2014 Outlook

PJM General Session

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Executive Director
UBS Investment Research

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Analyst Certification and Required Disclosures Begin on Page 24

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February 12th, 2014
Who Am I?

- Sellside Equity Research regularly publish reports on publicly traded, including *regulated and integrated utilities and IPPs*

- *Please email me after if you would like to be added to our research distribution list*
Where are we today?

Power Prices (and Markets) Under Pressure

- Load Growth Tepid (or Not)
- Gas Prices Remain Low (for Longer?)
- Renewables Build Continues Unabated (in fact with vigor)
- Substantial Retirements and New Build Will Continue
  - PJM must *enable* this transition, while *maintaining* reliability

*Source: Platts*
Structural or Cyclical Headwind in Gas Prices?

Dramatic fall in Delivered Cost of Gas

- When will the gas takeaway issues get resolved?

Source: Platts
Is PJM "West" Next?

Gas development could yet spread to Utica (and beyond?)

- Utica production remains strong, but liquids-rich
  - 'Associated' gas is the key
- Repurposing of REX Pipeline to reverse flow? 2015 is the bifurcating year.
- Beware Ohio Coal Generators….

Chicago Citygate ($/MMBtu)  
Dawn Hub ($/MMBtu)

Source: Platts
Gas Constraints to Save the Day?

Where are we today?

- Has been the case in NY and New England for Some Time…

![Graphs showing seasonal onpeak prices](source: Platts and UBS estimates)
Adding PJM to that List

Winter Eclipses Summer for 'Value' Argument

- Commodity Recovery *Rather* Than Power Supply/Demand (Heat Rate) Recovery?

![PJM West Seasonal Onpeak Prices ($/MWh)](chart)

Source: Platts and UBS estimates
The Renewables Are Coming

Watch Out!

- Robust outlook for new renewables
  - *Rush* to the door on PTC expiration
  - *Robust* capacity factor expectations

- Effectively equivalent to new gas assets being added to market
  - Compare to Europe?
    1) No demand growth, but new supply based on subsidies
    2) PTCs drive negative prices

- Where is this relevant?
  - Particularly in California: duck chart
  - Midwest: Total MWhs added matter
  - Flexibility attributes will increasingly matter

- No fuel costs to renewables
  - Increasing penetration will driven prices down, *below* that of other fuel sources
  - Akin to nuclear assets, with limited marginal costs

-> *Subsidized Renewables*.. *Not Subsidized Gas*?
## Renewables: Exceeding Demand?

Cumulative US build exceeds forecasted EIA demand growth through 2020

### Incremental Renewable Requirements vs. Projected Incremental Retail Sales (GWh)

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AZ</td>
<td>3,784</td>
<td>9,283</td>
<td>5,499</td>
</tr>
<tr>
<td>CA</td>
<td>57,231</td>
<td>21,834</td>
<td>(35,398)</td>
</tr>
<tr>
<td>CO</td>
<td>5,715</td>
<td>7,193</td>
<td>1,478</td>
</tr>
<tr>
<td>CT</td>
<td>1,456</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>1,162</td>
<td>373</td>
<td>(789)</td>
</tr>
<tr>
<td>HI</td>
<td>1,667</td>
<td>519</td>
<td>(1,148)</td>
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<tr>
<td>IA</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>IL</td>
<td>17,077</td>
<td>7,229</td>
<td>(9,848)</td>
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<tr>
<td>KS</td>
<td>3,140</td>
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<td>(1,857)</td>
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<tr>
<td>MA</td>
<td>5,944</td>
<td>2,709</td>
<td>(3,235)</td>
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<tr>
<td>MD</td>
<td>6,882</td>
<td>2,069</td>
<td>(4,813)</td>
</tr>
<tr>
<td>ME</td>
<td></td>
<td>557</td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td>11,218</td>
<td>3,624</td>
<td>(7,594)</td>
</tr>
<tr>
<td>MO</td>
<td>4,259</td>
<td>2,221</td>
<td>(633)</td>
</tr>
<tr>
<td>MT</td>
<td>1,589</td>
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<td></td>
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<tr>
<td>NC</td>
<td>8,162</td>
<td>9,968</td>
<td>6,574</td>
</tr>
<tr>
<td>NH</td>
<td>1,650</td>
<td></td>
<td>1,320</td>
</tr>
<tr>
<td>NJ</td>
<td></td>
<td>2,500</td>
<td></td>
</tr>
<tr>
<td>NM</td>
<td>2,850</td>
<td>2,854</td>
<td></td>
</tr>
<tr>
<td>NV</td>
<td>680</td>
<td>4,201</td>
<td>3,321</td>
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<tr>
<td>OH</td>
<td>10,695</td>
<td>7,829</td>
<td>(2,866)</td>
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<tr>
<td>OR</td>
<td>6,252</td>
<td>5,435</td>
<td>(817)</td>
</tr>
<tr>
<td>PA</td>
<td>6,404</td>
<td>4,858</td>
<td>(1,566)</td>
</tr>
<tr>
<td>RI</td>
<td></td>
<td>377</td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WA</td>
<td>4,713</td>
<td>10,799</td>
<td>6,087</td>
</tr>
<tr>
<td>WI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>159,884</td>
<td>111,340</td>
<td>(62,068)</td>
</tr>
<tr>
<td><strong>Total without CA</strong></td>
<td>102,852</td>
<td>89,507</td>
<td>(26,671)</td>
</tr>
</tbody>
</table>

