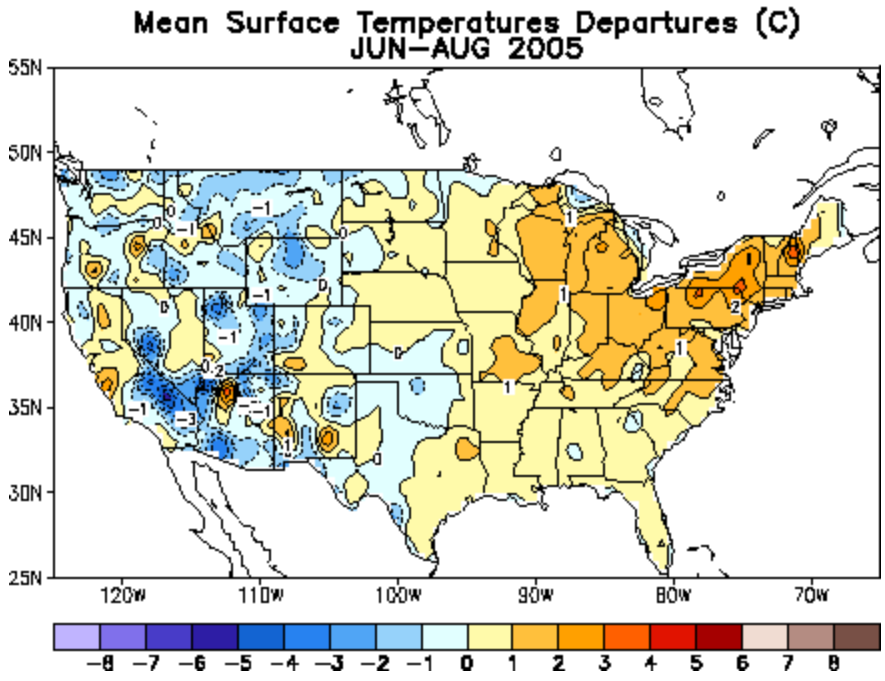
I have highlighted utilities for their valuable portfolio impacts in a number of articles. Utility firms tend to have low Beta, which means that they do not track with the S&P500. This is, of course, largely because demand for electricity and natural gas is quite inelastic. People have a hard time reducing their consumption for energy commodities if the prices go up. Further, the economic cycles that drive the financing and construction of electrical generation and transmission are not in sync with other key economic factors. It takes a number of years to get new power plants permitted and built, so even if a period of economic growth motivates new investment and construction, the actual returns generated by building new physical plants take years to be seen in corporate performance. The 'low Beta' qualities of utilities make them very attractive because they can help to insulate a portfolio from market swings.

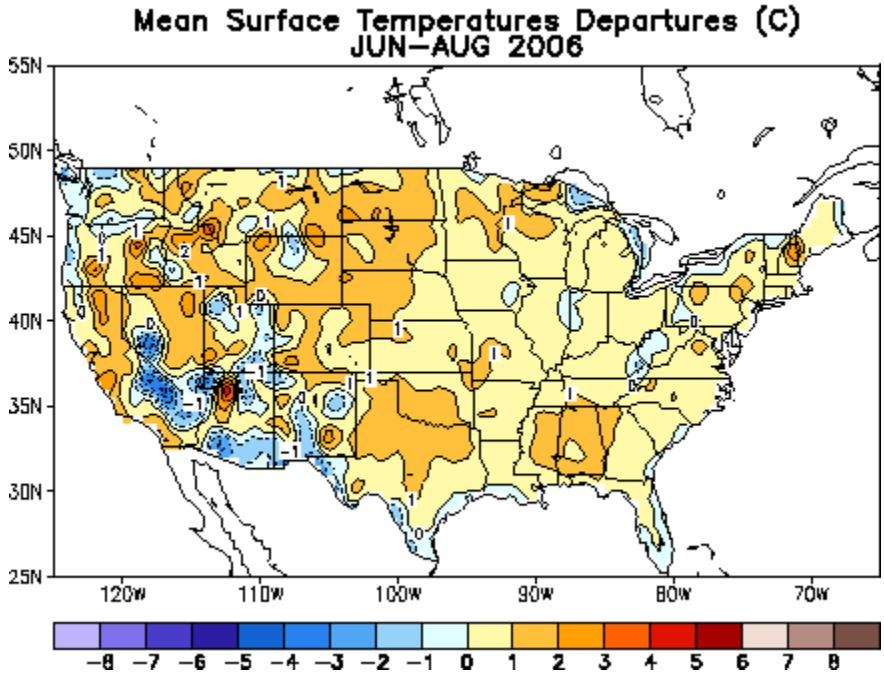
In this article, I want to highlight a feature of utilities investments that does not get much attention, but it makes utilities very special as a sector. The amount of electricity and natural gas that a utility sells is driven largely by the weather. Further, because of the physical and regulatory constraints associated with transporting electricity and gas between markets, a utility with low demand in its local service area cannot simply sell more gas and power to customers outside of its service area where demand (and prices) may be higher. Electricity is the only commodity in the world that cannot be stored and the transmission of electricity has constraints. First, there are transmission losses.

