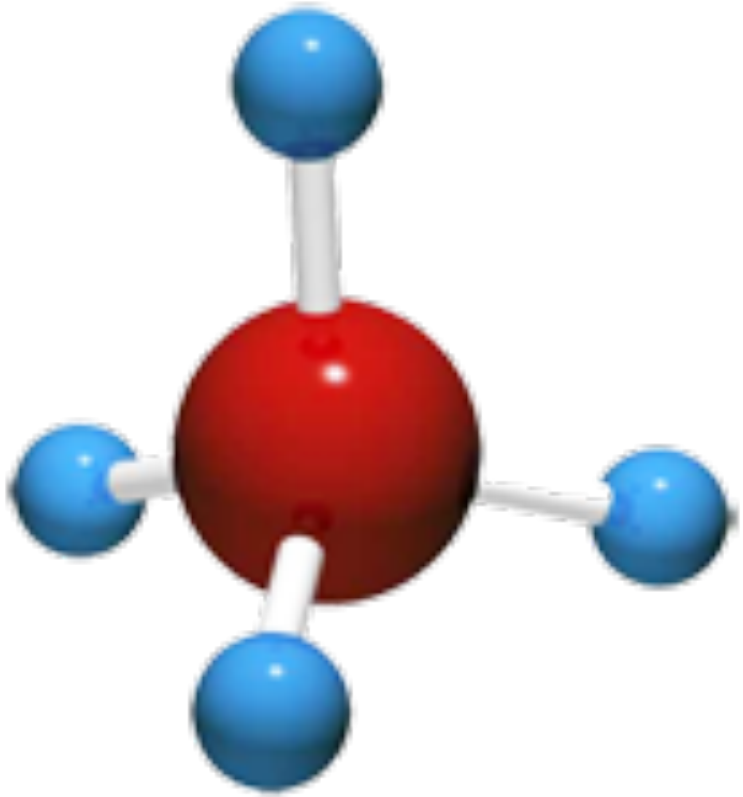
GAS 101

Natural Gas & Propane Basics

NATURAL GAS (METHANE)



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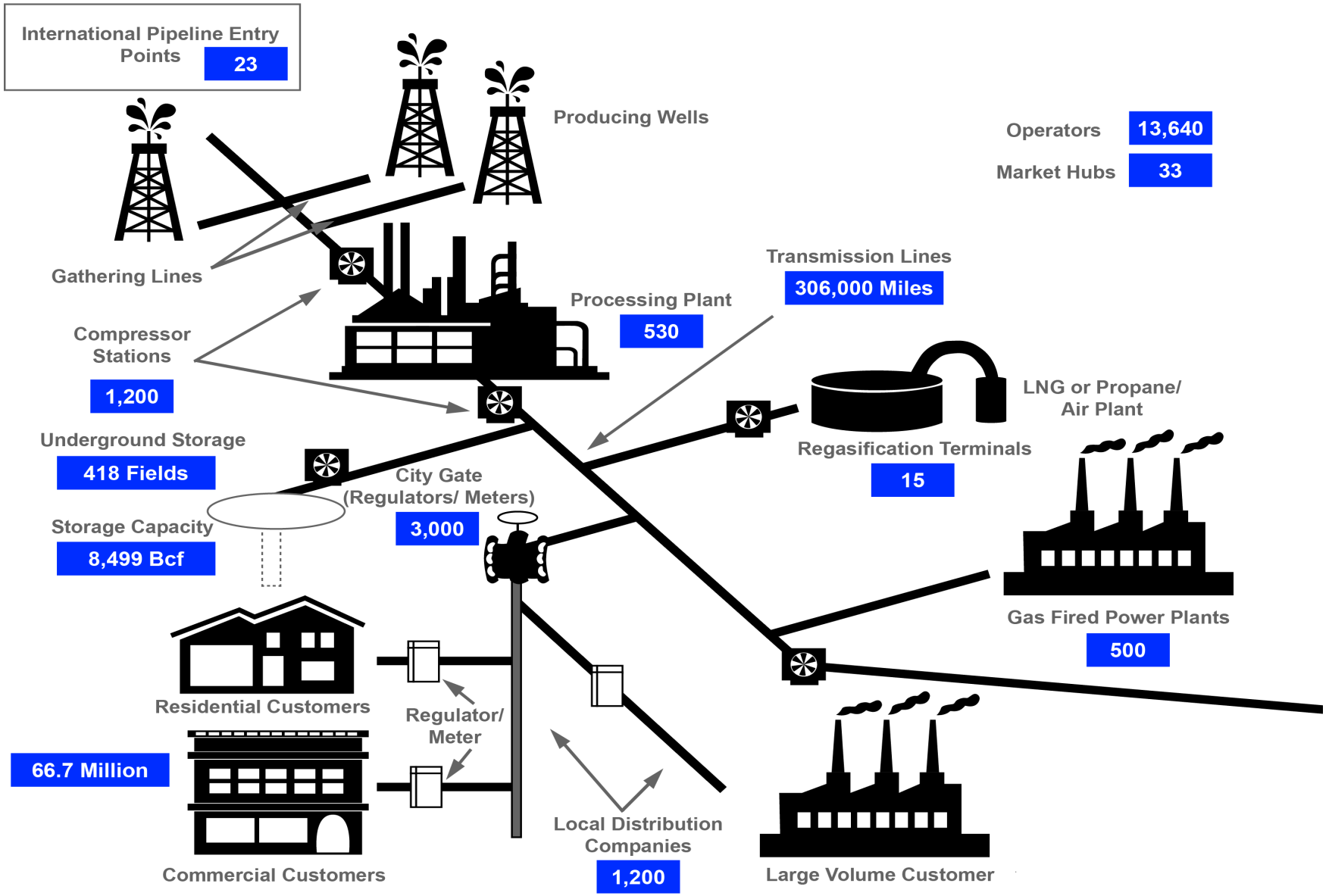
How is Natural Gas Delivered?

