Finance and Economics in Current Utility Markets: Implications for Distributed Generation

Steve Kihm, CFA
Principal and Chief Economist

January 22, 2016
Which is the “Best” Pathway Forward?

1. Eliminate all fossil fuel subsidies.
2. Strengthen Federal and State policy incentives, like rebates and tax credits for household and commercial adoption.
3. Eliminate all energy subsidies and let the market work.
4. Eliminate all energy subsidies and establish a carbon tax.
5. Ramp up Federal “clean” energy R&D.
6. Rely on State regulations to require utilities to meet targets.
7. Rely on the Clean Power Plan to induce virtuous cascade.
8. Eliminate utility franchise areas and permit full customer choice.
Power got more expensive

The end of the Insull era 1973

Following the OPEC oil embargo electricity prices began to increase.
Power Got Expensive; Investors Got Nowhere

Dow Jones Utility Index
1965 - 1985
At the turn of the century, Wisconsin utilities expected sales to grow at 2.3% per year
(Source data: 2013 Wisconsin Energy Statistics)
They didn't

(Source data: 2013 Wisconsin Energy Statistics)

Gap = 16.9 billion kWh/year
How did utility stocks fare?
Are Utilities in Financial Trouble? **Not now**

- Basic Materials
- Consumer Discretionary
- Consumer Staples
- Energy
- Financials
- Health Care
- Industrials
- Technology
- Utilities

10-Year Annualized Total Stock Returns
3M Corp Cash Flows
The business finances itself

Cash flow from operations

much more money comes in than the company needs to sustain itself financially

Capital spending

$7,000
$6,000
$5,000
$4,000
$3,000
$2,000
$1,000
$-

3M Corp Cash Flows
Net cash returned to investors

because it generates so much excess cash flow
3M can use it to:

(1) pay off debt
(2) pay dividends
(3) buy back some of its stock
MGE Energy Cash Flows
It needs external capital

cash flow from operations

capital spending

due to high capital requirement (which occur even if the utility’s sales aren’t growing) there is often not enough cash coming in to meet reinvestment needs

In many years MGE’s net return of cash is negative (meaning that it raised more new capital than it returned to investors).
Follow the cash: 3M Corp, past 10 years (net)

IN $50 billion

REINVEST $19 billion 37%

INVESTORS $31 billion
Follow the cash: MGE, past 10 years (net)

IN $1,091 million

REINVEST $927 million 85%

INVESTORS $98 million
## Cash Flow

**View:** Annual Data  |  Quarterly Data  
---|---

### Period Ending

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Market evolution and regulatory reform
Electric Industry Structure and Regulatory Responses in a High Distributed Energy Resources Future

Steve Cornelis

Steve Kihm, Seventhwave

Project Manager and Technical Editor:
Lisa Schwartz, Lawrence Berkeley National Laboratory
Two dimensions capture key features of natural monopolies, markets and non-market social values:

- **Pricing power** (the ability to set prices at or above effectively competitive levels and)
- **The social benefits of integration** (due to economies of scale, scope, integration or network).

This framework encompasses and distinguishes natural monopolies, markets, “public good” type market failures, and legally sanctioned or strategic monopolies, as well as intermediate industry structures, and can help identify appropriate policy and regulatory approaches. It also can capture the role of innovation in increasing societies’ overall wealth while reducing negative externalities.
Policy analysis and experience suggest different institutional structures depending on the combination of these characteristics.
Various industries and organizations can be effectively located in this space. Note synergies from right to left.
The power sector can also be seen more clearly in this framework -- both the institutional changes of the last 15 years (green arrows) and potential impacts of DERs (blue dotted arrows).
Applying an accurate financial framework
YOU GET WHAT YOU PAY FOR:

Moving Toward Value in Utility Compensation

PART ONE – REVENUE AND PROFIT

Steve Kihm, principal and chief economist, Seventhwave
Ron Lehr, director, Western Grid Group
Sonia Aggarwal, director, America’s Power Plan
Edward Burgess, program manager, Utility of the Future Center, Arizona State University