Secondly, the physical constraints of transmission mean that there can be a substantial difference in the wholesale price of power in different locations—even locations that are not geographically very distant. Congestion, meaning too much electricity trying to flow through too few wires in this context, is a substantial issue that is growing more serious with time:

http://www.usatoday.com/news/washington/2006-08-07-power-congestion_x.htm

The United States is 'transmission constrained.' The variability in demand for electricity and gas is highly variable in time as well as being spatially heterogeneous. Put in simpler terms, the weather-driven demand for electricity and gas varies quite a bit from year to year and the variability is not constant across the U.S., much less globally. To see how temperature anomalies vary from year to year and across the U.S., consider these maps generated by ***NOAA's Climate Prediction Center***:





Source: NOAA / CPC

http://www.cpc.ncep.noaa.gov/products/SCM/SCM-archive4.html

These maps show the average difference of temperatures from normal (in Celsius) for the peak summer months for electricity demand, June through August. The differences of temperature from the average climate are called ***temperature departures***. The top chart shows the pattern of temperature departures in 2005 for June-August and the lower chart shows the pattern for the same period in 2006. In 2005, the Western half of the United States was cooler than normal and the Eastern half of the U.S. was warmer than normal. In 2006, the pattern effectively reversed with the Eastern U.S. being about normal and the Western U.S. predominantly warmer than normal' albeit with cooler pockets in the Southwest. If you are interested in seeing the persistence of temperature deviations from normal and their spatial variation, you can track these statistics at this NOAA page:

http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/DD_monitoring_and_data.shtml

There are two key points here:

1) Seasonal variability in demand for gas and electricity (relative to normal) is not uniform across the U.S.
2) It can be difficult, expensive, or effectively impossible to 'wheel' power from a location of low demand to one with high demand.

What does this mean for the investor? Partly because of these two forces, the correlations in the stock returns from utilities are remarkably low. In other words, the earnings of a utility in one part of the U.S. can exhibit very low correlation to the earnings of a utility in another part of the U.S. Low correlation is something that investors are always looking for—this is the key to effective diversification and getting the highest possible return for your portfolio risk. **The unique feature of utilities is that they exhibit not only low correlation to the broader stock market, but also to each other!** This effect is even more powerful as the spatial separation gets greater — say to other countries. When we look to other countries, we also have the benefit that investment in electricity tends to go in swings (as with any capital intensive industry) and these swings are different in different regions. The low correlations between utilities are also caused by the fact that different utilities firms have responded to de-regulating markets in different ways. Some utilities grew large divisions to participate in de-regulated markets via 'merchant generation' and/or pure proprietary trading. Other utilities were more conservative, and retained the service of end-use retail and commercial clients as their focus. Despite being in the same industry, business models vary considerably between firms.

To demonstrate the very low correlation between utilities, I have selected a list of major U.S. and international utilities.

Ticker	Name
CNP	Centerpoint Energy
D	Dominion
DUK	Duke
ED	Consolidated Edison
EIX	Edison International
EXC	Excelon
FE	First Energy
NI	Nisource
PCG	PG&E
PEG	Public Svc. Enterprise Grp.
SO	Southern Co.
TXU	TXU
EON	E.ON AG
ELE	Endesa SA
SPI	Scottish Power
HNP	Huaneng Power

Selected list of utilities

The top portion of this list consists of major U.S. utilities. EON, ELE, SPI, and HNP are all large international utilities. E.ON is based in Germany, Endesa is based in Spain, SPI is based in (you guessed it) Scotland, and HNP is a major Chinese utility.

