

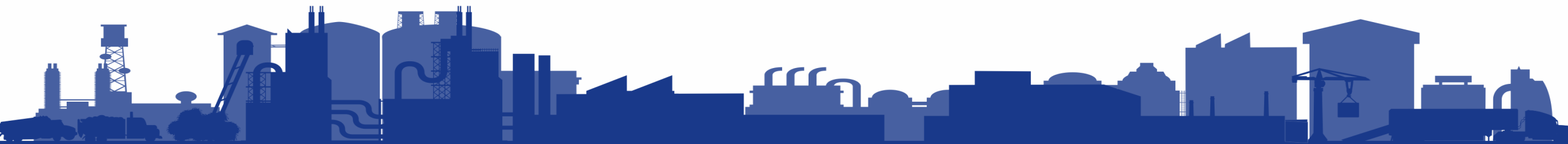


WATER VIRTUAL IN-PLANT (VINPLT) TRAINING

Session 8



Session 8: Closeout



Thank You!

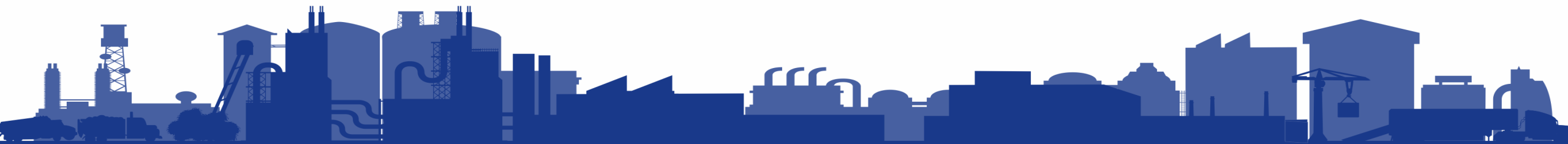
Sponsor:



Today's Agenda

	Recap of Materials Covered
	Participant Presentations
	Break
	Closeout Activity
	Participant Presentations
	Evaluation

SESSIONS RECAP



Session 1 Recap

Introduction, Energy Basics, & Power Company Relationships



Flow

gpm

POWER
(demand)

kW

Volume


gal

ENERGY
(consumption)

kWh

Session 1 Recap

Introduction, Energy Basics, & Power Company Relationships

ACME **ELECTRIC** 

February 2019

Account ID	0004 1234-56789 8	Invoice Number	123456789
Billing Dates	12/31/2018- 1/31/2019 32 days of service	Current Charges	\$29,760.80
		Due By	2/15/2019

METER # ABC123456, Schedule 81 Secondary

Service Description

Basic Charge	560.00
System Usage Charge	593.85
Off-Peak Usage of 195446.000 kWh x \$0.0335	6,547.44
On-Peak Usage of 295347.000 kWh x \$0.0504	14,885.49
Demand Charge of 932.000kW x \$1.9500	1,817.40
Transmission Charge of 932.000 kW x \$0.910	848.12
Distribution Facility Capacity Charge of 1017.00 kW x \$2.0600	2,095.00
	\$27,347.32

Taxes and Adjustments

City Tax (1.5%)	410.21
Public Purpose Charge (3%)	820.42
108 Regulatory Adjustments	29.47
115 Energy Efficiency Funding	1,153.38
	\$2,413.48

Period Ending	Avg Daily Temp	Avg kWh per day	Avg Cost per day
1/31/2019	71.5	15338	930.03
1/31/2018	73.1	15021	889.25

Session 1 Recap

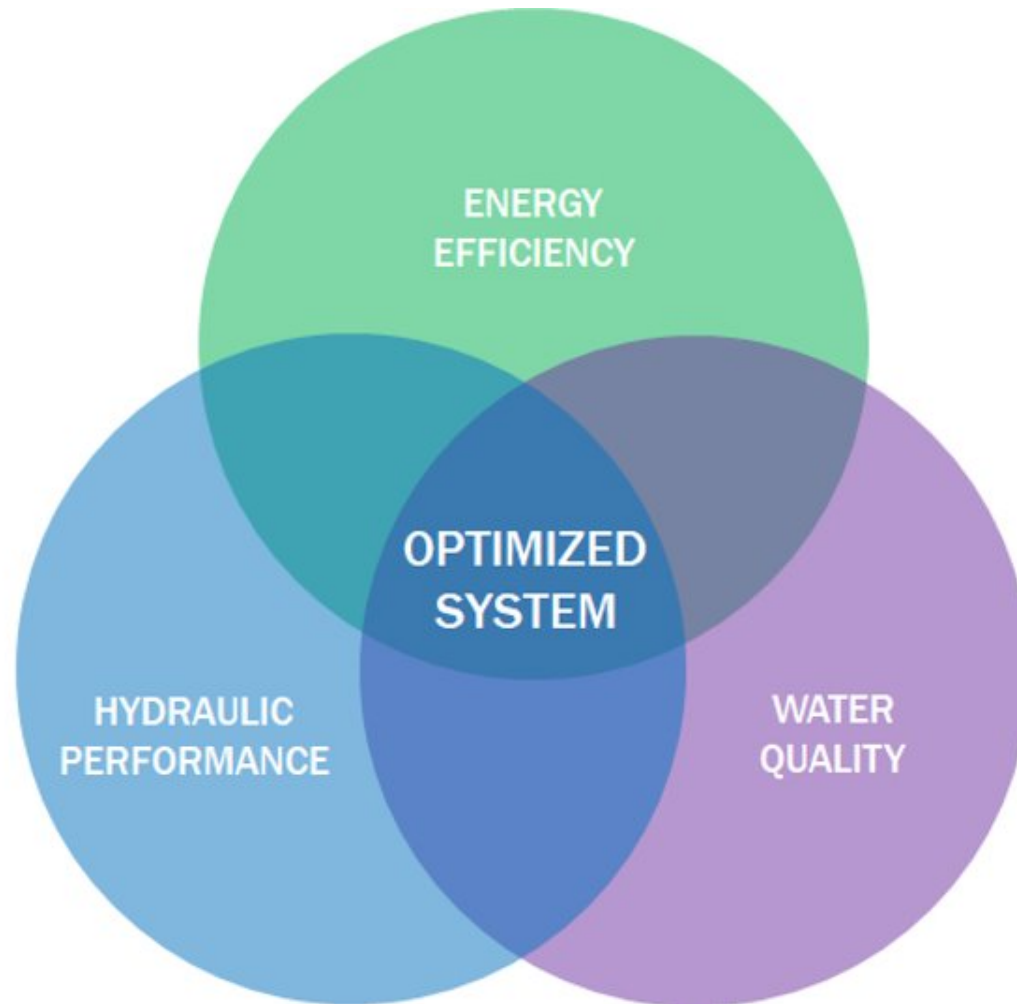
Introduction, Energy Basics, & Power Company Relationships