The U.S. Natural Gas Infrastructure, Including Gas Consuming Sectors

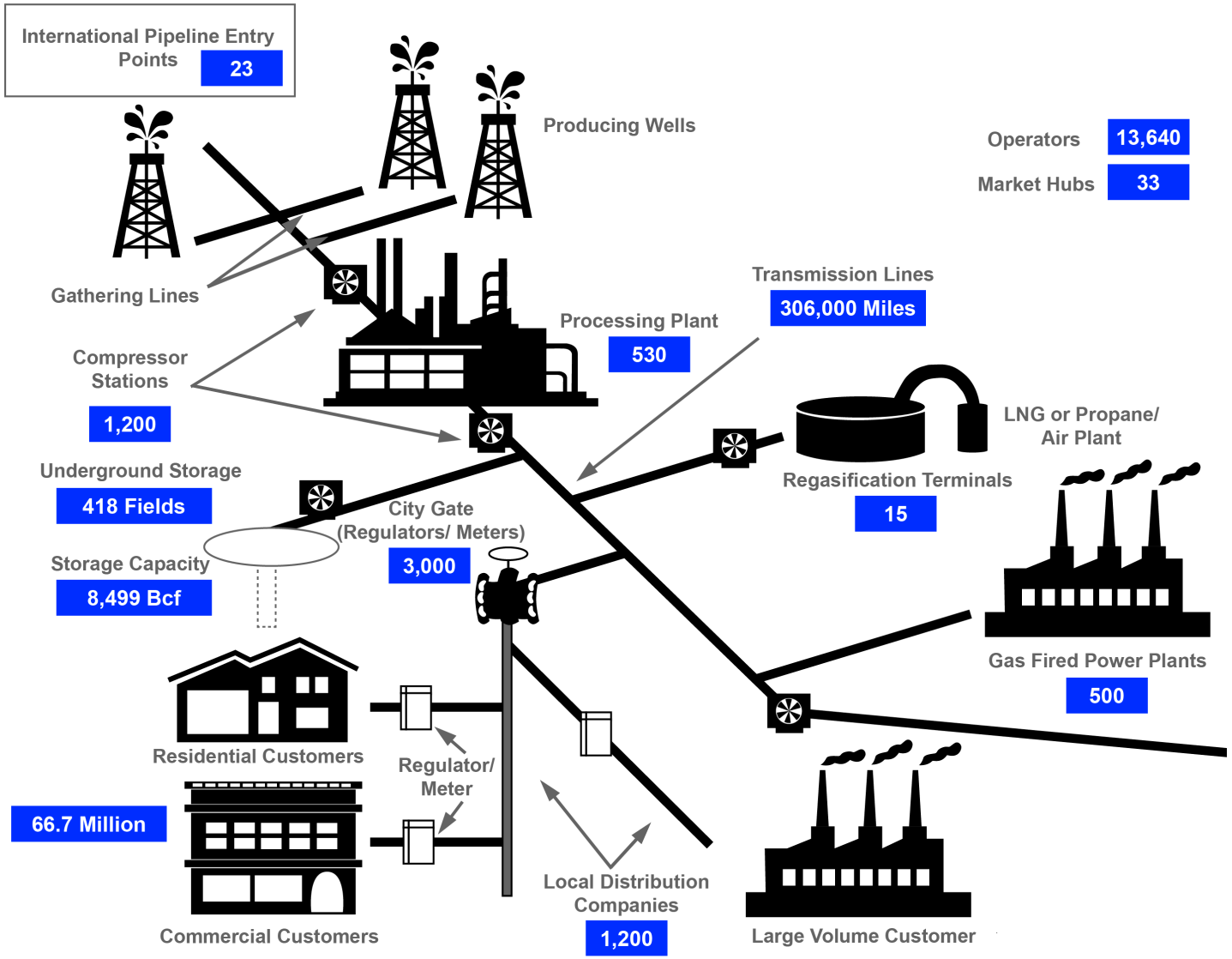


