Natural Gas Pipeline / LDC Rates

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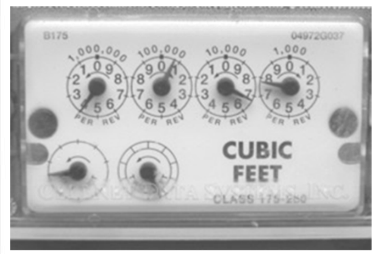
Gas Industry Structure

Producers

Pipelines

Distributors

LDC



Customers

Marketers/
Brokers

Upstream ←

→ Downstream

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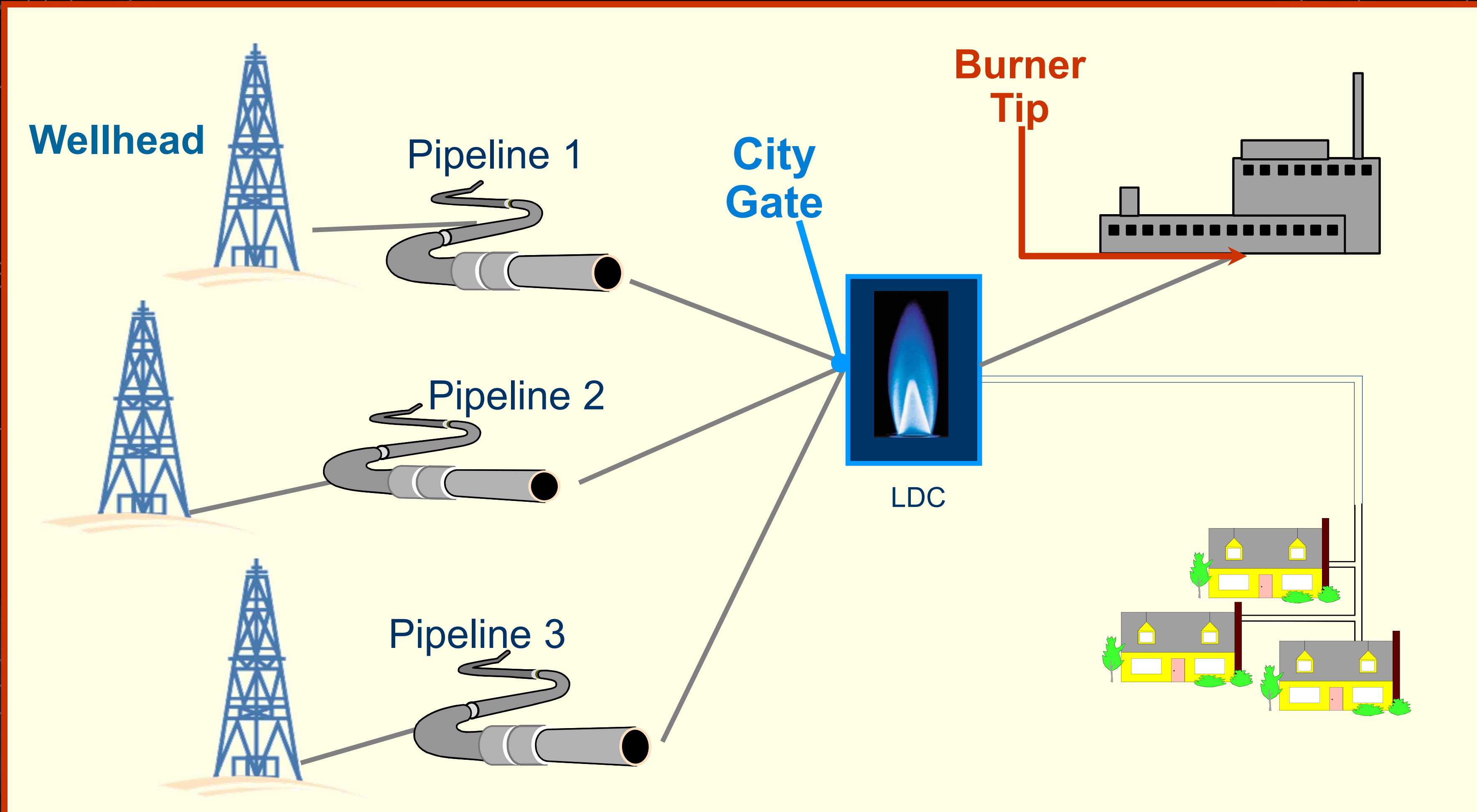
Gas Industry
Functional Structure