Energy Projects

Energy Project		VALUE MATRIX		Step	Identify					
		GO TO VALUE MATRIX		1						
Opportunity #	Opportunity Name	Savings (1-10)	Cost/Effort (1-10)		Opportunity Description	Location	System*	Date Submitted	Capital or O&M	Submitted By
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										

Session 1 Recap

Introduction, Energy Basics, & Power Company Relationships



Jones and Sowby, "Water System Optimization" (*Journal AWWA*, June 2014)

Session 1 Recap

Introduction, Energy Basics, & Power Company Relationships



Idaho Power
8,969 followers
1mo •

...

The City of McCall recently worked with Idaho Power and [SPF Water Engineering, LLC](#) to install variable frequency drive controllers at one of their pump stations.

The City received a \$32,446 incentive from Idaho Power's Commercial and Industrial Energy Efficiency program and is saving 180,258 kWh/year. That's enough energy to power over 15 average size homes for a year!



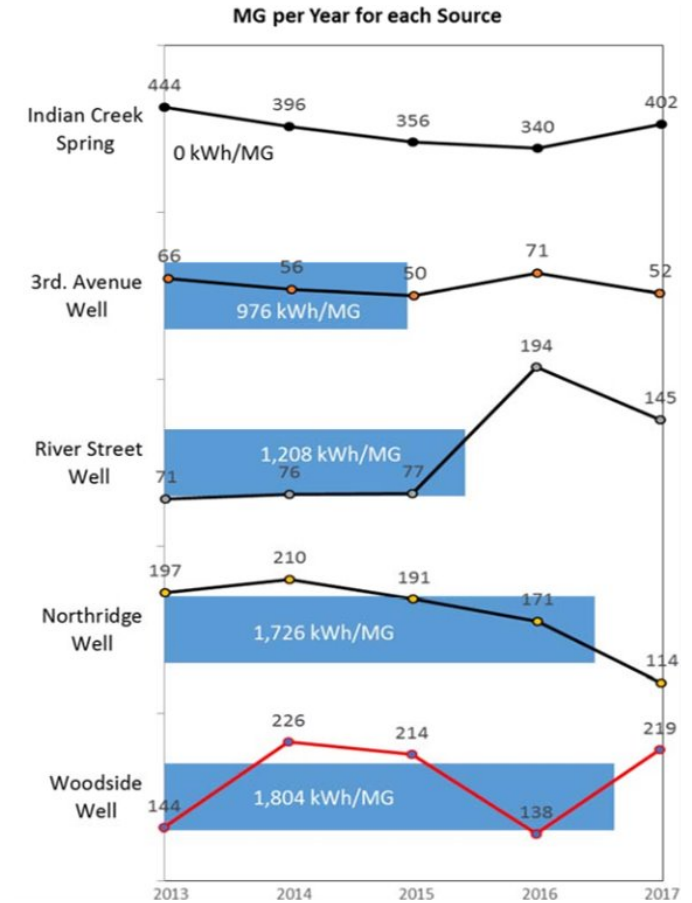
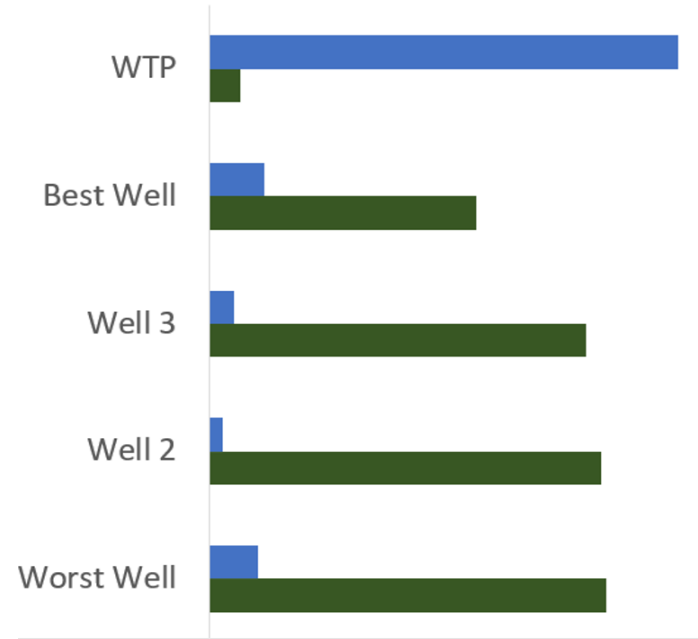
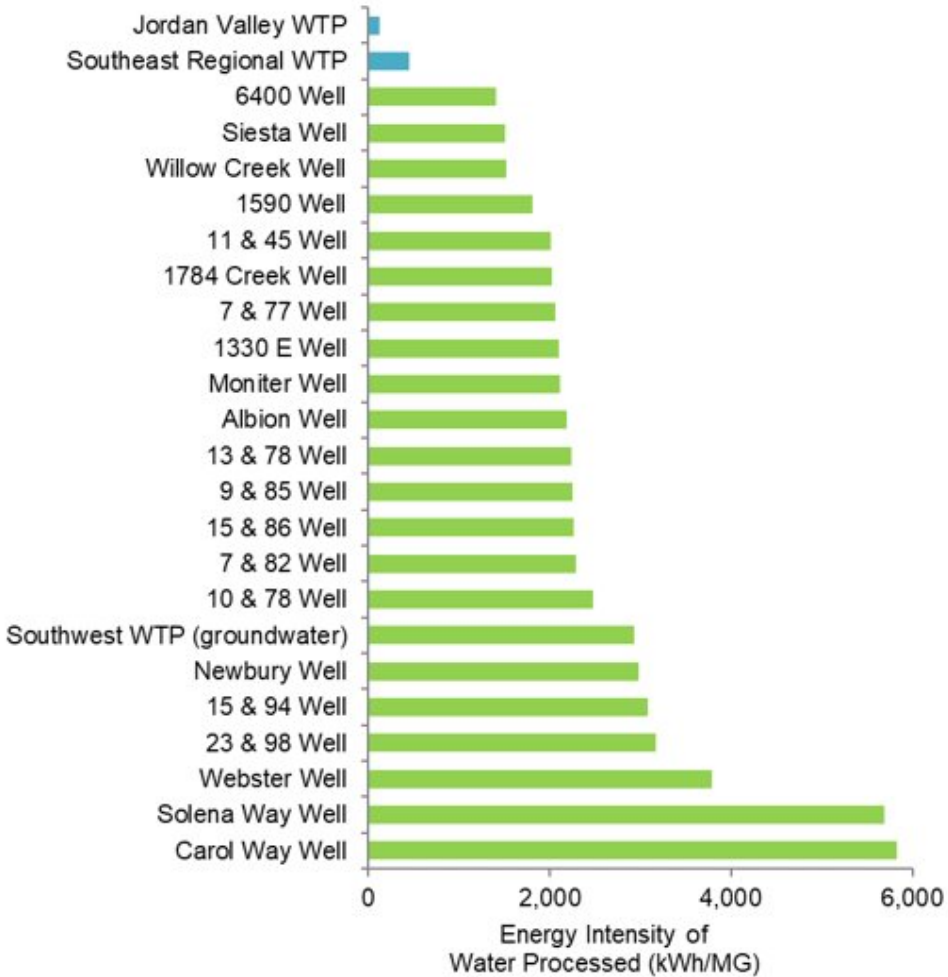
Session 2 Recap