Credit: Mina Lee

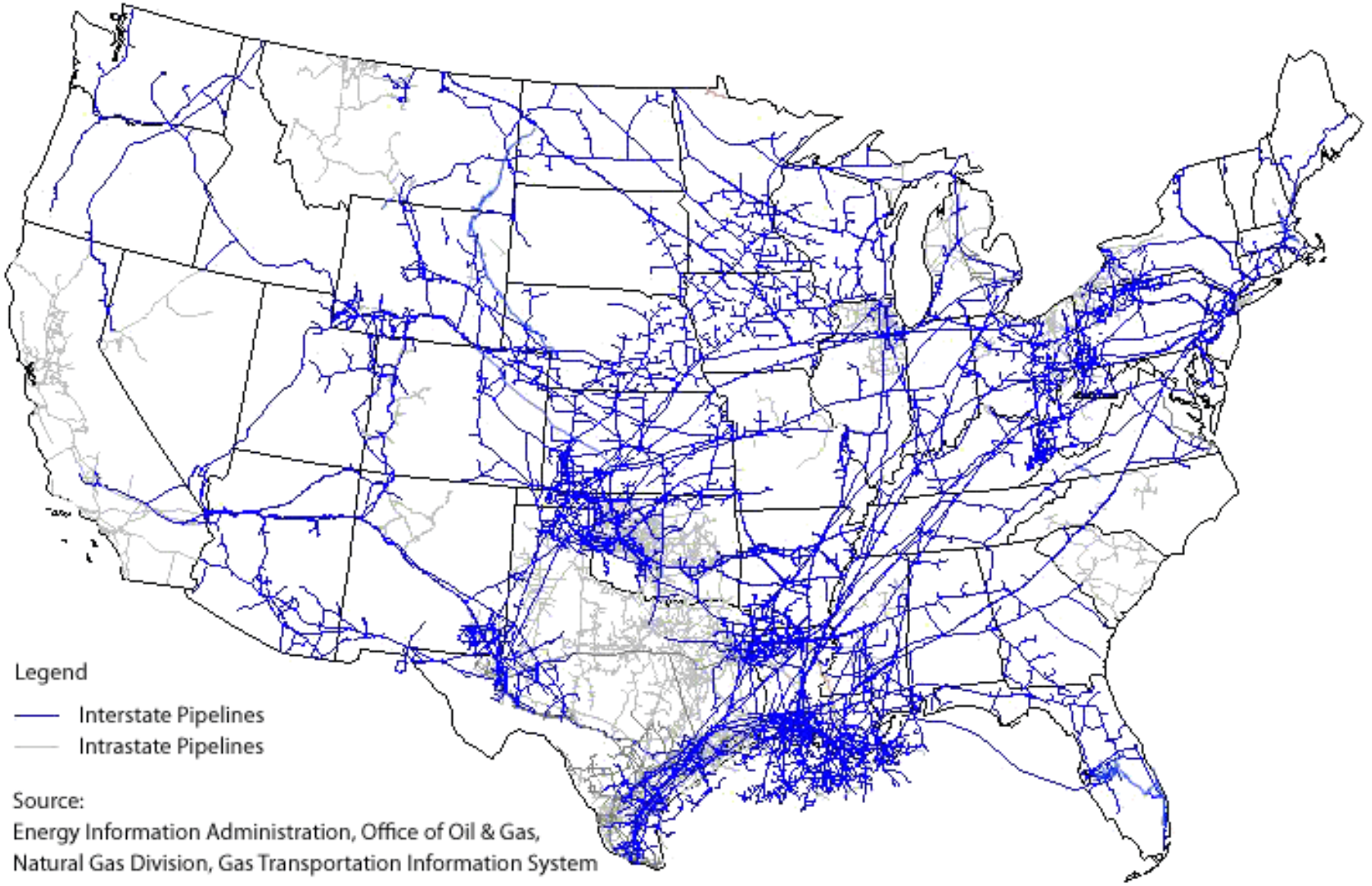
How is Natural Gas Delivered?