	SPY	CNP	D	DUK	ED	EIX	EXC	FE	NI	PCG	PEG	SO	TXU	EON	ELE	SPI	HNP
CNP	**16%**	100%															
D	**12%**	59%	100%														
DUK	**18%**	64%	68%	100%													
ED	**-8%**	**26%**	**46%**	50%	100%												
EIX	**5%**	**18%**	**31%**	**29%**	**18%**	100%											
EXC	**1%**	**34%**	**45%**	51%	**45%**	**14%**	100%										
FE	**3%**	**35%**	50%	53%	69%	**10%**	**36%**	100%									
NI	**17%**	**46%**	54%	54%	**49%**	**1%**	**37%**	**42%**	100%								
PCG	**12%**	**21%**	**26%**	**31%**	**33%**	59%	**15%**	**21%**	**31%**	100%							
PEG	**12%**	54%	62%	55%	59%	**21%**	56%	52%	50%	**25%**	100%						
SO	**-13%**	**33%**	56%	57%	65%	**19%**	**49%**	51%	**42%**	**11%**	51%	100%					
TXU	**-14%**	51%	**49%**	**36%**	**27%**	**22%**	**30%**	**30%**	**29%**	**21%**	**45%**	**28%**	100%				
EON	**29%**	**24%**	**22%**	**20%**	**18%**	**5%**	**8%**	**32%**	**8%**	**15%**	**33%**	**5%**	**25%**	100%			
ELE	59%	**18%**	**20%**	**23%**	**0%**	**6%**	**-2%**	**11%**	**9%**	**10%**	**15%**	**-13%**	**7%**	**43%**	100%		
SPI	**-4%**	**8%**	**20%**	**7%**	**20%**	**15%**	**6%**	**16%**	**8%**	**20%**	**24%**	**4%**	**13%**	**21%**	**23%**	100%	
HNP	**31%**	**9%**	**18%**	**1%**	**10%**	**-6%**	**0%**	**22%**	**21%**	**3%**	**14%**	**8%**	**4%**	**29%**	**25%**	**10%**	100%

Monthly correlations in total return for 9 years through November 2006

The grid above is a ***correlation matrix*** and it shows the correlation between the total returns (price appreciation plus reinvested dividends) for these stocks. To get the most return for the risk in a portfolio, you always want to find investments that have low correlation to each other and, typically, to the broader market (say the S&P500). SPY

(see the correlation matrix above) tracks the S&P500 (it is a market index ETF). We have used nine years of data because a number of these firms have not been listed for ten years as yet. For the nine year period, every one of these utilities exhibits low correlation to SPY (see the first column in the table above). To give a sense of how low these are, you might look at the following article:

http://etf.seekingalpha.com/article/18817

Gold exhibits correlations to the S&P500 as low as these, but gold is so volatile that it can never make up more than a tiny slice of a portfolio that is designed to meet the risk tolerances of most individuals. Utilities, on the other hand, tend to have manageable levels of volatility. **What are really striking about these utilities firms, however, are the very low correlations that they have to each other.**

Some of these firms have relatively higher correlations—largely due to their nearby or overlapping service markets. Duke (DUK) and Dominion (D) have a correlation of 68% (see table above). Southern Company (SO) and has a correlation of 57% to DUK and 56% to Dominion (D). Note the very low correlations between many of the largest U.S. utilities and the international utilities in this table. Excelon (EXC) shows correlations of 8% or less to all four of the international utilities. Scottish Power (SPI) has exhibited a correlation of -4% to the S&P500 over the trailing nine year period, as well as having outperformed the S&P500 since being publicly listed in the late 1980's. Note that we are not saying that SPI has out-performed every year. To the contrary, with the low correlation, there have been quite a few years where SPI has under-performed the market, but it has out-performed in aggregate.

It is important to remember that correlation measures the degree to which the returns on assets tend to move together, but do not tell you anything about volatility. Some of these firms are fairly low volatility (such as SO, D, and SPI). SO, D, and SPI have been about 30% more volatile than the S&P500 over the nine year period, but this pales by comparison to HNP (three times as volatile as the S&P500) or domestic utilities that pursued aggressive business models such as PCG, CNP, or TXU (all of which have exhibited more than twice the volatility of the S&P500 over the nine year period). The

portfolio effects of adding utilities to your investing strategy will be a function of both volatility and correlation and the range of correlation / volatility options is quite varied.