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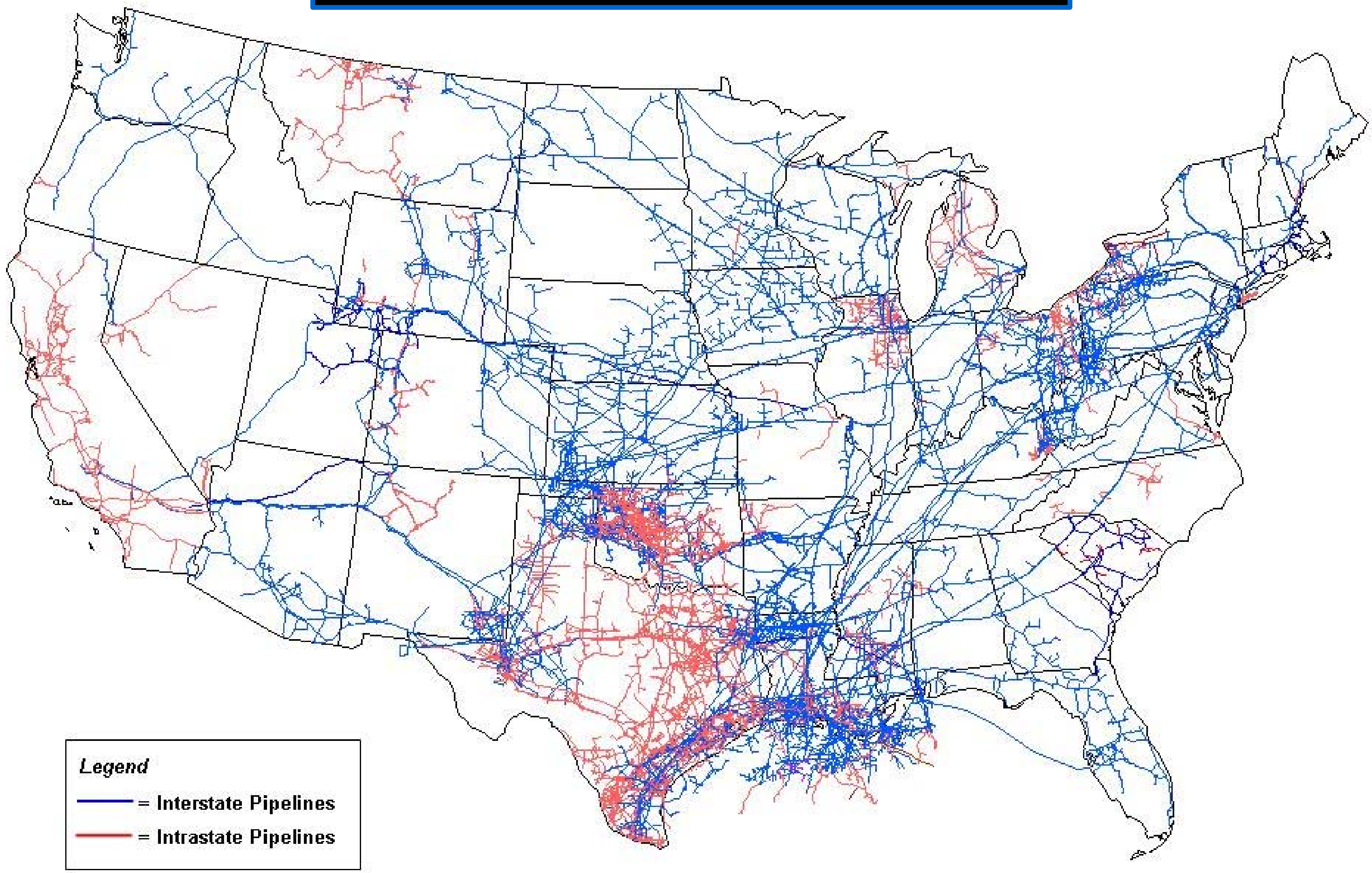
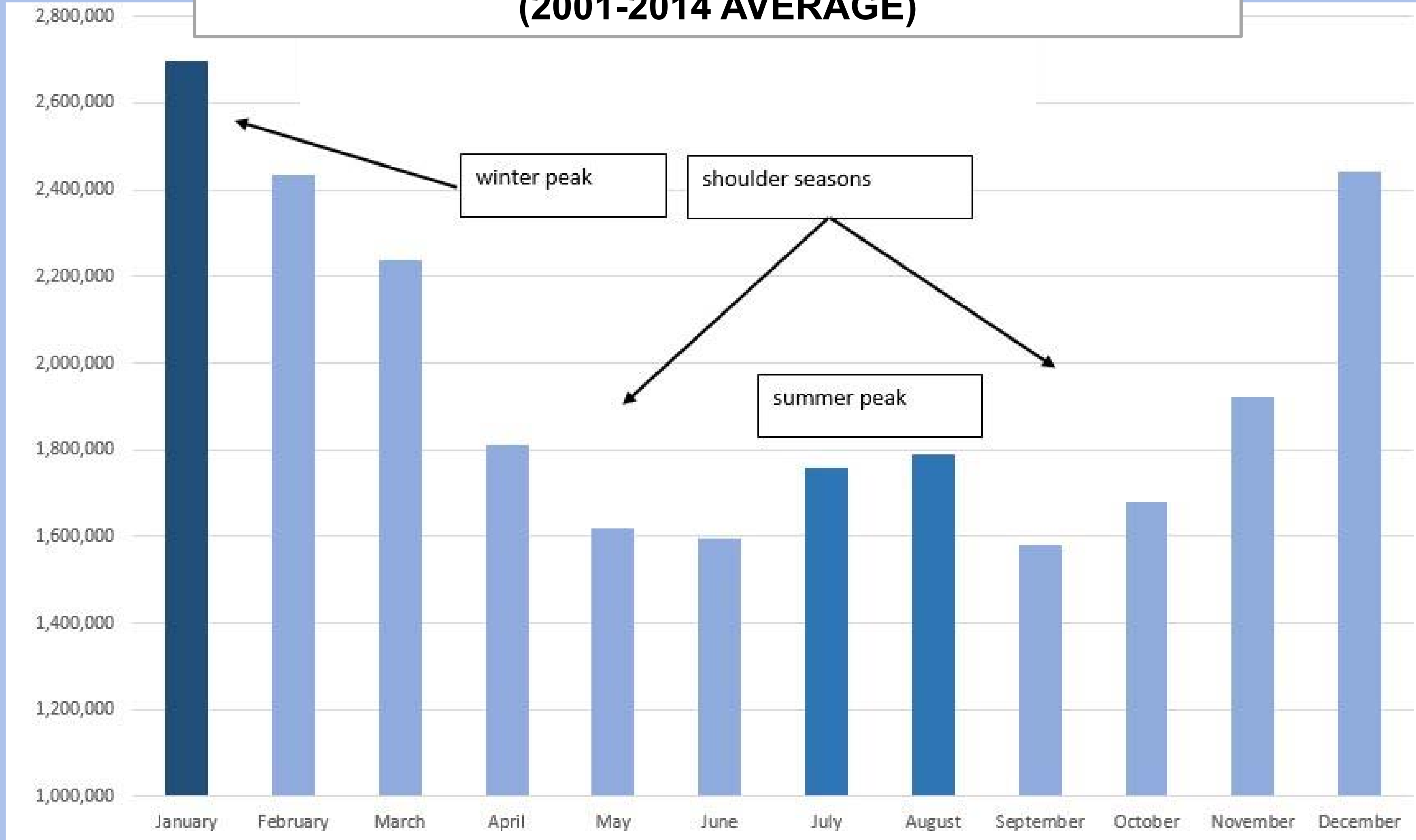
Shale Gas Plays, Lower 48 States

Natural Gas 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)