- Wells drill & extract gas from the earth
- Processing Plants clean raw natural gas by separating impurities and fluids
- Transmission pipelines carry dry natural gas to consumers across the US (usually between 16-48” in diameter)
- Storage facilities ensure that seasonal & peak demands can be met
- Compressor stations usually spaced 40-100 miles apart keep gas highly pressurized
- Utilities buy and distribute gas to local commercial and residential customers

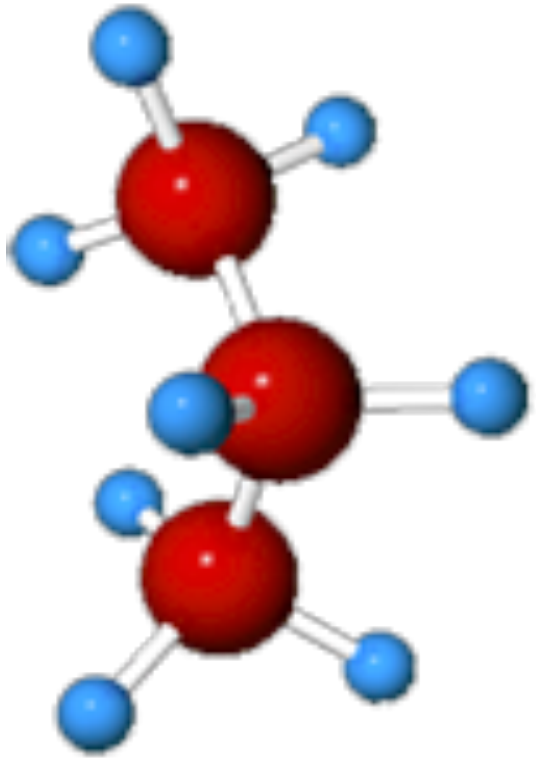
The U.S. Natural Gas Infrastructure, Including Gas Consuming Sectors



Credit: Mina Lee

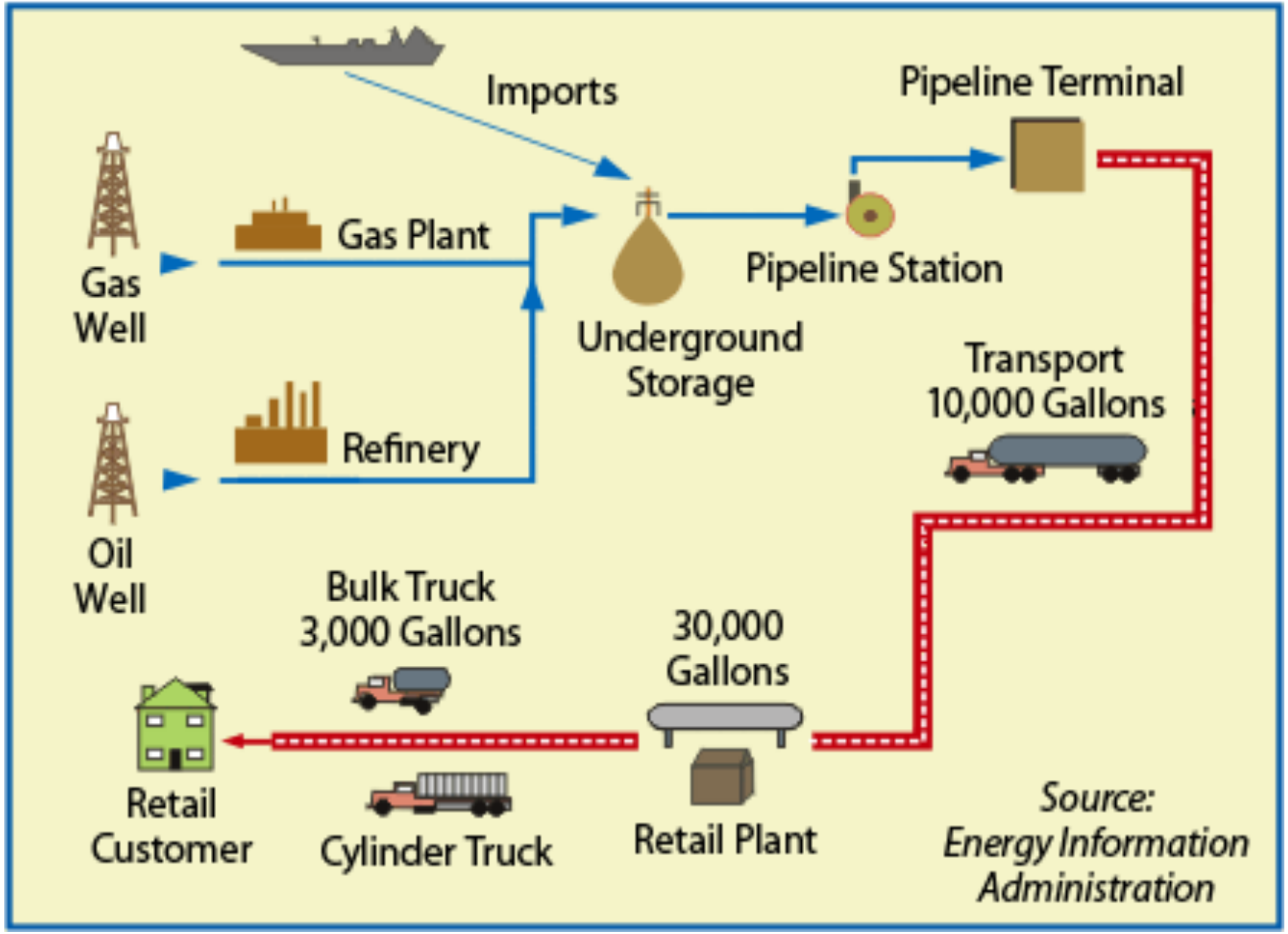

Legend
Interstate Pipelines
Intrastate Pipelines
Source:
Energy Information Administration, Office of Oil & Gas,
Natural Gas Division, Gas Transportation Information System