June 2015
STOCK PRICE FORMATION

Value flows from the gap between the return on equity \( r \) and the cost of equity \( k \) expressed explicitly in stock pricing formulas, such as this one\(^{20}\):

\[
P = BV + \frac{(r - k)BV}{k - g}
\]

In this model, \( P \) represents the stock price, \( BV \) is the accounting book value, and \( g \) is the long-run growth in residual earnings.\(^{21}\) It is the difference between the return on equity and the cost of equity \( (r - k) \) that we focus on here. The larger the gap between \( r \) and \( k \), the greater the value opportunity per dollar of capital invested.
If regulators set the return on equity at the cost of equity, utility stocks would trade at book value.

\[
P = BV + \frac{(k - k)BV}{k - g} = BV + 0 = BV
\]
• MGE Energy
  • Stock price $46.65
  • Book value $20.00

• WEC Energy Group
  • Stock price $52.94
  • Book value $27.45

• Alliant Energy
  • Stock price $61.76
  • Book value $31.95

• Xcel Energy
  • Stock price $36.26
  • Book value $20.90

stock price exceeds
book value

returns on equity must be
noticeably higher than the
cost of equity—and that’s OK
Recent estimates

• Value Line median estimated electric utility ROE 10.0%

• Estimated cost of equity using finance principles 7.8%

• Both seem reasonable (even though most people in the industry would say the cost of equity is about 10%--but there must be a gap between \( r \) and \( k \) given the relationship between stock prices and book value)
McKinsey & Co on risk and the cost of equity

Investors require compensation only for risks they cannot diversify away. The risks they cannot diversify away are those that affect all companies—for example, exposure to economic cycles [interest rates, inflation, recession—not distributed generation]. Since most of the risks that companies face are in fact diversifiable, most risks don’t affect a company’s cost of equity.
Risk Principles for Public Utility Regulators (Public Utility Regulation) Paperback

2016
by Janice A. Beecher (Author), Steven G. Kihm (Author)

► See all formats and editions

Paperback $29.95

1 New from $29.95

Risk and risk allocation have always been central issues in public utility regulation. Unfortunately, the term “risk” can easily be misrepresented and misinterpreted, especially when disconnected from long-standing principles of corporate finance. This book provides those in the regulatory policy community with a basic theoretical and practical grounding in risk as it relates specifically to economic regulation in order to focus and elevate discourse about risk in the utility sector in the contemporary context of economic, technological, and regulatory change. This is not a “how-to” book with regard to calculating risks and returns but rather a resource that aims to improve understanding of the nature of risk. It draws from the fields of corporate finance, behavioral finance, and decision theory as well as the broader legal and economic theories that...
Technical aside:

Today’s presentation discusses the effect of risk on equity holders. The impact on debt is more complicated. (see book)
How does risk affect utility stock prices?

Price of stock = \frac{\text{Expected cash flow}}{\text{Cost of equity}} \leftrightarrow \begin{align*} &\text{Firm-specific and sector-specific risks affect this} \\ &\text{Systematic risk affects this} \end{align*}
How does risk affect utility stock prices?

Most of the risk associated with distributed generation resides here...

\[
\text{Price of stock} = \frac{\text{Expected cash flow}}{\text{Cost of equity}}
\]

\(\leftarrow\)

Firm-specific and sector-specific risks affect this

Systematic risk affects this

...not here
Question

• Is the cost of equity for utilities today:
  • 10 to 11% (all risk in cost of capital)
  • 7 to 8% (only macroeconomic risk in cost of capital)

• Is the long-term growth in utility dividends likely to:
  • track GDP growth (5.0%)
  • lag GDP growth (3.8%)
Stock prices track underlying financial growth. Do utilities keep track with GDP?