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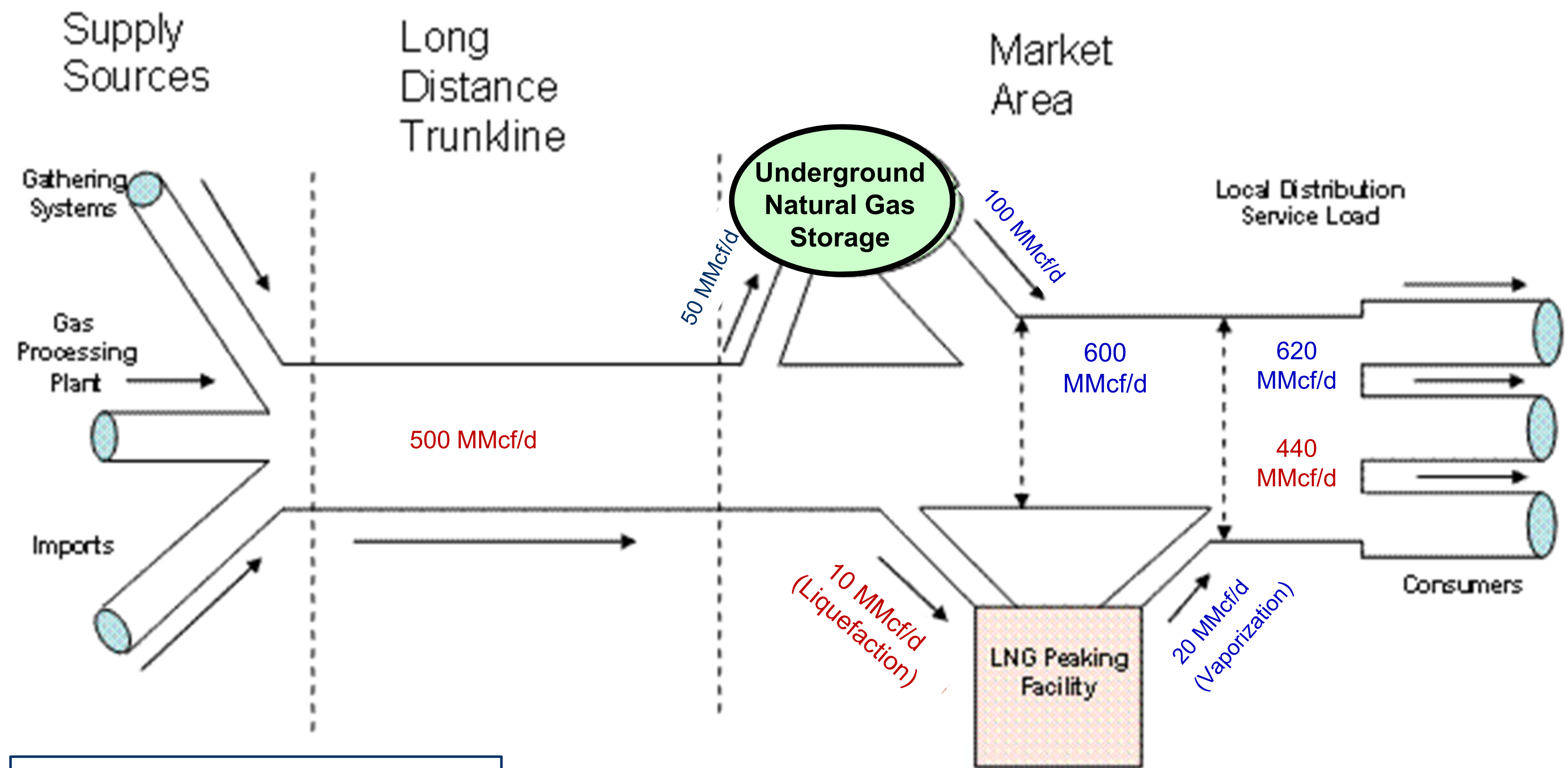
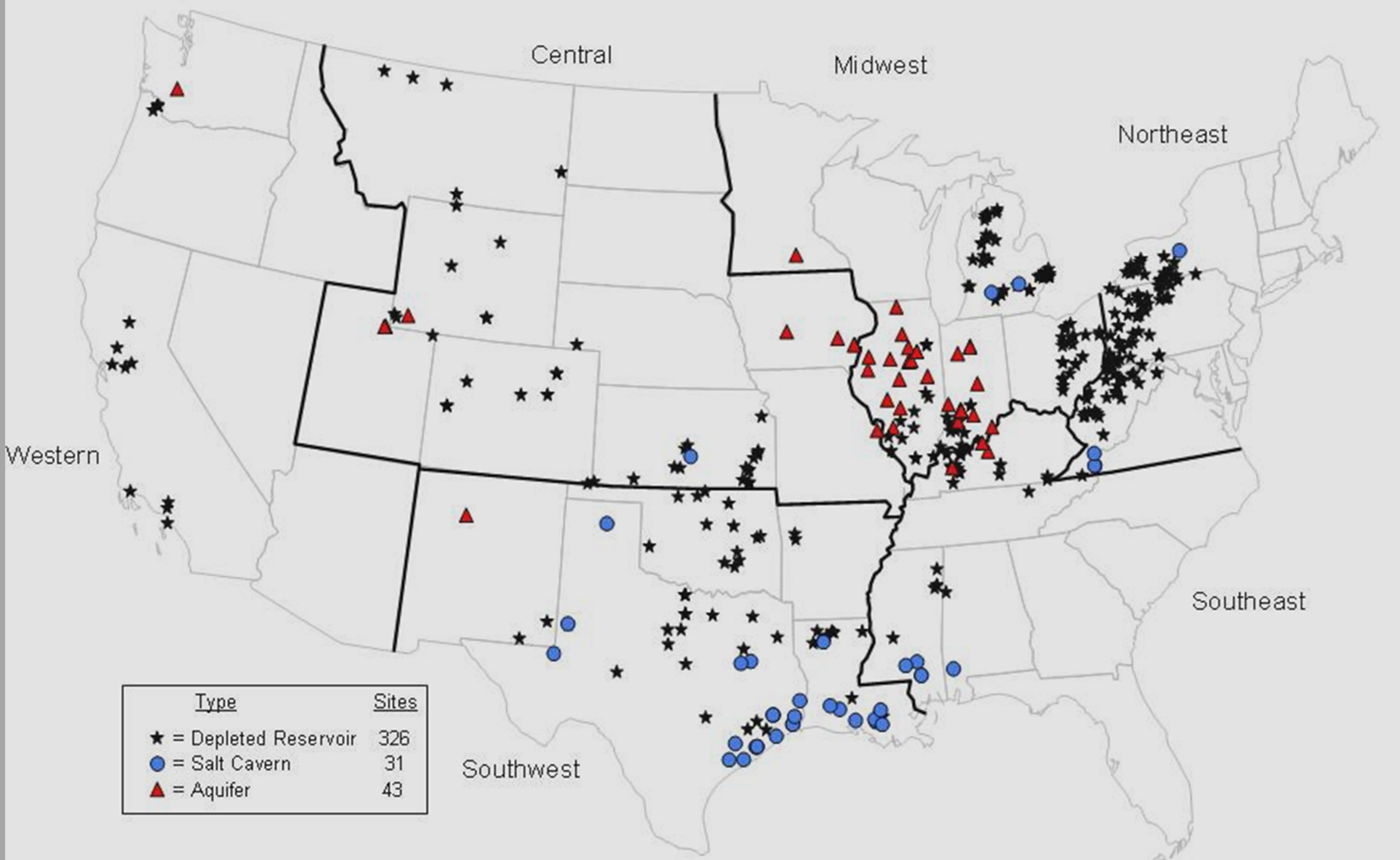


Black = Year round design capacity
Red = Non-heating season (spring-summer need)
Blue = Heating Season (winter or peak-period need)

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



Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division Gas, Gas Transportation Information System, December 2008.