### Notes:
- Utilized SNL data for the 2011 Compliance Data as there was no data reported from the states.

- Assumes Build out to Existing RPS Standards
  - Some states poised to increase?
  - Will likely be regionally concentrated

Source: LBNL, SNL, and UBS estimates

Source: EIA, Berkeley National Laboratory
On the (Bleeding) Edge

Negative Hours of Pricing are growing

- Power Prices are even *negative* for growing portion of time due to Production Tax Credits (PTCs)
- Negative Pricing pushes intersection of renewable policy against de-carbonization policy
  - Offsetting subsidies to 'save the nukes' will be state-driven?

### Quad Cities Day Ahead LMP Prices

<table>
<thead>
<tr>
<th>Year</th>
<th># hours with negative pricing</th>
<th>average negative price ($/MWh)</th>
<th>% of hours with negative prices</th>
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</thead>
<tbody>
<tr>
<td>2006</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>2007</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>2008</td>
<td>20</td>
<td>(2.57)</td>
<td>0.23%</td>
</tr>
<tr>
<td>2009</td>
<td>129</td>
<td>(4.12)</td>
<td>1.47%</td>
</tr>
<tr>
<td>2010</td>
<td>213</td>
<td>(6.11)</td>
<td>2.43%</td>
</tr>
<tr>
<td>2011</td>
<td>133</td>
<td>(3.39)</td>
<td>1.52%</td>
</tr>
<tr>
<td>2012</td>
<td>337</td>
<td>(7.77)</td>
<td>3.85%</td>
</tr>
<tr>
<td>2013</td>
<td>101</td>
<td>(15.35)</td>
<td>1.15%</td>
</tr>
</tbody>
</table>

Source: PJM. **2013 is YTD**

### Quad Cities Average LMP Prices ($/MWh)

<table>
<thead>
<tr>
<th>Year</th>
<th>Average LMP ($/MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>41.02</td>
</tr>
<tr>
<td>2007</td>
<td>44.17</td>
</tr>
<tr>
<td>2008</td>
<td>48.07</td>
</tr>
<tr>
<td>2009</td>
<td>25.23</td>
</tr>
<tr>
<td>2010</td>
<td>27.87</td>
</tr>
<tr>
<td>2011</td>
<td>27.09</td>
</tr>
<tr>
<td>2012</td>
<td>20.71</td>
</tr>
<tr>
<td>2013</td>
<td>25.36</td>
</tr>
</tbody>
</table>

Source: SNL

2013 as of Oct, 2013
Zero Marginal Cost?

The Future of Power Markets

- Markets will need to respond to these signals
- Does the future look more like energy or capacity markets
  - Intermittency and operational metrics will matter more
  - How will 'merchant' renewables ever be incentivized? Not with Energy?
- Still does not bode well for steam generation based technologies
  - Nuclear and Coal remain fragile
- Capacity markets appropriately redirect compensation towards fixed payments
  - Infrastructure business naturally attempts to match duration of assets with cash flows
PJM is an example of success.

No, the market is not broken.