Water Source Selection, KPIs, and Energy Teams

Measurement → Understanding → Control → Improvement

Session 2 Recap

Water Source Selection, KPIs, and Energy Teams



Session 2 Recap

Water Source Selection, KPIs, and Energy Teams



Session 3 Recap

Water Treatment and the 5 L's

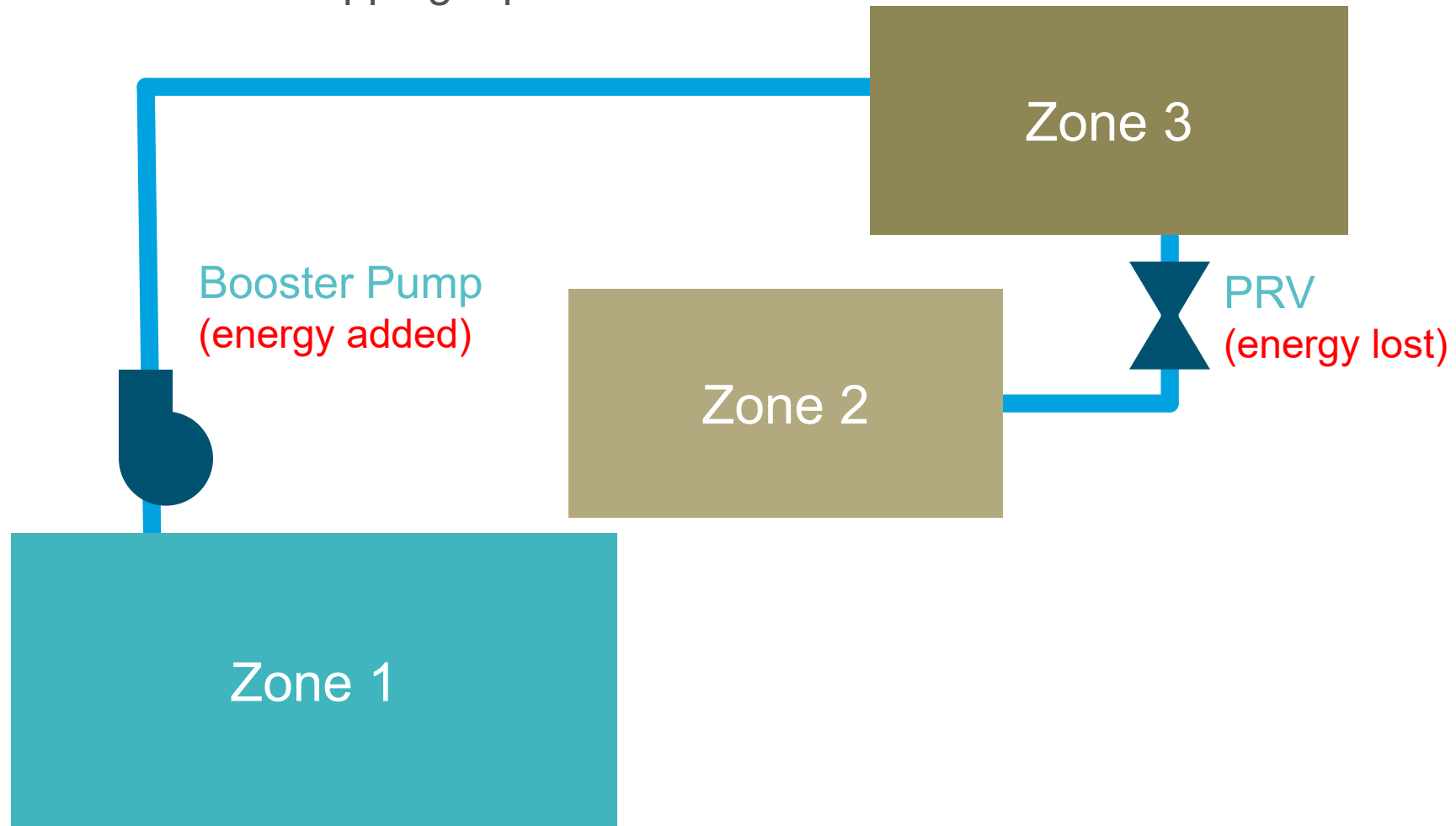


- Provide flexibility in influent pumps (multiple, VFD)
- Optimize chemical dose to avoid excess sludge
- Control mixing with VFD
- Backwash filters on head loss or NTU, not time
- Backwash one filter at a time
- Provide flexibility in finished water pumps (multiple, VFD, d/s storage)
- Tune up, reschedule, or upgrade air compressors
- Reconsider solids handling depending on rate schedule
- Check HVAC settings