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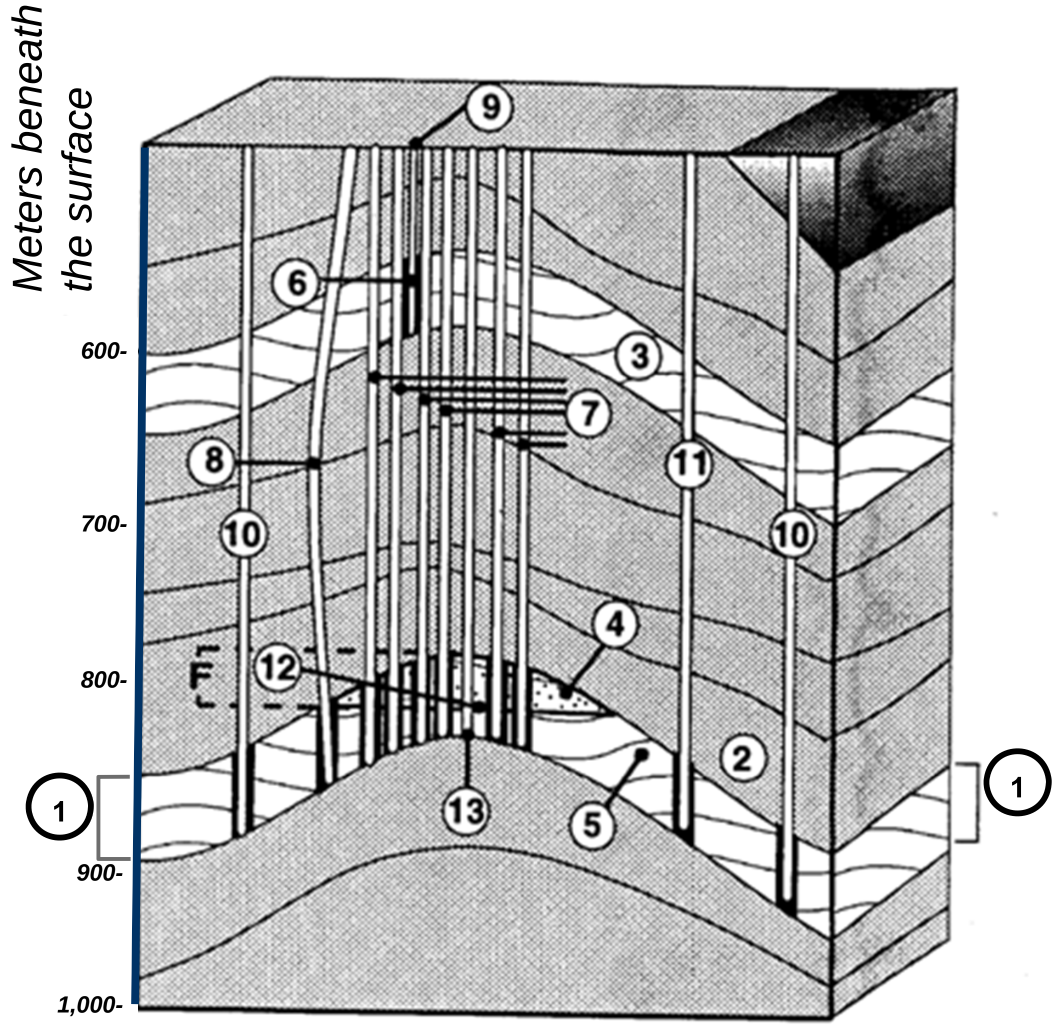

Diagrammatic cross section of an aquifer storage reservoir:

1. Aquifer. Porous, permeable layer (reservoir).
2. Impermeable cap rock.
3. Upper control aquifer.
4. Gas.
5. Water.
6. Strainers.
7. Operating well.
9. Upper aquifer observation well.
10. Peripheral observation well.
11. Water level monitoring well.
12. Water level gas/water interface.
13. Neutron logging well.
14. Closure.

Source: Gaz de France, "Underground Storages Facilities" (June 1992): Recreated by Energy Information Administration, Office of Planning, Management and Information Services.

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Line Pack

- Refers to the volume of gas that can be stored in a pipeline
- Gas can be compressed
- Pressure in pipeline increases
- Volume of gas stored depends on pressure rating of the pipe, flanges, valves, compressors, etc.
- Can be used to balance system

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Burner Tip Price ($/MMBtu)

Wellhead Price

\+

Pipeline Charge

\+

LDC Charge

=

Burner Tip Price

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Delivery Rates

Regulated Utility Tariff Rates

		Agency
Transmission (Pipeline Charge)	→	**FERC**
Distribution (LDC Charge)	→	**State/Local**

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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
  - Storage
- Revenue Allocation
  - Spread of utility revenue requirement among rate classes

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Main LDC Rate Case Issues

- Customer Balancing
  - Tolerance band
  - Cash-out pricing for transportation customer imbalances (market price vs utility cost of gas)

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Purpose of a Cost-of-Service Study

To measure the responsibility of each class for the service provided by the utility

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Typical Rate Classes in a Cost-of-Service Study

- Residential
- General Service
- Large Volume Service
- Interruptible
- Transportation