No.
Question

• Is the cost of equity for utilities today:
  • 10 to 11% (all risk in cost of capital)
  • 7 to 8% (only macroeconomic risk in cost of capital)

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Morningstar on WEC Energy Group

- We forecast $7.5 billion in capital expenditures through 2019, in line with management expectations, and rate-base growth in line with our long-term earnings forecast. **We use a 7.5% cost of equity** and a 5.6% weighted average cost of capital in our discounted cash flow valuation.
Authorized returns on equity lie above the cost of equity—as they should—when compared to CFOs' estimates for costs of equity.
Alfred Kahn on the return on equity

• If we set the return on equity = the cost of equity (the minimum) we do not promote economic progress

• The rate of return must fulfill what we may term an institutional function: it somehow must provide the incentives to private management that competition and profit-maximization are supposed to provide in the nonregulated price economy generally.

Don’t confuse my comments on cost of equity with notions of return on equity—current levels of that variable are fine (the key is that it’s a different variable).
THE COST OF CAPITAL:
MISUNDERSTOOD, MISESTIMATED AND MISUSED!

Aswath Damodaran
Why stockholders care only about macro risks

- Competition Scenario 1
  - Solar City: up 40%
  - Utilities: down 40%

- Competition Scenario 2
  - Solar City: down 40%
  - Utilities: up 40%

It’s the net effect across all stocks in institutional investor portfolios that matter to investors.

Little net impact on portfolio
Why stockholders care only about macro risks

- Competition Scenario 1
  - Solar City: up 40%
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- It’s the net effect across all stocks in institutional investor portfolios that matter to investors

- Macro Scenario-recession
  - Solar City: down 40%
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big net impact on portfolio
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this is a real risk to the utility, but not to its equity investors
Why stockholders care only about macro risks

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  • Solar City down 40%
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this is a real risk to the utility, and to its equity investors
Why stockholders care only about macro risks

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- It’s the net effect across all stocks in institutional investor portfolios that matter to investors
Who understands the cost of equity concept?

McKinsey & Co—only macro risks matter to equity investors

OR

Those who think all risks affect the cost of equity
MGE Energy \( (k = 10.0\%; \ g = 5.0\%) \)

\[
P = B + \frac{(r - k)B}{k - g}
\]

\[
P = \$20.00 + \frac{(0.130 - 0.100)\$20.90}{0.100 - 0.05} = \$32.00
\]
WEC Energy Group (k = 10.0%; g = 5.0%)

all risk here

track GDP

\[ P = B + \frac{(r - k)B}{k - g} \]

\[ P = \$27.45 + \frac{(0.110 - 0.100)\$27.45}{0.100 - 0.05} = \$32.94 \]
Alliant Energy ($k = 10.0\%; \ g = 5.0\%)$

\[ P = B + \frac{(r - k)B}{k - g} \]

\[ P = \$31.95 + \frac{(0.115 - 0.100)\$31.95}{0.100 - 0.05} = \$41.54 \]
Xcel Energy (k = 10.0%; g = 5.0%)  

\[ P = B + \frac{(r - k)B}{k - g} \]

\[ P = $20.90 + \frac{(0.100 - 0.100)\$20.90}{0.100 - 0.05} = $20.90 \]
MGE Energy \((k = 7.8\%; \ g = 3.8\%\) )

only macro risk here  \hspace{1cm} normal growth

\[
P = B + \frac{(r - k)B}{k - g}
\]

\[
P = \$20.00 + \frac{(0.130 - 0.078)\$20.00}{0.078 - 0.038} = \$46.00
\]
WEC Energy Group (k = 7.8%; g = 3.8%) only macro risk here normal growth

\[ P = B + \frac{(r - k)B}{k - g} \]

\[ P = \$27.45 + \frac{(0.110 - 0.078)\$27.45}{0.078 - 0.038} = \$49.41 \]
Alliant Energy \((k = 7.8\%; \ g = 3.8\%)\)

\(P = B + \frac{(r - k)B}{k - g}\)

\[P = 31.95 + \frac{(0.115 - 0.078) \times 31.95}{0.078 - 0.038} = 61.50\]
Xcel Energy (k = 7.8%; g = 3.8%)

only macro risk here  normal growth

\[ P = B + \frac{(r - k)B}{k - g} \]

\[
P = \$20.90 + \frac{(0.100 - 0.078)\$20.90}{0.078 - 0.038} = \$32.40
\]
MGE Energy value estimates