- Is it really distressed? No.
- It's not (primarily) about new, but retaining existing capacity
  - Latest build out of merchant gas plants under RPM underlines confidence
  - Most amount of new build since the last build cycle without immediate demand growth? Mostly premised on spark spread expansion
- PJM has proven to be the litmus test for other market constructs
  - Poster child for how to think about restructured markets globally
  - Demand Response savings have been substantial
- What is the appropriate compensation?

→ Would any other restructured have survived MATS implementation?
But Market is Migrating Towards Scarcity Price Focus

Greater energy price volatility using cheaper capacity resources?

- Reality appears to be trending towards 'peakier' value
  - Capacity construct compensates 'higher marginal cost' units the same
- Ultimate total cost of compensation should be the 'same'
  - Complementary energy and capacity compensation

### PJM ‘Maximum’ Potential Power Price Summary and Estimated Uplift to ATC prices($/MWh)

<table>
<thead>
<tr>
<th>Period</th>
<th>Resource Offer Cap</th>
<th>Penalty Factor for LMPs</th>
<th>Maximum Potential Shortage Price (Offer Cap + 2 * Penalty)</th>
<th>Assuming hit cap ~2 hours/year</th>
<th>Uplift to ATC Prices vs. Offer Cap-Only Energy Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 2012-May 2013</td>
<td>$1,000</td>
<td>$250</td>
<td>$1,500</td>
<td>$3,000</td>
<td>0.11</td>
</tr>
<tr>
<td>June 2013-May 2014</td>
<td>$1,000</td>
<td>$400</td>
<td>$1,800</td>
<td>$3,600</td>
<td>0.18</td>
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<tr>
<td>June 2014-May 2015</td>
<td>$1,000</td>
<td>$550</td>
<td>$2,100</td>
<td>$4,200</td>
<td>0.25</td>
</tr>
<tr>
<td>June 2016+</td>
<td>$1,000</td>
<td>$850</td>
<td>$2,700</td>
<td>$5,400</td>
<td>0.39</td>
</tr>
</tbody>
</table>

Source: PJM and UBS estimates
What's the Fuss about in MISO?

Vertically Integrated Markets will ultimately solve their issues

- Is it really **distressed**? Not in our opinion.
- RFPs have been suggesting less need.
  - Limited build plans from utilities
- *Under*-connected: a transmission solution?
- The **Problem** remains the 'seams' between restructured and regulated markets
  - No issue with transmission interconnectivity
  - It’s the interaction between markets
- Need to **increasingly** bifurcate black and white regulatory compacts
  - Cross-subsidization occurs
Permissible Bidding Strategies are Key!

**Focus on what retiring units are allowed to bid**

- Trend in a market without load growth is *towards Free Cash Flow Breakeven*
  - The question is about asset rationalization to meet load forecast, NOT new entry
  - One capacity source is *cannibalizing another* with a lower fixed cost structure

- The key questions remains what are permissible bidding strategies by participants
  - What is *my appropriate variable cost*?
  - *Recovery ON and OF Capital*: That is to say:
    1) 'Return on Equity'
    2) Depreciation
What will the corporates do?

Bifurcation in the sector

• Seeing the gradual De-Integration of the Sector?
  – Many companies in PJM never required divestment
  – Investment profile increasingly bifurcated:
    --> Regulated Utility ideal is stable dividend
    --> Merchant Business Model emphasizes commodity leverage
  – Will see this continue to unfold in coming year:
    PPL, AEP, DUK… eventually others to follow? What will EXC do?

• All about valuation arbitrage between metrics
  – EV/EBITDA vs. P/E Equity Valuations
  – *What is a Business worth that*: 
    a) generates no earnings? 
    B) generates no cash?

• Does current capitalization to enable a **spin** or **sale**?
Is There a Bid for Yield?

Contracted Generation Model Vindicated

- Success of NRG Yield heralds new focus
  - Contracted IPP Business model, primarily for renewables

- Bifurcation in equity markets between those with dividend and those without
  - Increasing premium for dividend growth

- Is it sustainable?
  - Accretive to acquire.. Until it's not.
  - Depleting assets? Contracts are 'above-market' by design.
  - Contract tenor: what's the coverage
Looking at the Regional Markets Outlook

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Let's Compare PJM to Other Markets

- More Reforms on the Way
  - What is going to happen? *Seems positive for RTO*
  - *MAAC should continue to see pressure given new builds*

- Fundamental upside limited by *new entrants, and return of capacity*

- Will Edison Mission portfolio retire now? *Unclear!*

- Power Price Outlook: *Bifurcated towards peak?*
New York: *How* to bring back capacity?