If you had a portfolio that was made up of 20% SPY and 5% of each of the utilities listed earlier in a table, the average annual return would have been 14.1% with a standard deviation of 13.6% for the nine year period ending at the end of November 2006. The S&P500 over this period generated an average annual return of 6.7% with a standard deviation of 15.2%. This portfolio exhibits a remarkably high level of diversification given that it is comprised of 80% utilities companies. We can see the impact of diversification because of the high return relative to risk, as measured by the standard deviation in annual return.

In analyzing portfolio performance, it is important to look forward and not just backwards. This is where a tool called Monte Carlo analysis is useful. Monte Carlo analysis simulates a large number of possible future market conditions to provide estimates of expected performance and the range of possible future performance for a portfolio. ***Quantext Portfolio Planner*** (QPP) is a Monte Carlo portfolio management tool that generates forward-looking statistical simulations for a portfolio. This Monte Carlo analysis captures risk, return, and accounts for correlation between assets in a portfolio. QPP projects that this portfolio (20% SPY and 5% of each utility) will generate an average annual return of 13.4% per year, with a standard deviation of 13.1% in the long term.

We have been going through a period of rapid change in the utilities industry that has enabled these firms to generate enough earnings growth to keep price-to-earnings ratios and dividend yields reasonable even as the stock prices have shown market-beating appreciation. That said, the ability of a diversified portfolio (with dividends reinvested) to out-perform the S&P500 is not entirely a recent phenomenon. Imagine that you are standing back on December 1, 1987. Vanguard's S&P500 index fund (VFINX) was only a few months old. Would it have been better to buy that fund or to buy a portfolio of utilities? FE was not yet public back then, but let's say that we created a portfolio that

has 6% in each of the other domestic utilities stocks listed in the table above and then put the remaining 34% in VFINX. From that day forward until November 30, 2006, VFINX has generated an average annual return of 12.3% with a standard deviation of 13.7%. The portfolio with 66% in utilities and 34% in VFINX has generated an average annual return of 16.4% with a standard deviation of 12.6%. Even if you leave out the most recent five years—a period of tremendous growth for utilities stocks—the utilities-laden portfolio still beats VFINX by about 3% per year, with less risk than VFINX.

Let's try to bring all of these themes back together. There are some unique features of utilities such that the returns on individual utilities firms exhibit remarkably low correlation—particularly for firms in the same industry. First, spatial variability in weather-driven demand is sufficiently high, even over extended periods, that demand for electricity and gas can be highly variable between firms. Second, it can be so expensive or even impossible to transmit power from one location to another (because of congestion) that wholesale prices of electricity can be highly variable across the country. Third, because of the regulations on the electricity business, there are additional constraints beyond the ability to physically transport power that reinforce the spatial heterogeneity in power prices. All three of these factors contribute to lowering the correlations between financial returns on stocks in utilities. **The low correlations mean that you can build a portfolio which is quite concentrated in utilities but that has a high average return relative to total portfolio risk (measured by standard deviation in return).**

The question, of course, is whether the capital markets are efficient enough to have accounted for these low correlations. If the stock market is truly 'informationally efficient', the advantageous portfolio impacts of utilities will be priced in – the prices will rise because the markets recognizes the portfolio benefit of owning these stocks. If this were the case, the future returns on utilities will be less rosy. In particular, the Capital Asset Pricing Model (CAPM) asserts that any low-Beta assets must have low expected return for this reason. I am not, however, a big believer in this form of market efficiency. The climate is changing, both as a result of natural influences and human activity. The

global demand for electricity and fuels is also variable (as well as monotonically increasing), and the means for production are changing too. Further, the development of transmission assets that would lower the spatial heterogeneity in wholesale prices of electricity are lagging behind the growth in demand (see the reference at the end of this paper for more information on this topic). On top of this, we have an evolving regulatory environment that increases uncertainty. In summary, then, I feel that sources of uncertainty are such that the capital markets have not already 'priced in' the remarkably powerful diversification benefits of owning utilities.

Before leaving this topic, let's be clear that I am in no way advocating an 80% utilities portfolio. I note this because I invariably get emails from readers challenging illustrative portfolios such as the one discussed here. What I am saying is that utilities have some very special features that justifies being 'overweight' in this sector.

Note: for those who want more information on electrical congestion / transmission issues, the following monograph is very interesting:

http://www.ornl.gov/~webworks/cppr/y2001/rpt/114177.pdf

Disclosure: the author owns shares in DUK and EXC