Session 3 Recap

Water Treatment and the 5 L's

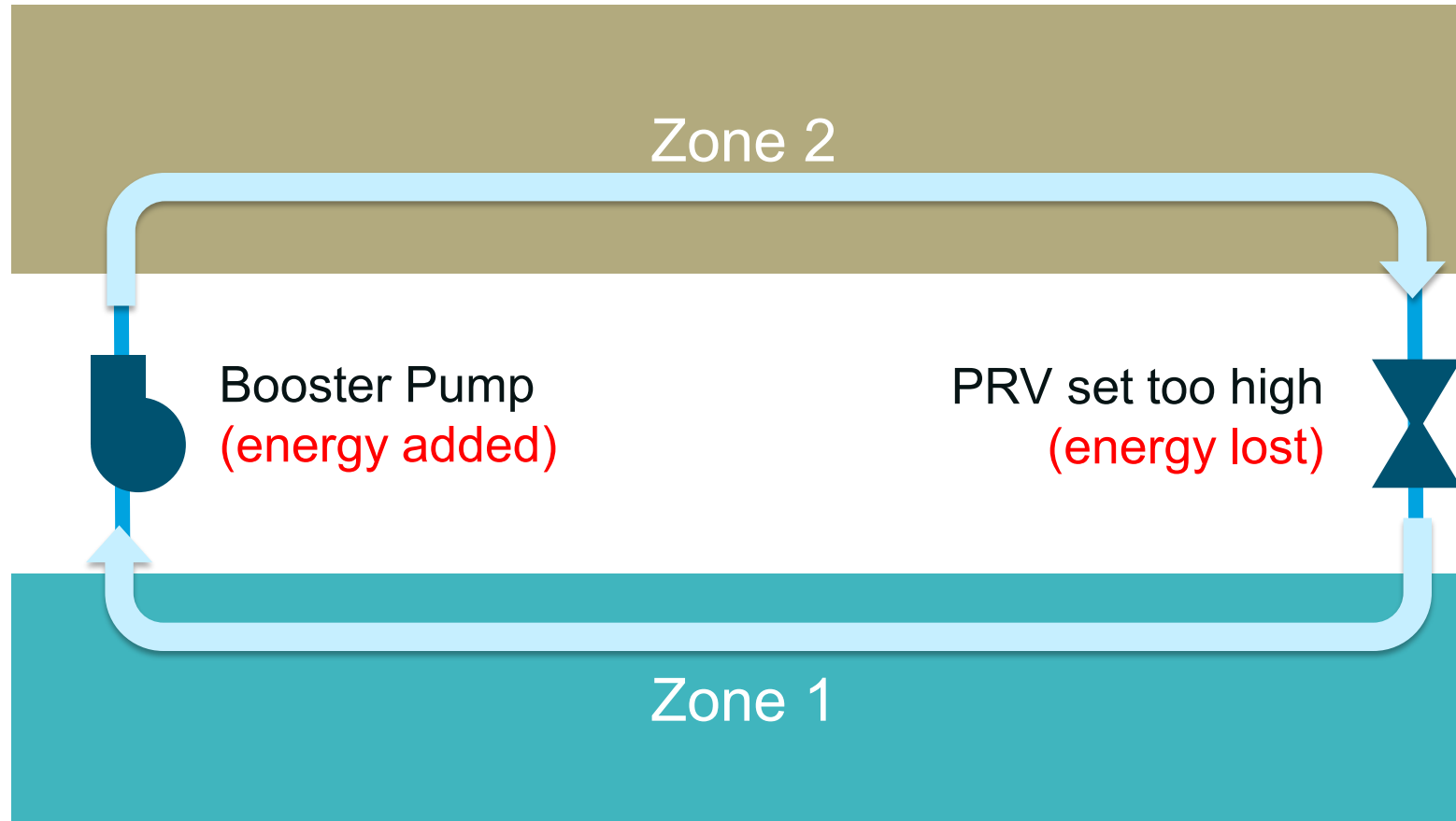
LEAPING: Skipping a pressure zone



Session 3 Recap

Water Treatment and the 5 L's

Looping: Pumping in Circles



Session 4 Recap

The 5 L's and Treasure Hunts

Leaking: Water loss is energy loss

Volume from Own Sources (corrected for known errors)	System Input Volume	Water Exported (corrected for known errors)	Billed Water Exported				Revenue Water	
		Water Supplied	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption		Revenue Water	
					Billed Unmetered Consumption			
