ThermWise®
Unlocking Customer Potential Through Data

Ted Peterson
Program Manager
Energy Efficiency, Questar Gas
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Agenda

- Introduction to Questar
- Introduction to ThermWise®
- Data efforts
  - ThermWise® Energy Comparison Report
  - ThermWise® Personalized Recommendations
  - Market Analysis
• Investor Owned Utility based in Salt Lake City, Utah
• Trades on the NYSE Under Stock Ticker: STR
• Enterprise Value: $5.5 billion
• 1,720 Employees
Questar Corporation is a growing Rockies-based integrated natural gas company with three complementary lines of business:

**Western United States**
Primarily Utah, Wyoming and Idaho

**Questar Gas** — *delivers* natural gas to nearly 946,000 homes and businesses in Utah, Wyoming & Idaho

**Wexpro** — *develops* low-cost natural gas for Questar Gas utility customers under the 1981 Wexpro Agreement

**Questar Pipeline** — *transports and stores* natural gas in the “heart of the Rockies” with over 2,600 miles of pipe and a 54 Bcf (working gas) storage field

**Questar Fueling** — manages and builds CNG stations for long-haul truckers
Questar Gas Overview

Key Facts & Statistics

Cities served 277
Customers @ 9/30/2014 954,754
Customer growth TTM 9/2014: 16,186 1.7%
Deliveries (TTM 9/30/2014) 189 MMdth
System miles (12/31/2013) 27,861 miles
Rate base (12/31/2013) $1,042 MM
Allowed Utah ROE (beg. 3/1/2014) 9.85%
Allowed equity percentage 52%
Ratings A2 (Moody’s) / A (S&P)
Regulators:
- Public Service Commission of Utah (“PSCU”)
- Public Service Commission of Wyoming (“PSCW”)

EBITDA ($ millions)

Customer base (9/30/2014)

By State
Wyoming 2.9%
Idaho 0.2%

By Revenue
Industrial 4.6%
Other 3.8%

By Volume
Industrial 44.2%
R&C\(^1\) 55.8%

\(^1\) Residential and commercial
Questar Gas’s residential rates are among the lowest in the continental U.S.

$ per Mcf, TTM 7/14; Source: U.S. Energy Information Administration
What is ThermWise?

• Questar Gas’ branding for rate payer funded Energy Efficiency Program introduced in 2007
• To date spent over $200 million
• Over $150 million paid out in incentives
• 3.91 Million Dth Saved to date
ThermWise Programs

• Appliance Rebates $50 - $750
• Builder Rebates $50 to $750
• Business Rebates $25 - $1,000
• Business Custom Rebates $1 / therm for first year after installation or 50% of eligible program costs
• Weatherization Program $.18 / sqft to .32 / sqft
• Home Energy Plan - $25 refundable
• Low Income Programs - $500,000 provided to agencies
• Energy Comparison Report
ThermWise team works with manufacturers, distributors, retailers, builders and others to ensure natural gas equipment is available and installed.

36% of Questar Gas customers had participated in at least 1 ThermWise Rebate program as of September 30, 2014.

According to AGA 2013 survey data, QGC is one of only five natural gas utilities to achieve 20% or greater market participation rates.
Utah Residential Customer Usage Breakdown

- Heating: 65%
- Hot Water: 19%
- Clothes Washing: 6%
- Dishwashing: 6%
- Other: 4%

Typical residential customer 80 Dth per year
Typical customer bill $737.01 per year
69% of gas burned is in the winter five months
Customers pay $19.45 per year for programs

Sample of 10,129 Audits, May 2011
Energ... Energy Comparison Report

• Home Energy Reports – ThermWise® Energy Comparison Report
  – Sent out to over 230,000 customers
  – Using data to educate our customers about their usage & help us better market to them.