PROPANE or LPG
(liquefied petroleum gas)



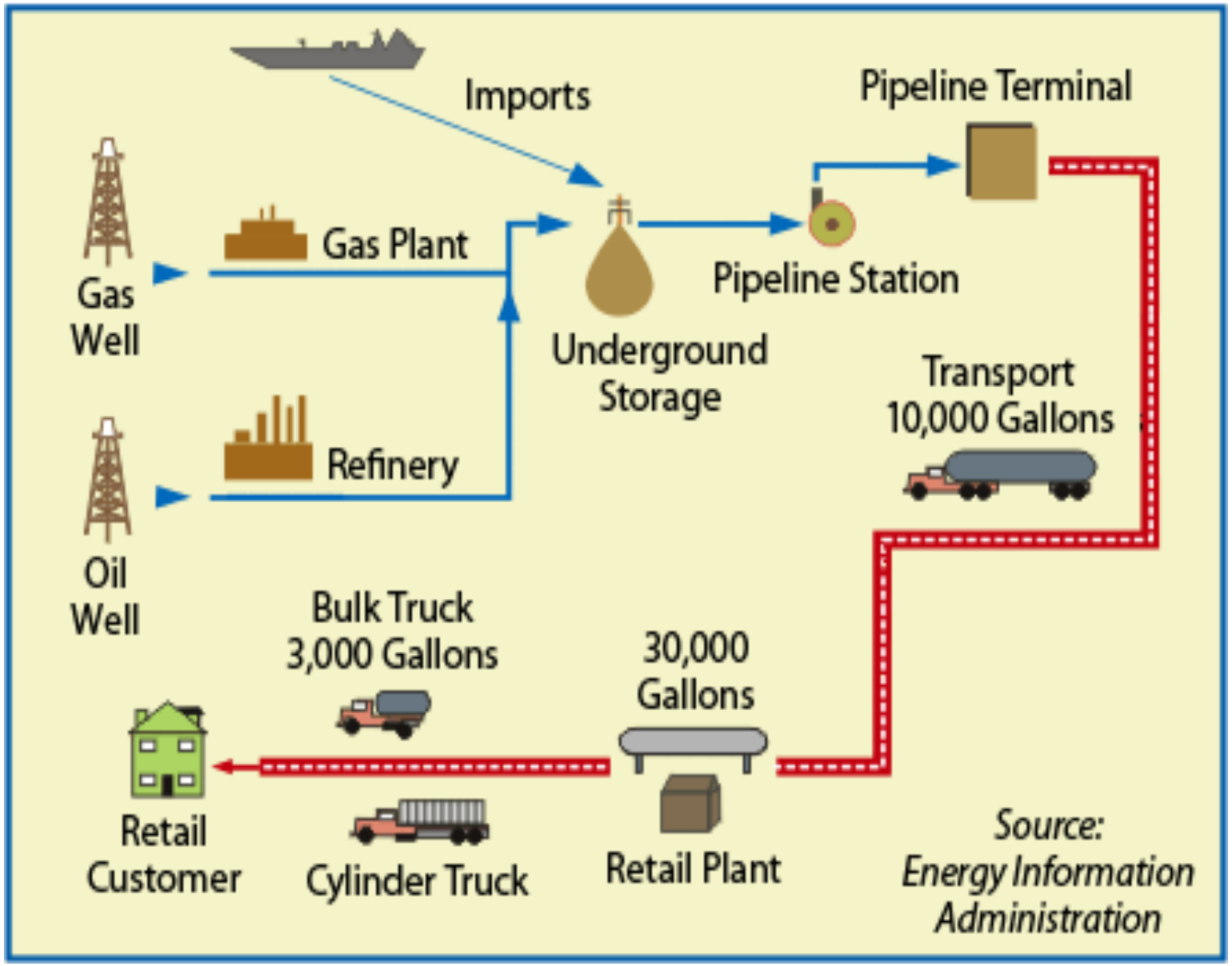
C_3H_8

How is Propane Delivered?



How is Propane Delivered?