• k = 10.0%; g = 5.0% (all risk in k; grow at GDP) $32.00
• k = 7.8%; g = 3.8% (only macro risk in k; normal growth) $46.00

• Actual stock price $46.65
WEC Energy value estimates

• k = 10.0%; g = 5.0% (all risk in k; grow at GDP) $32.94
• k = 7.8%; g = 3.8% (only macro risk in k; normal growth) $49.41

• Actual stock price $52.94
Alliant Energy value estimates

• $k = 10.0\%; \ g = 5.0\% \ (all \ risk \ in \ k; \ grow \ at \ GDP) \ \ \ \ 41.54$

• $k = 7.8\%; \ g = 3.8\% \ (only \ macro \ risk \ in \ k; \ normal \ growth) \ \ \ \ 61.50$

• Actual stock price \ \ \ \ 61.76
Xcel Energy value estimates

• k = 10.0%; g = 5.0% (all risk in k; grow at GDP) $20.90
• k = 7.8%; g = 3.8% (only macro risk in k; normal growth) $32.40

• Actual stock price $36.26
McKinsey & Co on risk

The unique risks that any particular company faces of say running into trouble or, even worse, bankruptcy (which clearly destroys shareholder value) are **not priced into the cost of equity**.
How does risk affect utility stock prices?

Most of the risk associated with distributed generation resides here...

\[
\text{Price of stock} = \frac{\text{Expected cash flow}}{\text{Cost of equity}}
\]

\[\iff\]

\[\iff\]

\[\iff\]

Distributed generation is a real threat to utilities and it can affect the value of their stocks. It just doesn’t affect the cost of equity. That’s Finance 101.
This is not a new idea

• A geologist looking for oil worries about the risk of a dry hole
• A pharmaceutical manufacturer worries about the risk of a new drug
• The owner of a hotel in a foreign country worries about expropriation
This is not a new idea

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Are these risks that the firm should worry about? Absolutely
This is not a new idea

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Are these risks that equity investors would worry about?  No
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Are these risks that equity investors would worry about?

No

The bad outcomes we cited appear to reflect unique risks that would not affect the rate of return demanded by investors. They affect cash flows.
McKinsey & Co on risk

Companies certainly do need to worry about the affects that are not macro-related, even though those risks don’t affect the cost of equity.

It’s all about **cash flow risk**.
distributed generation ultimately will affect the ability of utilities to earn returns (or create more opportunities for utilities to earn them)

\[ P = BV + \frac{(r - k)BV}{k - g} \]

but will not affect the cost of capital
capital will continue to flow even if risk lowers the return utilities will earn

\[ P = BV + \frac{(r - k)BV}{k - g} \]

but investors will expect to earn the same return as they did before the risk increase
capital will continue to flow even if risk lowers the return utilities will earn to make this happen the stock price must decline

$$P = BV + \frac{(r - k)BV}{k - g}$$

but investors will expect to earn the same return as they did before the risk increase
Utilities can raise capital even if they earn less than the cost of equity, but can do so only at the expense of their existing investors.
Utilities can raise capital even if they earn less than the cost of equity, but can do so only at the expense of their existing investors.

We don’t want this to happen.

It’s not fair.

But utilities can raise, and have raised, capital when it happens.

Whether they would do so willingly is a reasonable question.
The constraints here are institutional (regulators required to authorize a fair return) and managerial (executives want to protect existing investors), not a capital market restriction.
Takeaway

• If we don’t understand finance principles, we will have a hard time developing sound strategies relating to distributed generation
• Knowing how risk affects value is critically important
• Knowing how capital flows is essential
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• If we don’t understand finance principles, we will have a hard time developing sound strategies relating to distributed generation
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• Are we getting this?

• What are the implications for distributed generation?