				Unbilled Authorized Consumption	Unbilled Unmetered Consumption		Non-revenue Water	
					Unbilled Metered Consumption			
			Water Losses	Apparent Losses	Customer Metering Inaccuracies			
					Unauthorized Consumption			
					Systematic Data Handling Errors			
				Real Losses	Leakage on Transmission and Distribution Mains			
					Leakage and Overflows at Utility's Storage Tanks			
Leakage on Service Connections up to the point of Customer Metering								
Water Imported (corrected for known errors)								

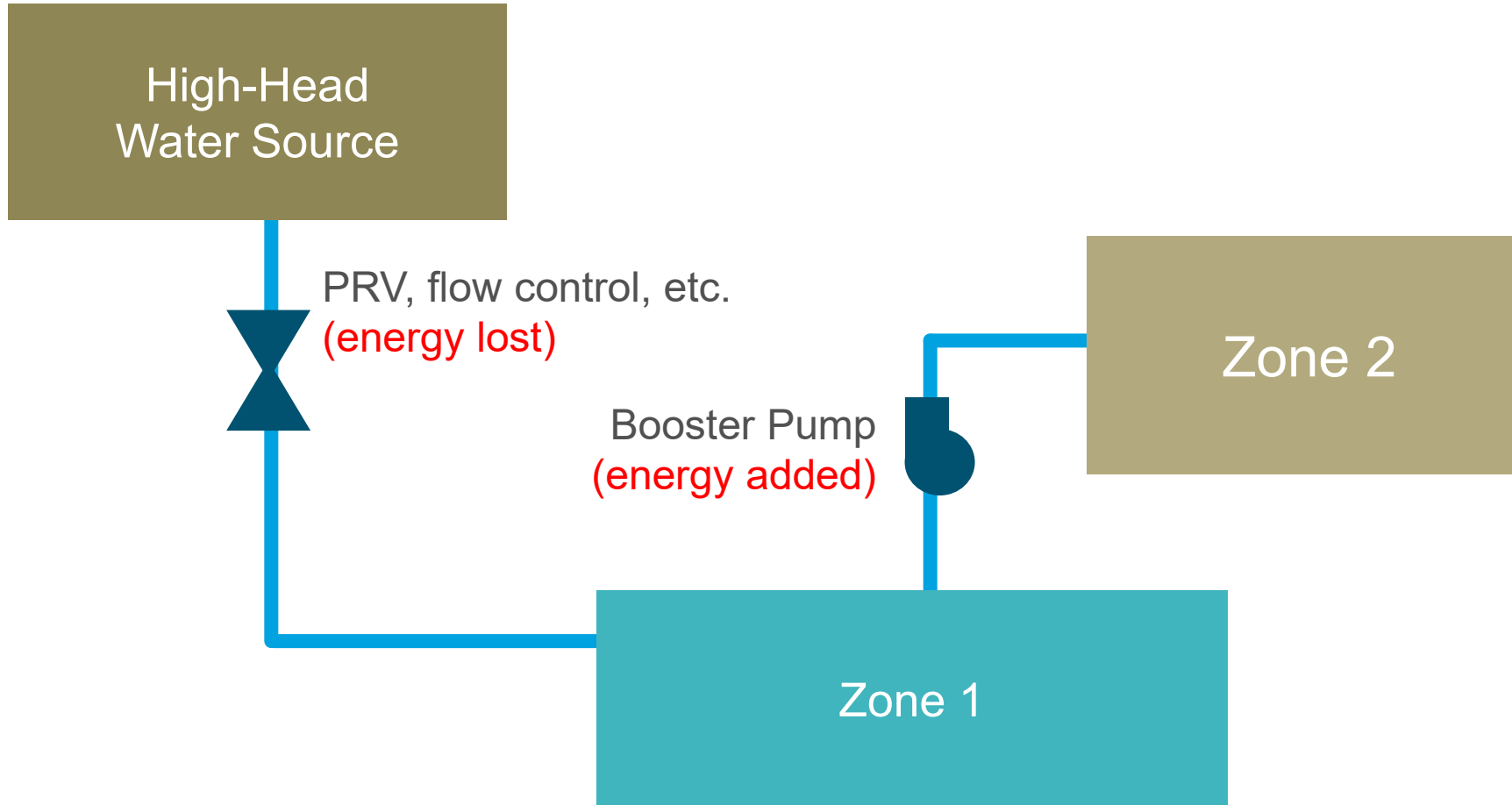


Leak on 12" main. Photo courtesy of Harold Hargaves, City of Pocatello, ID.