- Propane is extracted from natural gas at processing plants
- It is also separated from crude oil during the refining process
- Propane is usually stored and transported in a liquid state (under pressure & refrigeration)
- Commercial & residential customers typically found in sparsely populated areas where there are no natural gas pipelines
- Delivered to permanently placed tanks on customers property
- Tanks are either above ground or underground



Natural Gas vs Propane

GAS PROPERTIES	LPG (PROPANE)	NATURAL GAS (METHANE)
CHEMICAL FORMULA	C_3H_8	CH_4
ENERGY CONTENT BTU/FT^3	2,572	1,011
SPECIFIC GRAVITY	1.5219	0.5537
BURNING TEMPERATURE C^O	1,967	1,950
TYPICAL DELIVERY PRESSURE	11” WC	7” WC

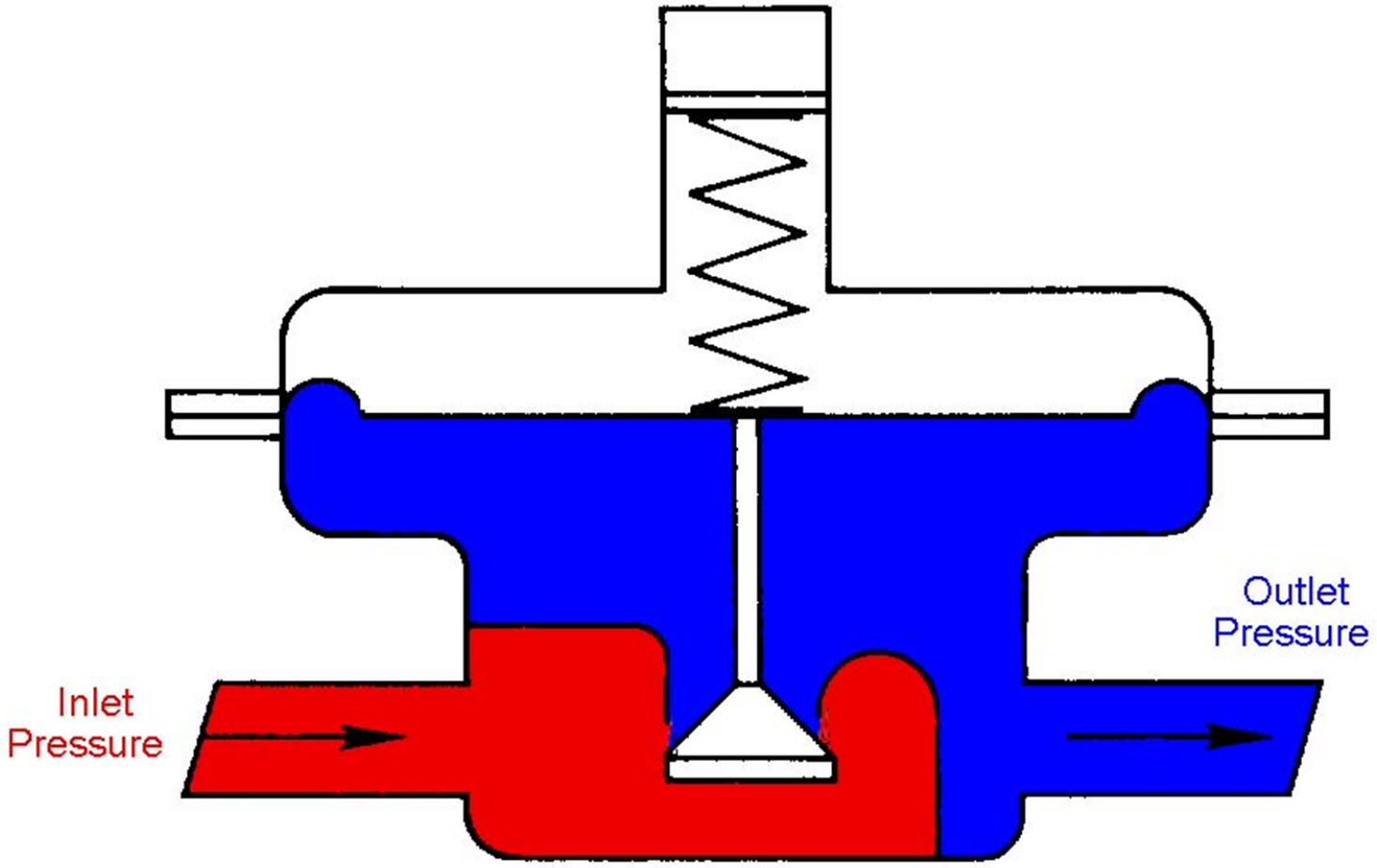
REGULATOR 101

Basics of Gas Regulation

WHAT DOES A GAS REGULATOR DO?

How does It Work?

