

## Mining for New Customers

### Predicting the Probability of Non-Customer Conversions to Gas

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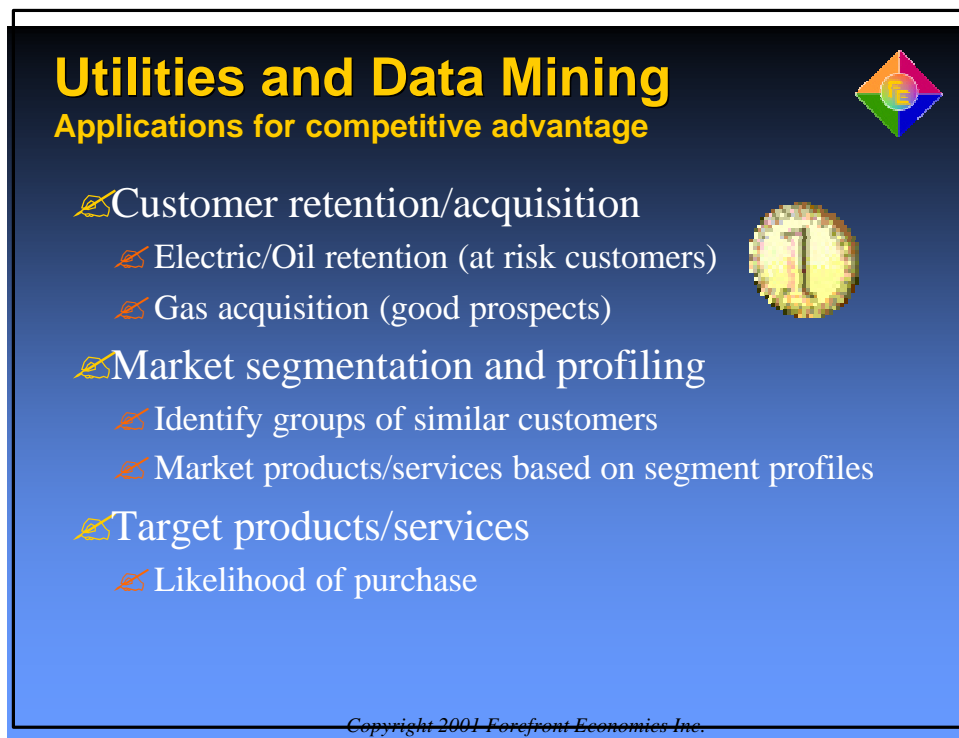
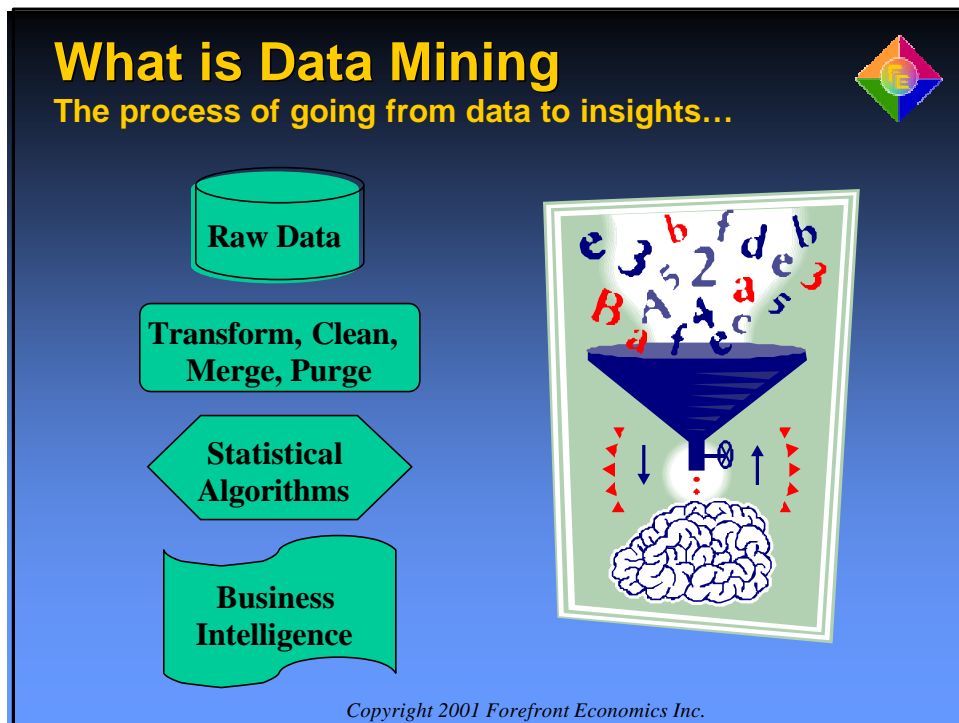
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## Overview



- ✍ Data Mining
  - ✍ What is it (and isn't)
  - ✍ How is it used?
- ✍ Potential energy related applications
- ✍ Case study – customer acquisition
- ✍ Data mining resources

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## **Case Study: NW Natural Gas**

### **Predicting the Probability of Non-Customer Households Conversion to Gas**



- ✍ Develop model to predict conversion propensity
- ✍ Apply model to all non-customers homes in service territory
- ✍ Identify highest probability opportunities
  - ✍ Profile of household characteristics
  - ✍ Examine geographic distribution/concentration
- ✍ Use results for
  - ✍ Targeted marketing for in-fill
  - ✍ Proactive main extension planning

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## **Approach**



- ✍ Sample of 10,000 homes
  - ✍ 5,000 conversions in 1999
  - ✍ 5,000 non-customers on-main
- ✍ Tax assessor records used for attribute data
  - ✍ Attribute rich
  - ✍ Available for all non-customer homes
- ✍ Model the conversion “decision” using house and neighborhood attributes
- ✍ “Score” all non-customers sites for probability of conversion