Session 4 Recap

The 5 L's and Treasure Hunts

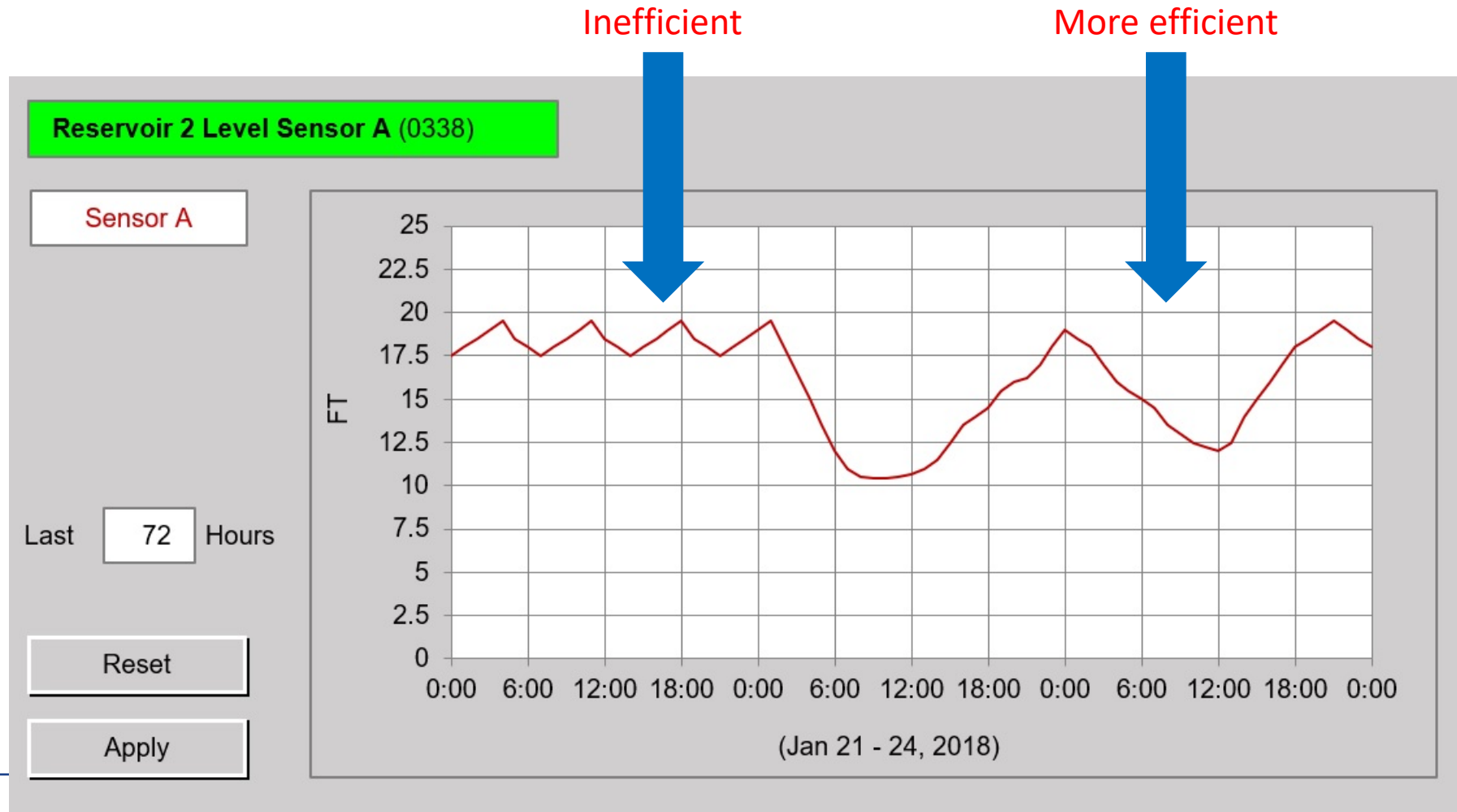
Losing: Breaking beneficial pressure prematurely