- Inlet pressure (red) enters the regulator
- Outlet pressure is adjusted by the force of the spring on the top of the diaphragm
- Outlet pressure (blue) is the pressure required to be delivered to the equipment after the regulator
- As the equipment turns on, the pressure under the diaphragm decreases. The force of the spring opens the valve and allows gas flow
- When the equipment turns off the pressure under the diaphragm increases and overcomes the spring force to close the valve and shut off flow
- Inlet pressure must be higher than the outlet pressure for the regulator to function



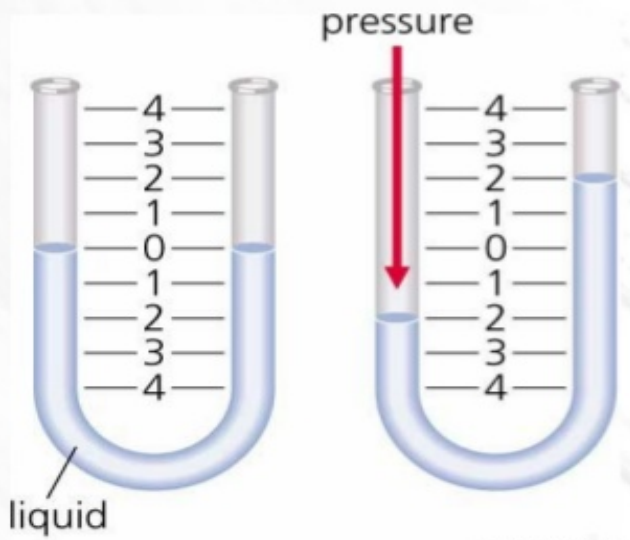
Simple Spring Regulator

HOW DO WE MEASURE PRESSURE?

Inches Water Column

Manometer

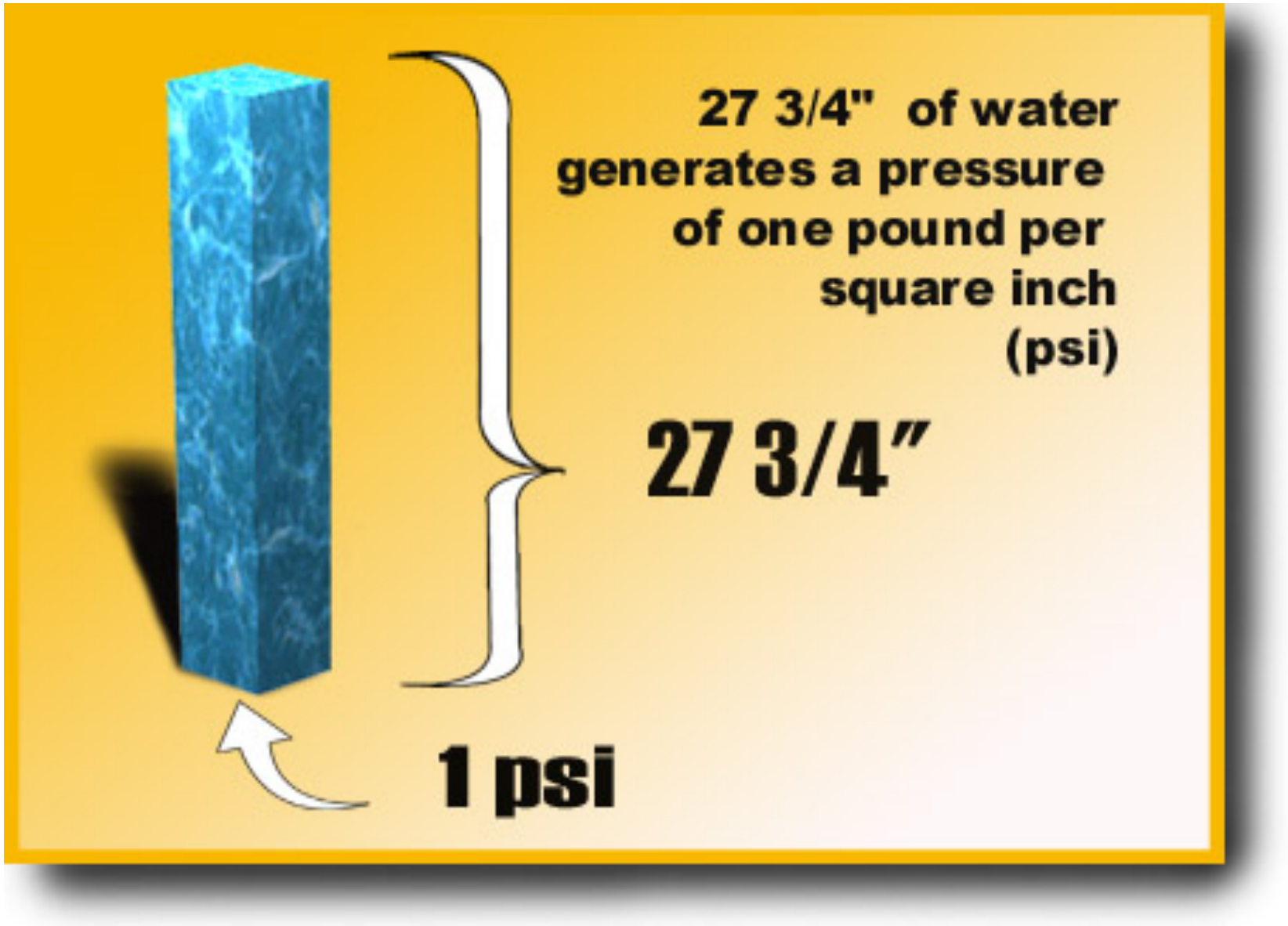
The simplest device used to measure pressure is the manometer. A “U” shaped tube filled with water. This is the origin of the unit “Inches of Water Column”