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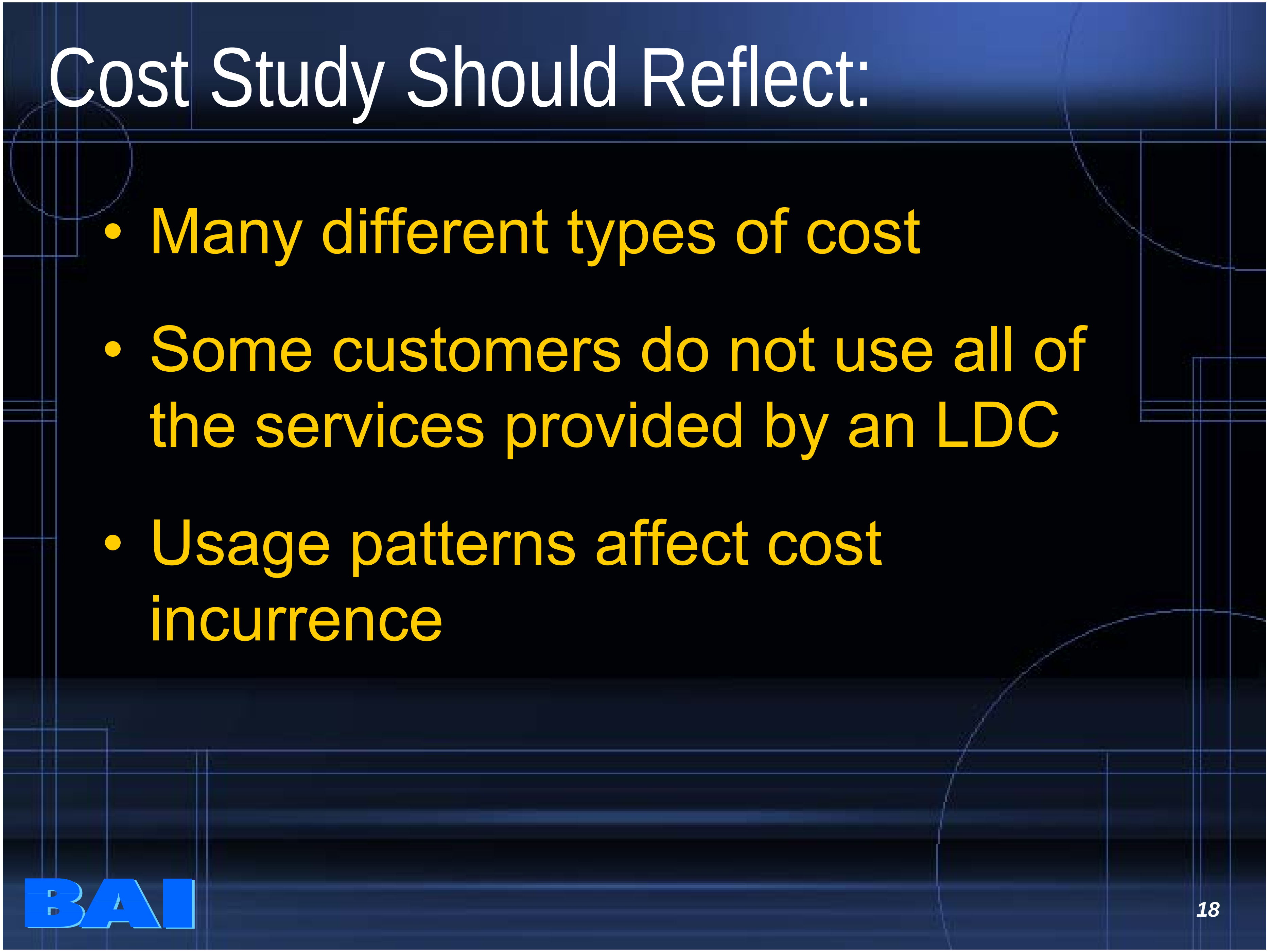
Cost Study Should Reflect:
• Many different types of cost
• Some customers do not use all of the services provided by an LDC
• Usage patterns affect cost incurrence
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18

Procedure

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

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Functionalization

COSTS

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

- **Production**
- **Storage**
- **Distribution**

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Classification

Determine the primary causative factor for each type of cost

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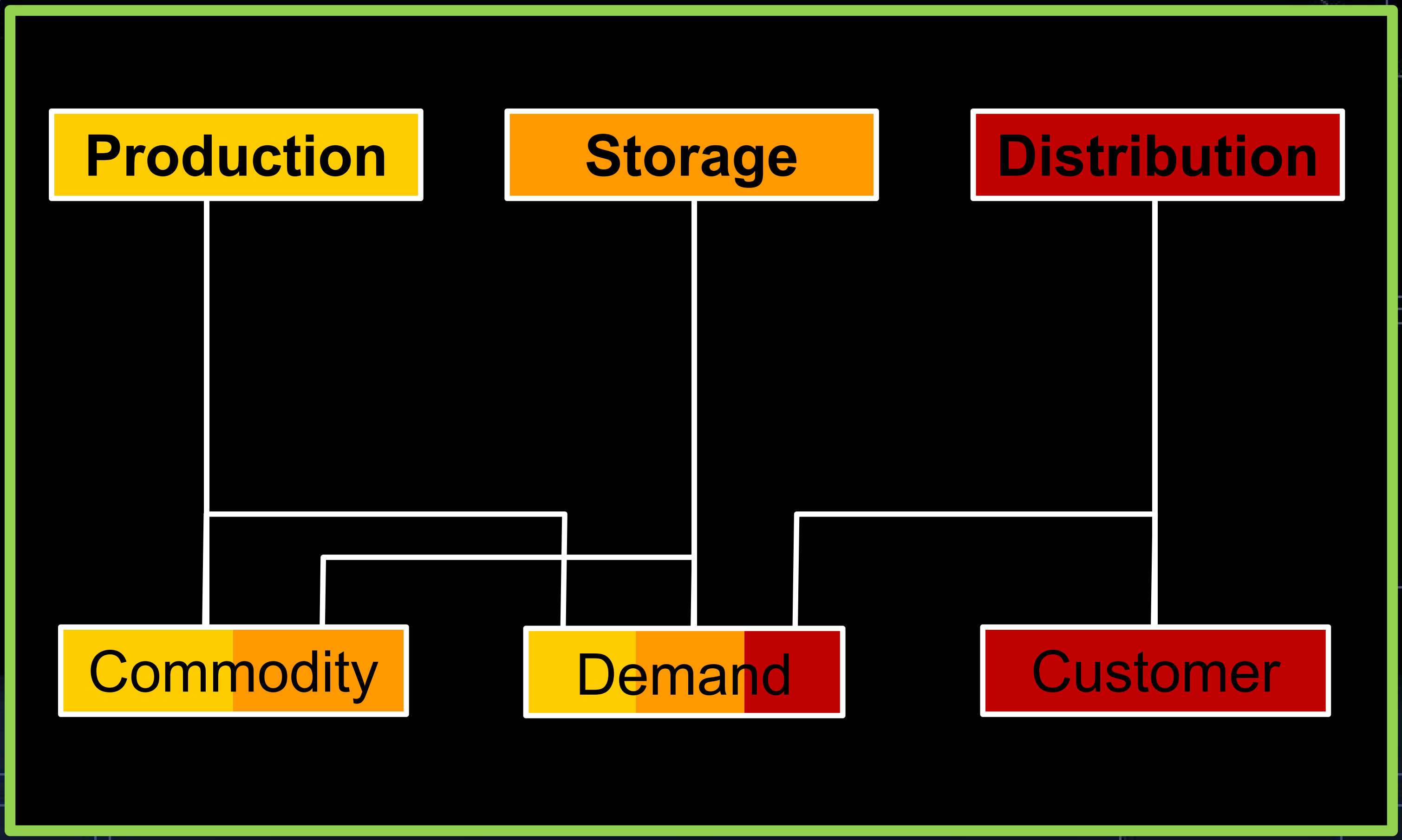
Classification



Classification Categories

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

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Classification of Plant

	Customer	Demand	Commodity
Production		✓	✓
Storage		✓	✓
Distribution	✓	✓	
General	✓	✓	✓

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Classification of Expense

	Customer	Demand	Commodity
Production		✓	✓
Storage		✓	✓
Distribution	✓	✓	
Customer Acct.	✓		
Admin. & Gen.	✓	✓	✓

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Methods of Allocation

- Cost causation
- “Benefits”
- Social / Political Policy
- End results

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Demand Allocation Methods

General Criteria

- Cost causation
- Recognize utility's load characteristics
- Choice of method can be controversial
  - Design Day Demand vs. Average & Peak
- Distribution mains are typically largest plant investment for a LDC

Demand Allocation Methods

- Coincident Peak (Design Day Demand)
- Non-Coincident Peak Demand
- Average Demand
- Average and Excess
- Average and Peak