- Market concentration leads to questions of contracting for un-mothballing
  - **PJM Lesson:** Should MOPR rules be re-applied here to bring back capacity?

- What assets are in question?
  1. NRG’s Bowline (under GenOn subsidiary)
  2. Danskammer (Former Dynegy)
  3. USPowerGen’s 20 and 40 units at Astoria (Will be Tenaska)

- NYPSC turning to a market solution:
  - Is this just an attempt to limit consumer inflation, given higher demand curve
  - *Or* a real turn in commitment to restructured markets?

- **Cheaper** than new build, *but* question is do you want to keep old assets around?
  - Bring *back* NRG Bowline or allow NRG to *repower* to a new CCGT in Astoria
  - Pricing on contract needs to out-weigh new entrant costs
New England: And Then The Purge Happened…

- Rationalization is happening *prior* to the floor going away
  - Brayton Point, Vermont Yankee, Norwalk, Demand Response
  - Other Oil Capacity *could have followed in February auction for 2017/18?*

- Other static de-list bids could bring some stability to market
  - But trend here is again, *back to cash flow break-even*

- **Saw pricing hit new levels (1.1x Net CONE = ~$7/kW-month)**
  - Illustrates need for sloped demand curve
  - Vertical demand curve leads to Boom-and-Bust
  - Be a leader in design of 'market' approaches to Firm Fuel?

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### Latest ISO-NE FCM Capacity Auction Results

<table>
<thead>
<tr>
<th>ISO New England FCM Results</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>2016/17</th>
<th>2017/18</th>
<th>2016/19</th>
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<tbody>
<tr>
<td>FCA Auction #</td>
<td></td>
<td></td>
<td></td>
<td>4-Feb-13</td>
<td>4-Feb-13</td>
<td>3-Feb-14</td>
<td></td>
</tr>
<tr>
<td>Auction Date</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period (Years)</td>
<td>2013/14</td>
<td>2014/15</td>
<td>2015/16</td>
<td>4-Feb-13</td>
<td>2016/17</td>
<td>2017/18</td>
<td>2016/19</td>
</tr>
<tr>
<td><strong>CONE (Updated)</strong></td>
<td>4.918</td>
<td>5.349</td>
<td>5.723</td>
<td>8.05</td>
<td>8.39</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Increase</strong></td>
<td>9%</td>
<td>7%</td>
<td>7%</td>
<td>6%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clearing Price, $/kW-month</td>
<td>2.85</td>
<td>3.21</td>
<td>3.43</td>
<td>3.15</td>
<td>7.025</td>
<td>2.50</td>
<td></td>
</tr>
<tr>
<td>Cost of Firm Capacity</td>
<td>2.52</td>
<td>2.88</td>
<td>3.13</td>
<td>2.88</td>
<td>7.025</td>
<td>2.50</td>
<td></td>
</tr>
<tr>
<td>NEMA (Boston Clearing Price)</td>
<td>82.72</td>
<td>94.03</td>
<td>102.87</td>
<td>94.78</td>
<td>230.96</td>
<td>230.96</td>
<td>82.19</td>
</tr>
<tr>
<td>$/MW-day Equivalent</td>
<td>219</td>
<td>493</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

*Source: ISO-NE and UBS estimates*
And the Basis Continues to Get Wider

**Pinch Point Approaching in ~2015…**

- Gas basis $3-4/MMBtu, with Nominal Price back to ~$8/MMBtu in 2015
  - Positive impact to heat rates / power prices
  - Transient phenomenon: solved with *either* electric transmission or gas midstream

  'Gas by Wire' Solution? HQ as well? … Governor's RFP is worth watching closely

- **Be Careful of Inadequate Gas Policy Driving Undesirable Effects on Power Markets**
  - Need for real resolution of underlying inability to fund gas pipeline Firm Transport

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**Algonquin Gas Basis ($/MMBtu)**

**Mass Hub On-Peak Power Prices ($/MWh)**

*Source: Platts*
California: Same Story on Keeping Generation 'Around'

- More (renewable) supply = Lower Power Prices
- Question of Energy Storage
  - What will the CPUC's latest 1.4GW procurement lead to?
- Will the once-through cooling rules hold out?
  - This is the only key to price recovery— and only for flexible capacity
  - **PJM Lesson: Focus on Intermittency Implementation**

NP15 Spark Spreads ($/MWh)

![Graph showing NP15 Spark Spreads](source: Platts)

![Graph showing California's infamous 'Duck Chart'](source: CAISO)
ERCOT: Lessons from the Energy-Only Structure?