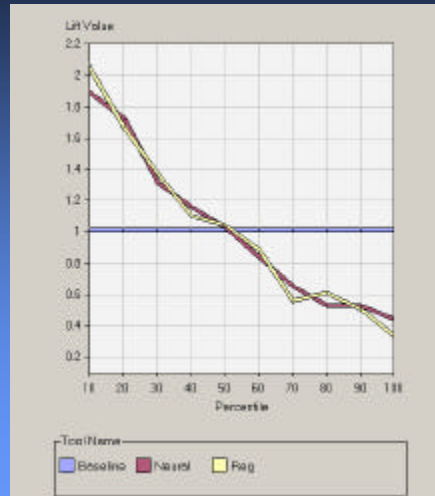
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## Model Assessment

Lift Chart – an important marketing tool.



- ✍ Model lines show “lift” over/under natural conversion rate (baseline)
- ✍ Both models provide substantial “lift”
- ✍ Logistic regression chosen for transparency
- ✍ Visual aid for how “deep” to go into list



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## Predictive Model

Variables in Logistic Regression Model



Variable in Model	Impact on Probability	Statistical Significance
Age of Home	+	Moderate
Relative home values of neighborhood	+	Strong
Ducted home	+	Strong
Fireplace in home	-	Weak
Neighborhood churn (percent turnover)	+	Weak
Owner occupied	+	Strong
Recent sale (last year)	+	Strong
Electric space heat	-	Strong
Oil space heat	+	Strong
Square feet	+	Strong

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## Application of Results



📌 “Score” all non-customer sites

📌 Uses

- 📌 Relative probability
- 📌 Target marketing lists
- 📌 Proactive main-line expansion
  - Target neighborhoods with greatest conversion potential

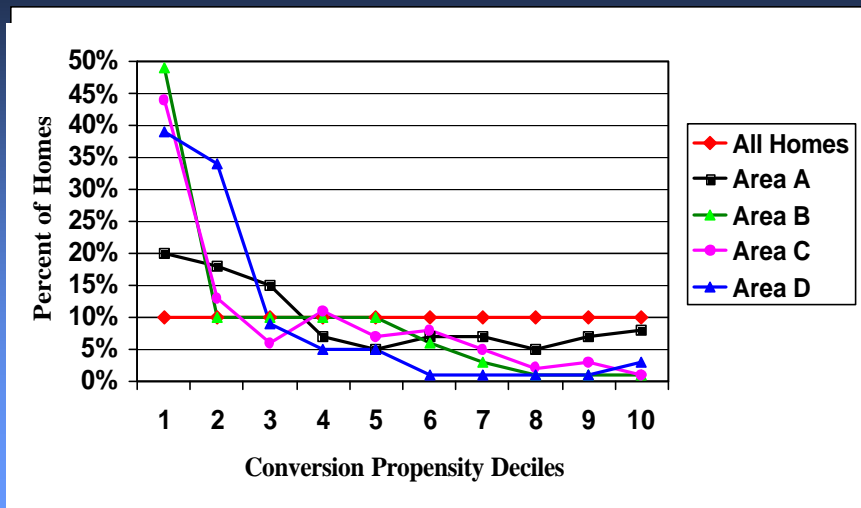
📌 Limitations

- 📌 Absolute probability
- 📌 Who will convert next year
- 📌 How many will convert next year

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## Target Neighborhoods

Areas with concentration of high propensity to convert homes

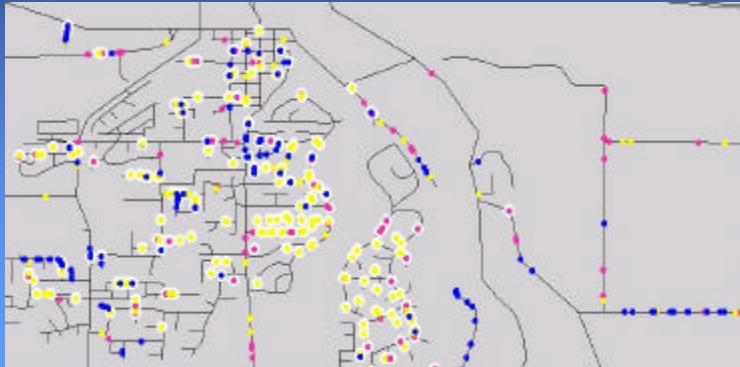


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## Targets identified with GIS



- ✍ Areas of high potential
  - ✍ All dots are non-customers
  - ✍ Blue dots show high potential targets
  - ✍ White dots indicate on-main



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## Deploying Model

**Understanding and using business intelligence.**



- ✍ Demonstrate usefulness to management
  - ✍ Conceptual review
  - ✍ Review of specific areas with current projects
- ✍ Deploy results
  - ✍ Database for development of target marketing campaign
  - ✍ GIS-based marketing system
  - ✍ Main-line expansion opportunity identification
- ✍ Evaluation of results
  - ✍ Anecdotes from field are positive
  - ✍ Higher-than-typical response rates

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## Data Mining Quotes/Axioms



✍️ “Data mining is the discovery of interesting, unexpected, or valuable structures in large data sets”

» David Hand

✍️ If it's interesting or unusual it's probably wrong

» Twyman's law

✍️ “All models are wrong, some are useful”

» George Box

✍️ “If we torture the data long enough, they will confess”

» Unknown

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## Data Mining Resources



✍️ Clearly define objectives

✍️ Secondary data sources

✍️ Assessor data

✍️ Business records

✍️ Data mining software

✍️ The SAS Institute

✍️ SPSS

✍️ Reference

✍️ “Mastering Data Mining: The Art and Science of Customer Relationship Management”, Berry & Linoff



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