Natural Gas
Pipeline / LDC Rates
Natural Gas Pipelines

Legend:
- Interstate Pipelines
- Intrastate Pipelines

Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System
U.S. NATURAL GAS CONSUMPTION (MMCF) BY MONTH (2001-2014 AVERAGE)

- Winter peak
- Shoulder seasons
- Summer peak
Note: MMCF/d= million cubic feet per day. Areas shown are not proportional to capacity volumes indicated. Other natural gas transmission pipelines may interconnect with and supplement the supplies of the mainline transmission or local distribution company in the market area to meet peak period demands.

Source: Energy Information Administration, Office of Oil and Gas
Gas Storage

Diagrammatic cross section of an aquifer storage reservoir:

2. Impermeable cap rock.
3. Upper control aquifer.
4. Gas.
5. Water.
7. Operating well.
9. Upper aquifer observation well.
10. Peripheral observation well.
11. Water level monitoring well.

Burner Tip Price ($/MMBtu) = Wellhead Price + Pipeline Charge + LDC Charge
Delivery Rates

Regulated Utility Tariff Rates

Transmission (Pipeline Charge) → FERC

Distribution (LDC Charge) → State/Local
LDC Rate Case

• Utility files proposed rates and supporting evidence
• Other parties challenge and offer alternatives
• Commission makes decision
Main LDC Rate Case Issues

• Class Cost of Service
  – Volumetric vs. demand allocation

• Revenue Allocation
  – Spread of utility revenue requirement among rate classes
Purpose of a Cost-of-Service Study

To measure the responsibility of each class for the service provided by the utility
Typical Rate Classes in a Cost-of-Service Study

- Residential
- General Service
- Large Volume Service
- Interruptible
- Transportation
Cost Study Should Reflect:

• Many different types of cost
• Some customers do not use all of the services provided by an LDC
• Usage patterns affect cost incurrence
Procedure

1) Identify different types of cost
2) Determine causative basis for each type
3) Allocate each item among classes
Functionalization

COSTS
Return, Non-Gas
O&M Expenses, Depreciation, Taxes

- Production
- Storage
- Distribution
Determine the primary causative factor for each type of cost
Classification Categories

- Direct assignment
- Number of customers
- Commodity (Mcf or therm usage)
- Demand requirements (Maximum rate of usage – Mcf per day)
- Revenue related
Classification of Plant

<table>
<thead>
<tr>
<th></th>
<th>Customer</th>
<th>Demand</th>
<th>Commodity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Storage</td>
<td>❌</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Distribution</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>General</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>
## Classification of Expense

<table>
<thead>
<tr>
<th>Category</th>
<th>Customer</th>
<th>Demand</th>
<th>Commodity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Storage</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Distribution</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Customer Acct.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admin. &amp; Gen.</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
Methods of Allocation

• Cost causation
• “Benefits”
• Social / Political Policy
• End results
Demand Allocation Methods

General Criteria

• Cost causation
• Recognize utility’s load characteristics
• Choice of method can be controversial
Demand Allocation Methods

- Coincident Peak
- Non-Coincident Peak
- Average and Excess
- Average and Peak
- Average Demand
# Coincident Peak Allocation Method

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Mcf</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>54,125</td>
<td>54.00%</td>
</tr>
<tr>
<td>General Serv.</td>
<td>32,000</td>
<td>31.93%</td>
</tr>
<tr>
<td>Interruptible</td>
<td>7,100</td>
<td>7.09%</td>
</tr>
<tr>
<td>Transportation</td>
<td>7,000</td>
<td>6.98%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100,225</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>
Average & Excess Method

System Peak

Excess Demand

Average Demand

Class Peak

Excess Demand

Average Demand
## Average & Excess Method

<table>
<thead>
<tr>
<th></th>
<th>Average Demand %</th>
<th>LF</th>
<th>Excess Demand %</th>
<th>1 - LF</th>
<th>AED %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Res</td>
<td>32.5%</td>
<td>37%</td>
<td>64.9%</td>
<td>63%</td>
<td>52.9%</td>
</tr>
<tr>
<td>GS</td>
<td>29.5%</td>
<td>37%</td>
<td>33.2%</td>
<td>63%</td>
<td>31.8%</td>
</tr>
<tr>
<td>IS</td>
<td>20.9%</td>
<td>37%</td>
<td>0.1%</td>
<td>63%</td>
<td>7.8%</td>
</tr>
<tr>
<td>Transp.</td>
<td>17.1%</td>
<td>37%</td>
<td>1.8%</td>
<td>63%</td>
<td>7.5%</td>
</tr>
</tbody>
</table>
### Average & Peak Method

<table>
<thead>
<tr>
<th></th>
<th>Average Demand %</th>
<th>LF</th>
<th>Peak Demand %</th>
<th>1 - LF</th>
<th>AEP %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Res</td>
<td>32.5%</td>
<td>37%</td>
<td>58.9%</td>
<td>63%</td>
<td>49.2%</td>
</tr>
<tr>
<td>GS</td>
<td>29.5%</td>
<td>37%</td>
<td>33.7%</td>
<td>63%</td>
<td>32.1%</td>
</tr>
<tr>
<td>IS</td>
<td>20.9%</td>
<td>37%</td>
<td>0.0%</td>
<td>63%</td>
<td>7.7%</td>
</tr>
<tr>
<td>Transp.</td>
<td>17.1%</td>
<td>37%</td>
<td>7.4%</td>
<td>63%</td>
<td>11.0%</td>
</tr>
</tbody>
</table>
### Average Demand or Commodity Allocation Factors