Session 4 Recap

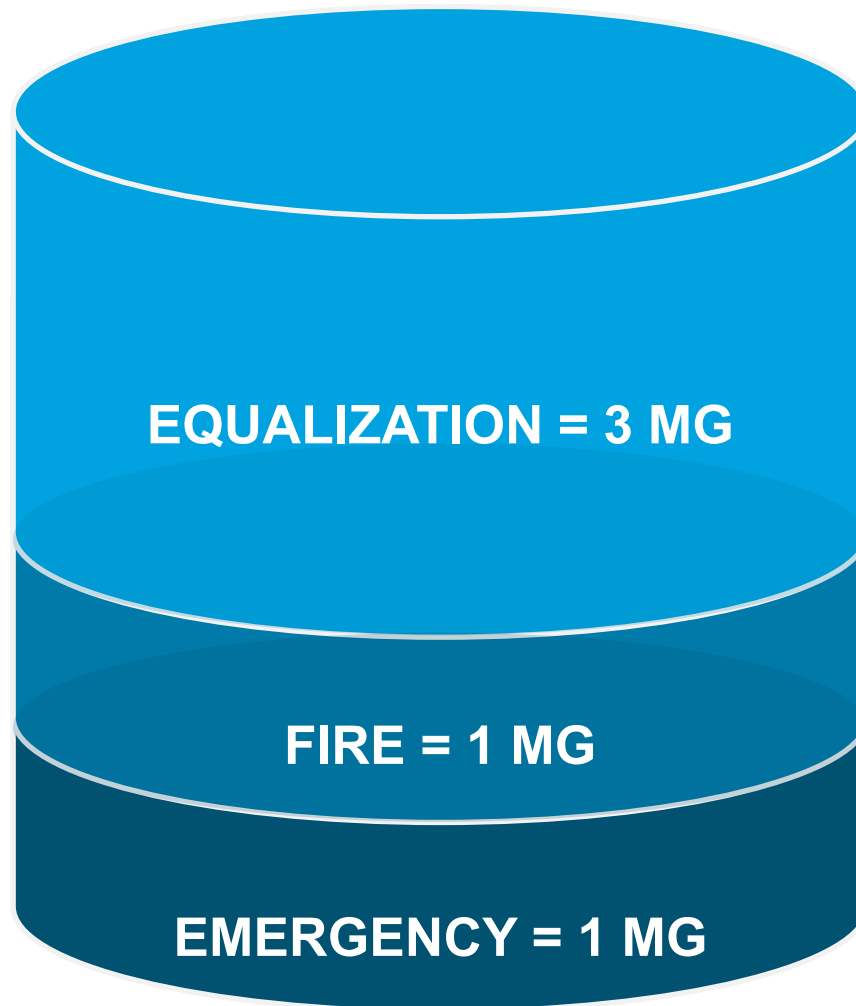
The 5 L's and Treasure Hunts

Loading: Meeting peak demand with pumps instead of storage



Session 4 Recap

The 5 L's and Treasure Hunts



Tanks are batteries!
Meet peak demand with **storage**

Session 4 Recap

The 5 L's and Treasure Hunts

Treasure Hunt Overview



**Identify priority
systems/areas**

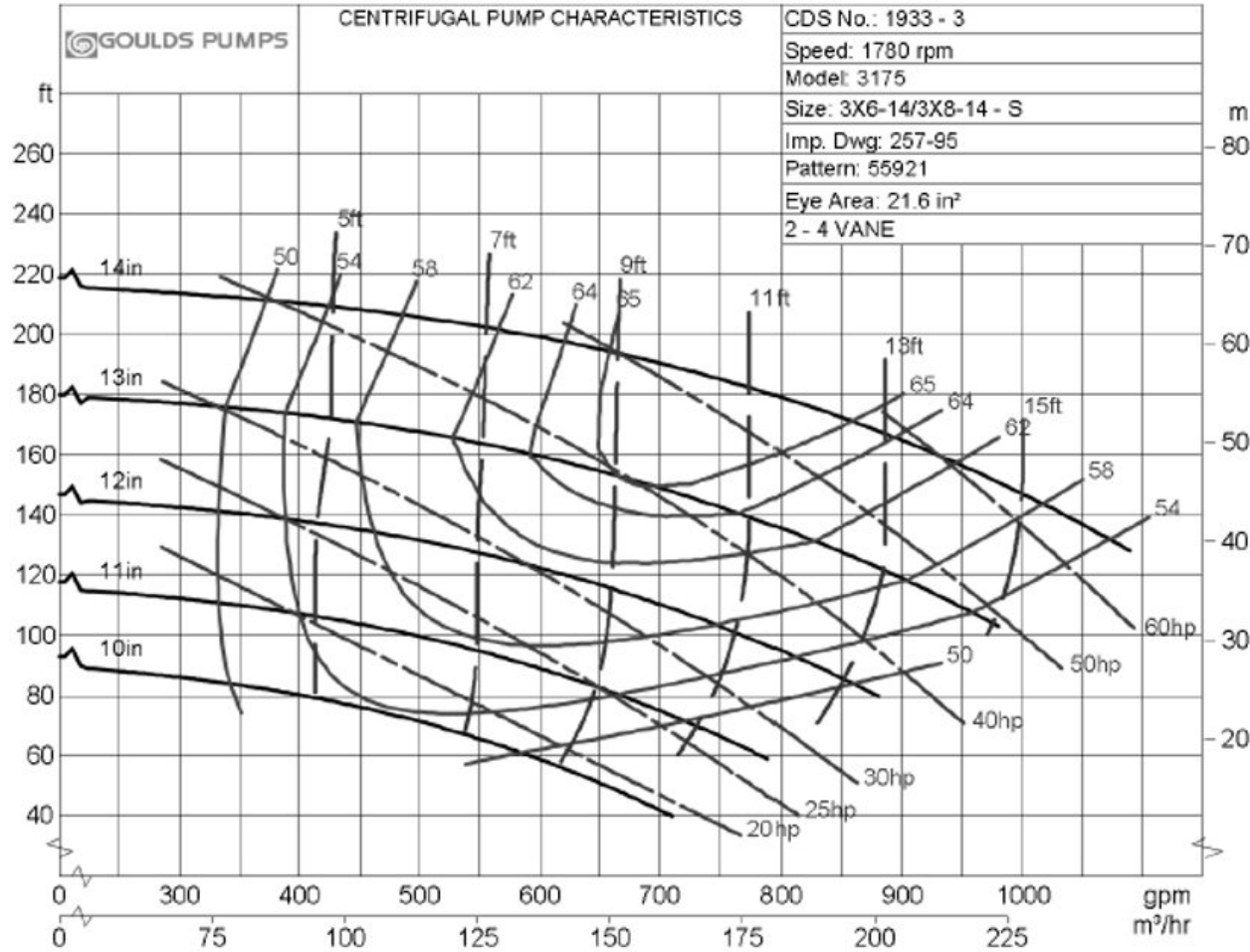
**Break into
teams**

**Brainstorm
opportunities**

**Prioritize
and schedule**

Session 5 Recap

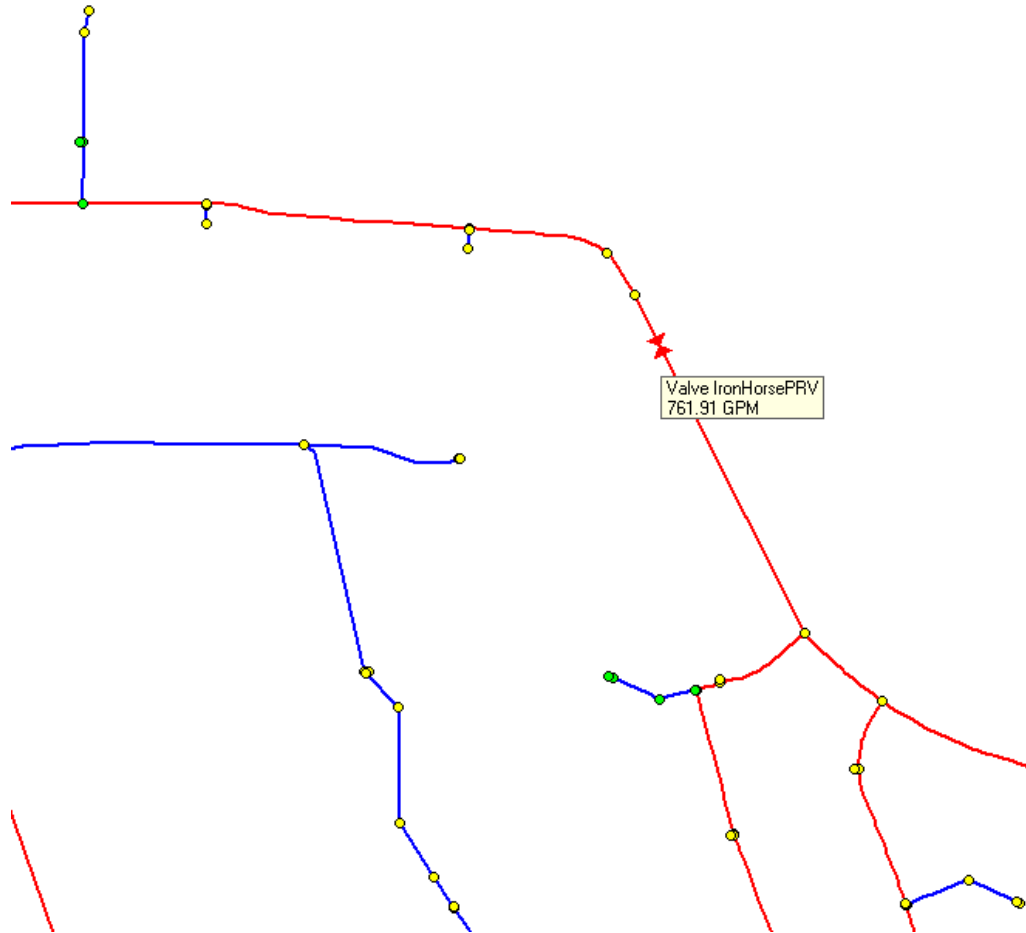
Pumps!



- How to calculate pump power
- How read pump curves
- How to choose impellers for efficiency
- How to find the operating point
- What happens when you throttle a valve
- What happens when you change speed
- Why pumps are often oversized!

Session 6 Recap

Hydraulic Modeling and Energy-Efficient Design