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Coincident Peak (Design Day Demand) Allocation Method

	Mcf	Percent
Residential	53,830	58.90%
General Serv.	30,800	33.70%
Interruptible	0	0.0%
Transportation	6,765	7.40%
TOTAL	91,395	100.00%

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Non-Coincident Peak Demand (Maximum Demand)

	Mcf	Percent
Residential	60,233	54.90%
General Serv.	35,146	32.05%
Interruptible	7,136	6.50%
Transportation	7,159	6.55%
TOTAL	109,674	100.00%

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Average Demand or Commodity Allocation Factors

	Annual Mcf Throughput	Percent
Residential	4,015,479	32.5%
General Serv.	3,635,714	29.5%
Interruptible	2,577,034	20.9%
Transportation	2,114,666	17.1%
TOTAL	12,342,893	100.0%

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Average Demand or Commodity Allocation Factors

	Ave. Dem. (Mcf/Day)	Percent
Residential	11,001	32.5%
General Serv.	9,961	29.5%
Interruptible	7,060	20.9%
Transportation	5,794	17.1%
TOTAL	33,816	100.0%

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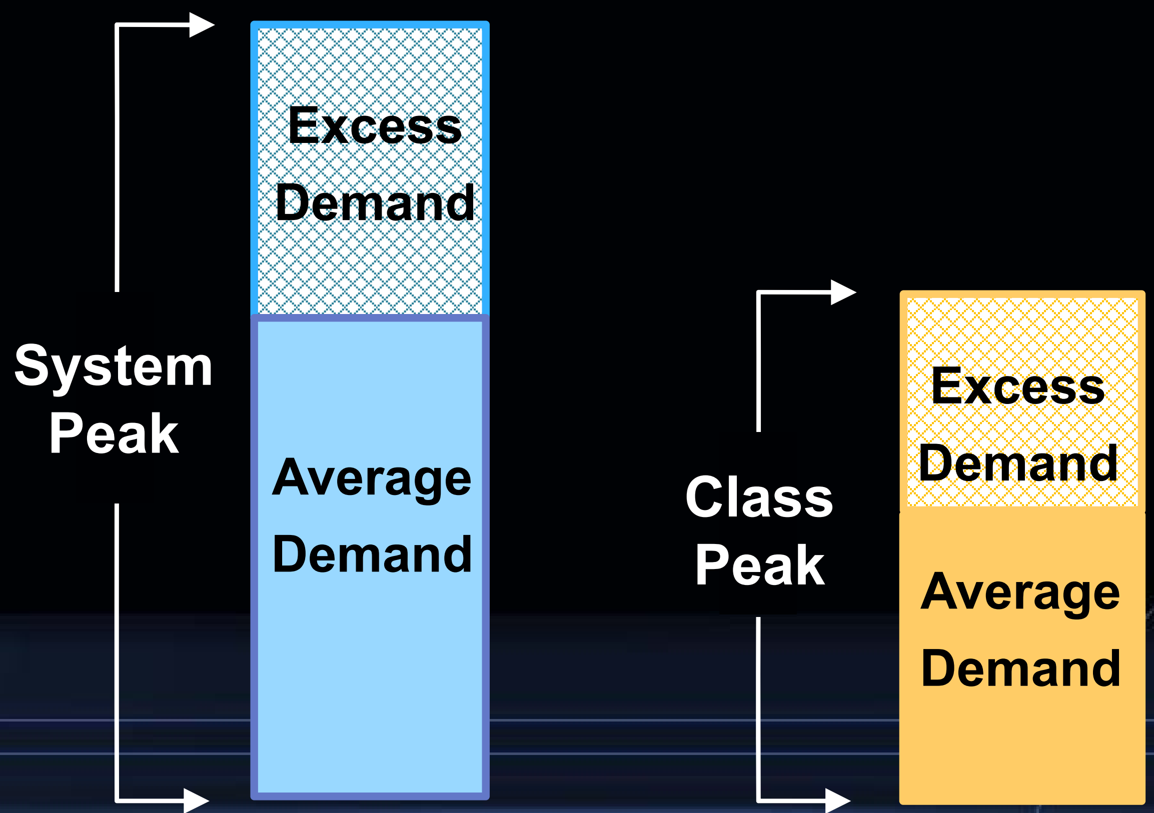
Average & Excess Method



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Average & Excess Method

	Average Demand	Maximum Demand	Excess Demand	Ex. Dem. %
Res	11,001	60,233	49,232	64.9%
GS	9,961	35,146	25,185	33.2%
IS	7,060	7,136	76	0.1%
Transp.	5,794	7,159	1,365	1.8%

Excess Demand = Maximum Demand – Average Demand

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Average & Excess Method

	Average Demand %	LF	Excess Demand %	1 - LF	AED %
Res	32.5%	37%	64.9%	63%	52.9%
GS	29.5%	37%	33.2%	63%	31.8%
IS	20.9%	37%	0.1%	63%	7.8%
Transp.	17.1%	37%	1.8%	63%	7.5%

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Load Factor

- Average Demand / Peak Demand
- Measures how efficiently a class uses peak day capacity
- For the example, Load Factor equals: 33,816 Mcf / 91,395 Mcf, or 37%

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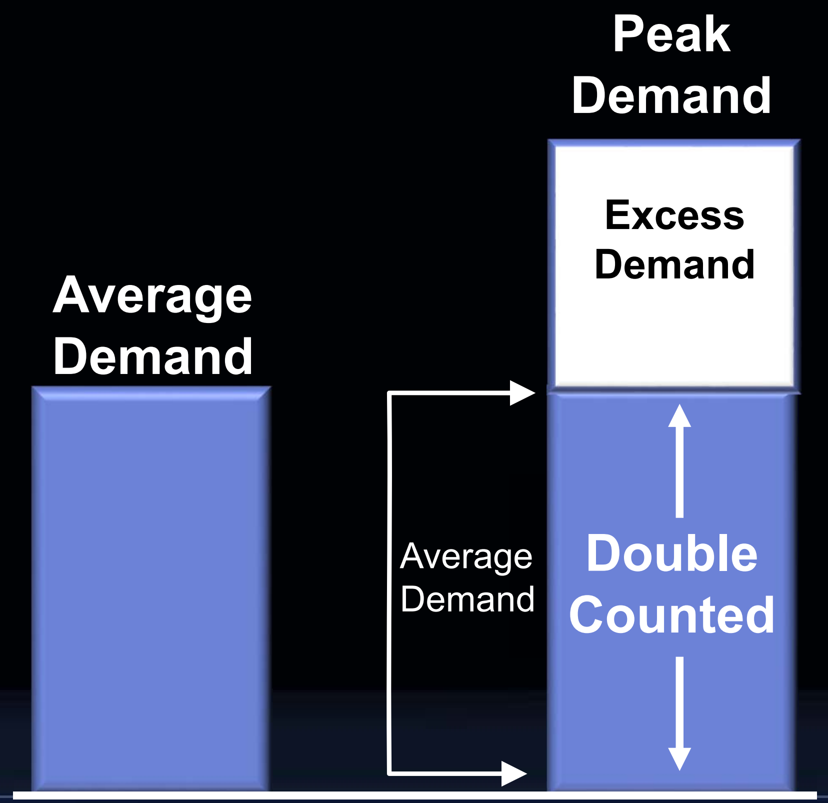
Average & Peak Method