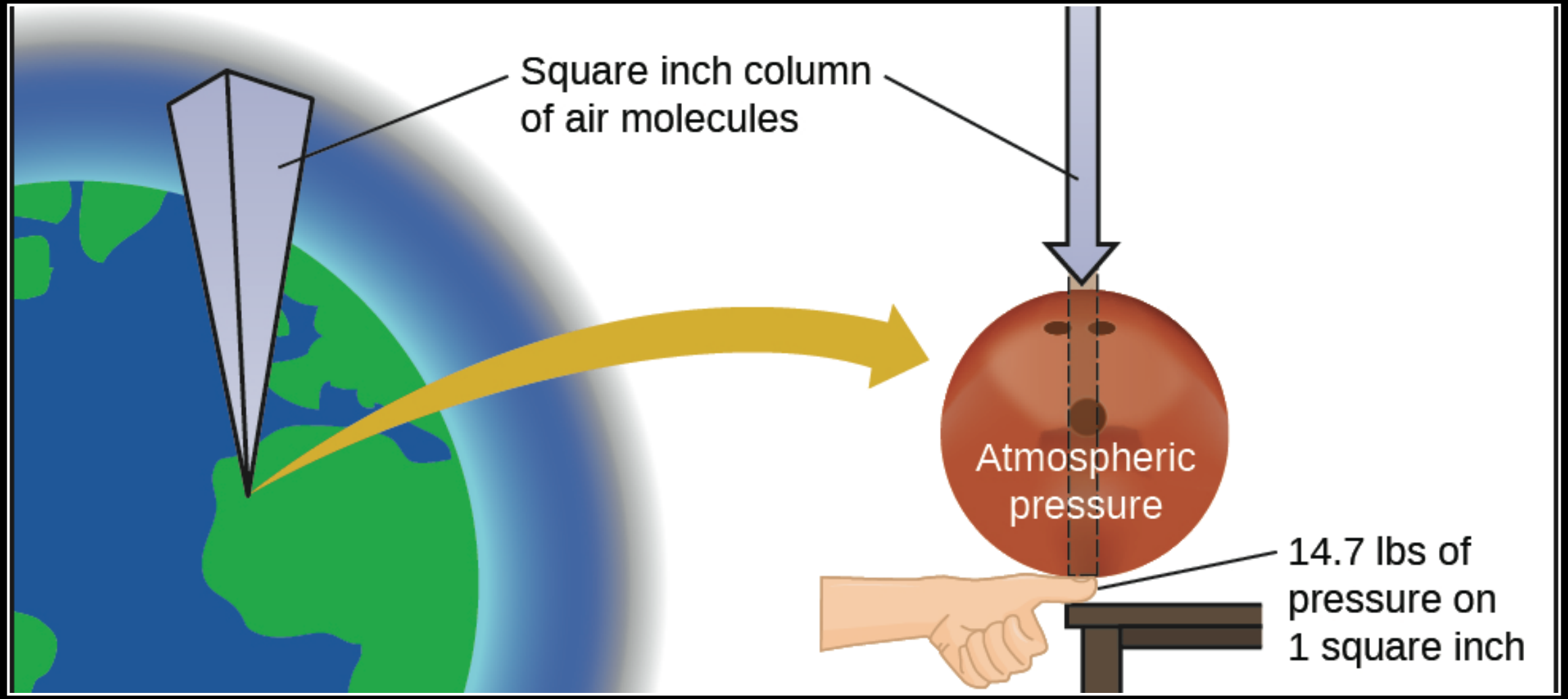


www.alliancecalibration.com

28”wc = 1 PSI

Pounds Per Square Inch (PSI)





ATMOSPHERIC PRESSURE (Atm)

GAS PRESSURE CHEAT SHEET

PRESSURE EQUIVALENTS		
28”WC	=	1 PSI
14”WC	=	½ PSI
7”WC	=	¼ PSI
1 PSI	=	0.14 kPa
1 kPa	=	4”WC
1 BAR	=	14.7 PSI
Atm	=	14.65 PSI

QUESTIONS?