<table>
<thead>
<tr>
<th></th>
<th>Annual Mcf Throughput</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>4,015,479</td>
<td>32.5%</td>
</tr>
<tr>
<td>General Serv.</td>
<td>3,635,714</td>
<td>29.5%</td>
</tr>
<tr>
<td>Interruptible</td>
<td>2,577,034</td>
<td>20.9%</td>
</tr>
<tr>
<td>Transportation</td>
<td>2,114,666</td>
<td>17.1%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>12,342,893</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>
## Average & Peak Allocation

<table>
<thead>
<tr>
<th>Rate Schedule</th>
<th>Amount</th>
<th>Peak Day CCF</th>
<th>Annual Volume CCF</th>
<th>Load Factor %</th>
<th>Net Plant $/CCF Peak Day</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>$502,789,056</td>
<td>10,000,000</td>
<td>1,100,000,000</td>
<td>30.1%</td>
<td>$ 50.28</td>
<td>0.96</td>
</tr>
<tr>
<td>Commercial</td>
<td>$370,697,833</td>
<td>7,000,000</td>
<td>900,000,000</td>
<td>35.2%</td>
<td>52.96</td>
<td>1.01</td>
</tr>
<tr>
<td>Transportation</td>
<td>$126,513,110</td>
<td>2,000,000</td>
<td>400,000,000</td>
<td>54.8%</td>
<td>63.26</td>
<td>1.20</td>
</tr>
<tr>
<td>Total</td>
<td>$1,000,000,000</td>
<td>19,000,000</td>
<td>2,400,000,000</td>
<td>34.6%</td>
<td>$ 52.63</td>
<td>1.00</td>
</tr>
</tbody>
</table>

## Coincident Demand Allocation

<table>
<thead>
<tr>
<th>Rate Schedule</th>
<th>Amount</th>
<th>Peak Day CCF</th>
<th>Annual Volume CCF</th>
<th>Load Factor %</th>
<th>Net Plant $/CCF Peak Day</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>$526,315,789</td>
<td>10,000,000</td>
<td>1,100,000,000</td>
<td>30.1%</td>
<td>$ 52.63</td>
<td>1.00</td>
</tr>
<tr>
<td>Commercial</td>
<td>$368,421,053</td>
<td>7,000,000</td>
<td>900,000,000</td>
<td>35.2%</td>
<td>52.63</td>
<td>1.00</td>
</tr>
<tr>
<td>Transportation</td>
<td>$105,263,158</td>
<td>2,000,000</td>
<td>400,000,000</td>
<td>54.8%</td>
<td>52.63</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>$1,000,000,000</td>
<td>19,000,000</td>
<td>2,400,000,000</td>
<td>34.6%</td>
<td>$ 52.63</td>
<td>1.00</td>
</tr>
</tbody>
</table>
### Allocation of System Peak Day Capacity

**Peak Day Capacity (CCF) = 18,744,947**

#### Peak & Average Allocation

<table>
<thead>
<tr>
<th>Rate Schedule</th>
<th>Coincident Peak Day Demand (CCF)</th>
<th>Average &amp; Peak Allocated Peak Day Capacity (CCF)</th>
<th>Surplus/(Shortfall) in Allocated Peak Day Capacity (CCF)</th>
<th>Surplus/(Shortfall) in Allocated Peak Day Capacity %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Heating Residential</td>
<td>78,779</td>
<td>87,429</td>
<td>8,650</td>
<td>11.0%</td>
</tr>
<tr>
<td>Residential</td>
<td>8,823,800</td>
<td>8,664,723</td>
<td>(159,077)</td>
<td>-1.8%</td>
</tr>
<tr>
<td>Commercial</td>
<td>8,229,751</td>
<td>8,202,764</td>
<td>(26,987)</td>
<td>-0.3%</td>
</tr>
<tr>
<td>Transportation</td>
<td>1,612,617</td>
<td>1,790,031</td>
<td>177,414</td>
<td>11.0%</td>
</tr>
<tr>
<td>Total</td>
<td>18,744,947</td>
<td>18,744,947</td>
<td>-</td>
<td>0.0%</td>
</tr>
</tbody>
</table>
Customer Classification of Distribution Mains

Total Demand = 1,000 Mcf
Minimum Distribution Method for Deriving Customer Related Component of Distribution Main

1) Diameter of smallest main 1.5”
2) Cost/foot of 1.5” main $0.61 / ft.
3) Total length of mains 6,385,860 ft.
4) Cost if all mains were 1.5” diameter $3,988,733
5) Actual cost of mains $19,326,453
6) Customer portion (4) / (5) 20%
Cost-of-Service Study

Comparison of Allocation Factors

Transp. GS Res
Customer

Transp. GS Res
Demand

Transp. GS Res
Throughput
Bypass of an LDC

Wellhead

Pipeline 1

Bypass Line

Burner Tip

Pipeline 2

LDC

Pipeline 3

City Gate

City
Potential Advantages of Bypass

- Lower price
- Deal directly with pipeline
- Decrease state regulation
- Choice of service
- Sometimes alternate pipeline supplier
Potential Disadvantages of Bypass

• Only one pipeline supplier
• No LDC backup or storage service
• LDC may have excess capacity
• LDC services eliminated
Bypass can often be prevented by cost-based rates
QUESTIONS?