Average & Peak Method

	Average Demand %	LF	Peak Demand %	1 - LF	AEP %
Res	32.5%	37%	58.9%	63%	49.2%
GS	29.5%	37%	33.7%	63%	32.1%
IS	20.9%	37%	0.0%	63%	7.7%
Transp.	17.1%	37%	7.4%	63%	11.0%

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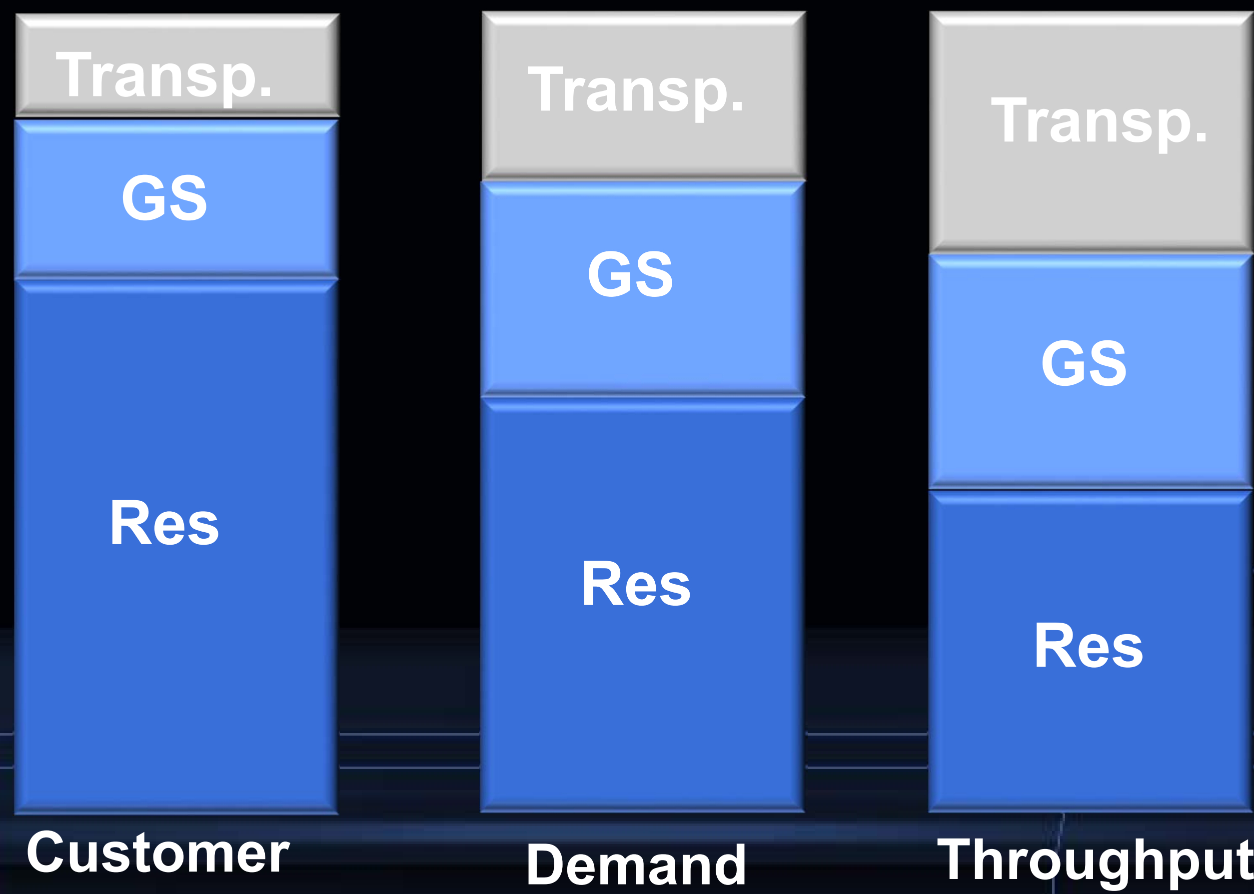
Cost-of-Service Study

Comparison of Allocation Factors



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Cost-of-Service Study
Comparison of Allocation Factors

Transportation Class

• Non-Coincident Peak	6.6%
• Coincident Peak	7.4%
• Average & Excess	7.5%
• Average & Peak	11.0%
• Average Demand	17.1%

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Coincident Peak vs. Average and Peak

Distribution Mains Acct. 376 Net Plant - $1,000,000,000

Average & Peak Allocation

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

Coincident Peak Allocation

Rate Schedule		Amount	Peak Day CCF	Annual Volume CCF	Load Factor %		Net Plant $/CCF Peak Day	Index
Residential	$	526,315,789	10,000,000	1,100,000,000	30.1%	$	52.63	1.00
Commercial	$	368,421,053	7,000,000	900,000,000	35.2%		52.63	1.00
Transportation	$	105,263,158	2,000,000	400,000,000	54.8%		52.63	1.00
Total	$	1,000,000,000	19,000,000	2,400,000,000	34.6%	$	52.63	1.00