What can be gleaned from the experience in the South

- Supply Additions: *Still* Coming?
  - If you believe in integrity of markets, can attract super-low capital costs?

- Demand Drives a return to New Entrant Economics?
  - Without it, do markets trend towards going forward costs?

- But without a capacity market
  - What is the long-term reserve margin of a market without a capacity construct?
  - Are counting on Demand Response to fill their projected void?

- Growing renewable penetration with better transmission pushes need for Flexibility
  - Is the reason they ultimately pursue a new market structure?
Risk Statement

- Risks for Utilities and Independent Power Producers (IPPs) primarily relate to volatile commodity prices for power, natural gas, and coal. Risks to IPPs also stem from load variability, and operational risk in running these facilities. Rising coal and, to a certain extent, uranium prices could pressure margins as the fuel hedges roll off Competitive Integrates. Further, IPPs face declining revenues as in the money power and gas hedges roll off. Other non-regulated risks include weather and for some, foreign currency risk, which again must be diligently accounted in the company’s risk management operations. Major external factors, which affect our valuation, are environmental risks. Environmental capex could escalate if stricter emission standards are implemented. We believe a nuclear accident or a change in the Nuclear Regulatory Commission/Environment Protection Agency regulations could have a negative impact on our estimates.

Risks for regulated utilities include the uncertainty around the composition of state regulatory Commissions, adverse regulatory changes, unfavorable weather conditions, variance from normal population growth, and changes in customer mix. Changes in macroeconomic factors will affect customer additions/subtractions and usage patterns.
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**UBS Investment Research: Global Equity Rating Allocations**

<table>
<thead>
<tr>
<th>UBS 12-Month Rating</th>
<th>Rating Category</th>
<th>Coverage</th>
<th>IB Services</th>
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</thead>
<tbody>
<tr>
<td>Buy</td>
<td>Buy</td>
<td>44%</td>
<td>32%</td>
</tr>
<tr>
<td>Neutral</td>
<td>Hold/Neutral</td>
<td>46%</td>
<td>32%</td>
</tr>
<tr>
<td>Sell</td>
<td>Sell</td>
<td>10%</td>
<td>19%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UBS Short-Term Rating</th>
<th>Rating Category</th>
<th>Coverage</th>
<th>IB Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy</td>
<td>Buy</td>
<td>less than 1%</td>
<td>less than 1%</td>
</tr>
<tr>
<td>Sell</td>
<td>Sell</td>
<td>less than 1%</td>
<td>less than 1%</td>
</tr>
</tbody>
</table>

1: Percentage of companies under coverage globally within the 12-month rating category.
2: Percentage of companies within the 12-month rating category for which investment banking (IB) services were provided within the past 12 months.
3: Percentage of companies under coverage globally within the Short-Term rating category.
4: Percentage of companies within the Short-Term rating category for which investment banking (IB) services were provided within the past 12 months.

Source: UBS. Rating allocations are as of 30 September 2013.

**UBS Investment Research: Global Equity Rating Definitions**

<table>
<thead>
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<th>UBS 12-Month Rating</th>
<th>Definition</th>
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<td>Buy</td>
<td>FSR is &gt; 6% above the MRA.</td>
</tr>
<tr>
<td>Neutral</td>
<td>FSR is between -6% and 6% of the MRA.</td>
</tr>
<tr>
<td>Sell</td>
<td>FSR is &gt; 6% below the MRA.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UBS Short-Term Rating</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy</td>
<td>Buy: Stock price expected to rise within three months from the time the rating was assigned because of a specific catalyst or event.</td>
</tr>
<tr>
<td>Sell</td>
<td>Sell: Stock price expected to fall within three months from the time the rating was assigned because of a specific catalyst or event.</td>
</tr>
</tbody>
</table>
Required Disclosures cont’d

- **KEY DEFINITIONS**

- **Forecast Stock Return (FSR)** is defined as expected percentage price appreciation plus gross dividend yield over the next 12 months.
- **Market Return Assumption (MRA)** is defined as the one-year local market interest rate plus 5% (a proxy for, and not a forecast of, the equity risk premium).
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