![Bar chart showing energy usage comparison]

You used 50% more natural gas last month than your Efficient Neighbors.
## Energy Comparison Report Changes

<table>
<thead>
<tr>
<th>Version Prior to Fall 2014</th>
<th>Fall 2014 Version</th>
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</thead>
<tbody>
<tr>
<td><strong>Elements of Comparison</strong></td>
<td><strong>Improved elements of Comparison:</strong></td>
</tr>
<tr>
<td>- Square Footage Bands (250 increment up to 5,000)</td>
<td>- Square Footage</td>
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<tr>
<td>- Year built (10 year bands)</td>
<td>- Year built</td>
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<tr>
<td>- Closest neighbors within weather zone</td>
<td>- Base load</td>
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<tr>
<td>- Premise to premise comparison</td>
<td>- Peak to base / load factor</td>
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<tr>
<td></td>
<td>- Weather Sensitivity (LRS)</td>
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<tr>
<td></td>
<td>- Use cosine similarity between customers</td>
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<tr>
<td></td>
<td>- Weather zone</td>
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<td></td>
<td>- Service Agreement to Service Agreement Comparison</td>
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</table>
Improvements in Comparison

Company characteristics for comparison has improved with each subsequent rollout.
Improvements in Comparison
Improvements in Comparison
• Cosine Similarity
  – Mathematical formula which guarantees only the most similar customers will be compared
  – Able to quantify similarity between customers and avoid unwarranted comparisons
Upselling

Do you want fries with that?
ThermWise® Rebate Programs
Bob Jones
Customer 1
Cosine = .9

Bob Jones
Customer 2
Cosine = .6

Base load (Normalized Values)

Weather Sensitivity (Normalized Values)
Similarity Computed

A cosine similarity index is computed across five characteristics (Square Footage, Year built, Base load, Peak to base (load factor), Weather Sensitivity (LRS)) for each customer in weather zone by dwelling type.

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<table>
<thead>
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<tbody>
<tr>
<td>Sim (n1, Bob)</td>
<td>0.7</td>
</tr>
<tr>
<td>Sim (n2, Bob)</td>
<td>0.3</td>
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<tr>
<td>Sim (n3, Bob)</td>
<td>0.5</td>
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<tr>
<td>Sim (n4, Bob)</td>
<td>0.4</td>
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<tr>
<td>Sim (n5, Bob)</td>
<td>0.99</td>
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</tbody>
</table>

Bob lives in Salt Lake City
Possible Recommendations

16 possible recommendations across the Weatherization and Appliance Programs
Cosine similarity calculations are considered for all of the possible rebate promotions.

<table>
<thead>
<tr>
<th></th>
<th>Water Heater</th>
<th>Furnace</th>
<th>Insulation</th>
<th>Washer</th>
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<tbody>
<tr>
<td>n1</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
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<tr>
<td>n2</td>
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<tr>
<td>n3</td>
<td>0.5</td>
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<tr>
<td>n4</td>
<td>0.4</td>
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<tr>
<td>n5</td>
<td>0.99</td>
<td>0.99</td>
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<tr>
<td>Average</td>
<td>0.73</td>
<td>0.66</td>
<td>0.53</td>
<td>0.50</td>
</tr>
</tbody>
</table>

For computation purposes in this example only the top three customers who have participated in the measure are included in the average computation.

As part of the recommender the top 100 cosine similarities relative to that customer are averaged.
<table>
<thead>
<tr>
<th>Customer</th>
<th>Furnace</th>
<th>Water Heater</th>
<th>Insulation</th>
<th>Furnace</th>
<th>Fireplace</th>
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![Icon](ThermWise_rebate_programs)
ThermWise Rebate Programs

ThermWise Personalized Recommendations

For residential customers to drive engagement in the program.

Set up Control / Experimental Group for the Program

10,000 – print recipients
10,000 – email recipients

With associated control groups

Will disseminate to customers twice per year.

Evaluation to occur after one year’s time.
Recommender Strategy

- Considerations:
- Expansion to online rebate application process
- Incorporate methodology to Company’s Energy Comparison Report tips.
Market Analysis

- Engaged in a Customer Segmentation Study
- Analytics on customers profiles
- Begin utilizing NAICS codes for business customers.
Conclusion

• Questar Gas is beginning to take advantage of data to further drive savings beyond just the low-hanging fruit

• Questar Gas believes that this effort will further drive savings by new programs, better analysis, and enhanced marketing deployment.
Questions?

Ted.Peterson@questar.com
801-324-2655