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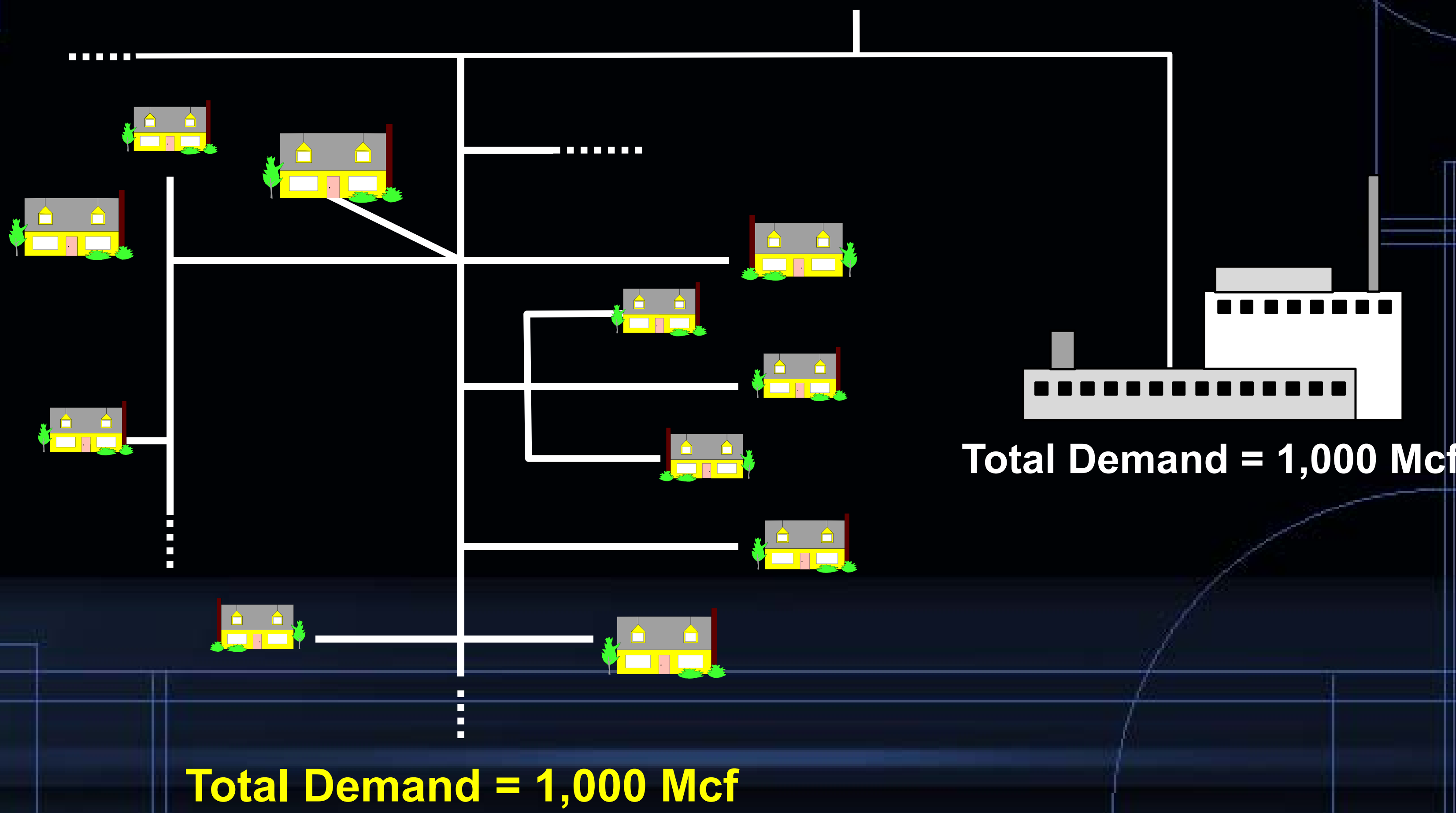
Customer Classification of Distribution Mains



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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%

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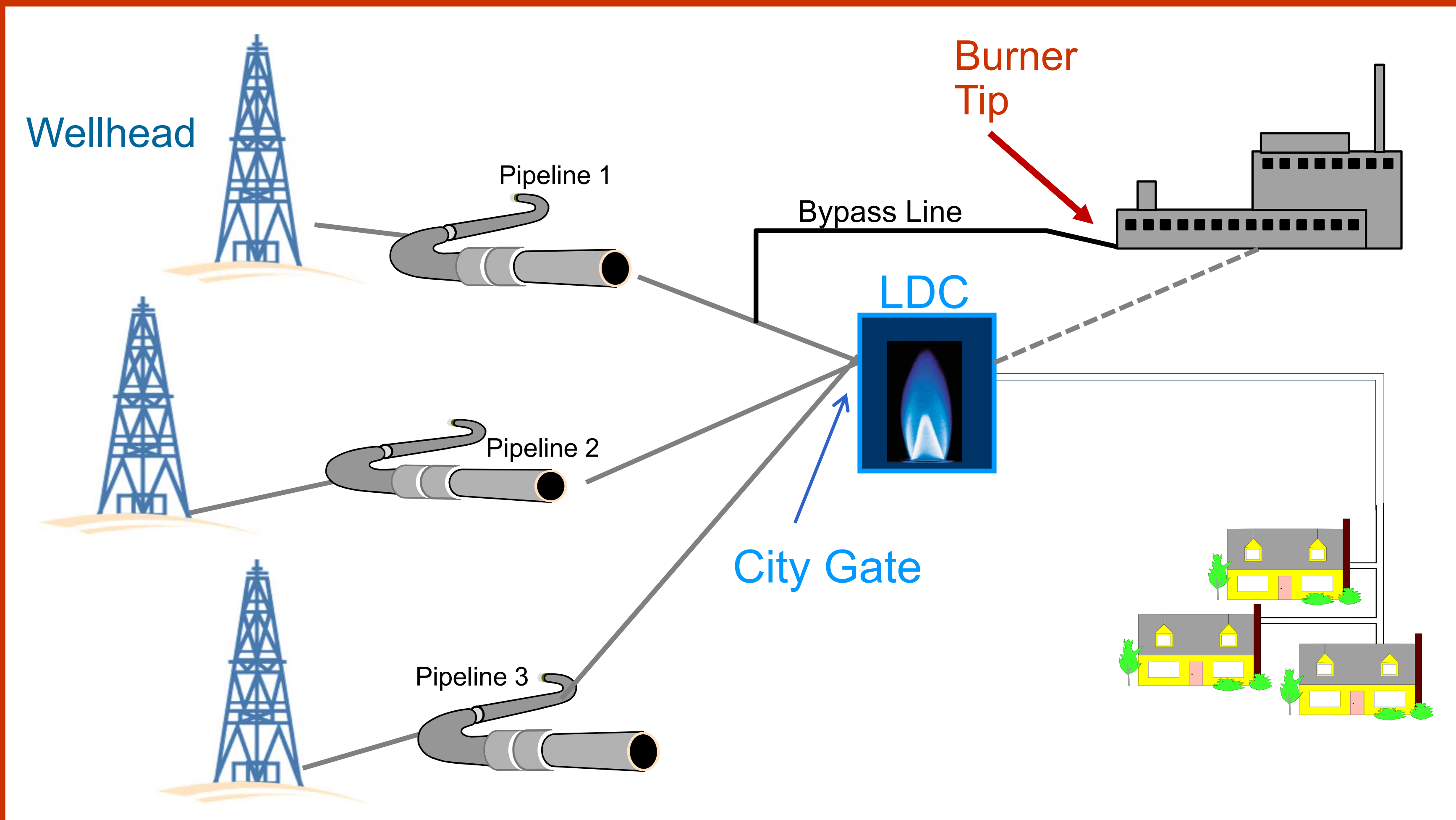
Bypass of an LDC



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Potential Advantages of Bypass

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

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Potential Disadvantages of Bypass

- Only one pipeline supplier
- No LDC backup or storage service
- LDC may have excess capacity
- LDC services eliminated

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Bypass can often be prevented by cost-based rates

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QUESTIONS?

BAI