Hydraulic Modeling for Energy Analysis

- Identify areas of extreme pressure
- Test new valve settings
- Trace water traveling from a certain source
- Test new pump setpoints to improve tank level fluctuation
- Verify size of proposed pumps or pipes
- And more!

Session 6 Recap

Hydraulic Modeling and Energy-Efficient Design

- Consider full range of operating conditions
- Allow control AND efficiency
- Look beyond capital costs
- Plan for growth
- Include measurement devices
- Remember lights and HVAC
- Use power company incentives!



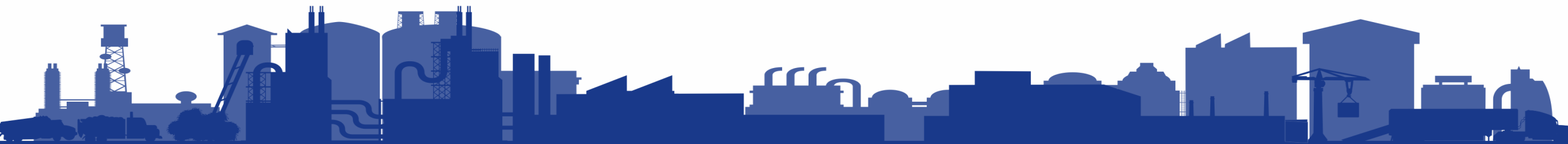
Session 7 Recap

Persistence Strategies

- Engaged people are the key to success.
- An engaged workforce understands their goals, knows their impact, is empowered to act, is aware of the process, and is recognized for contributing.
- **An engaged workforce saves energy!**



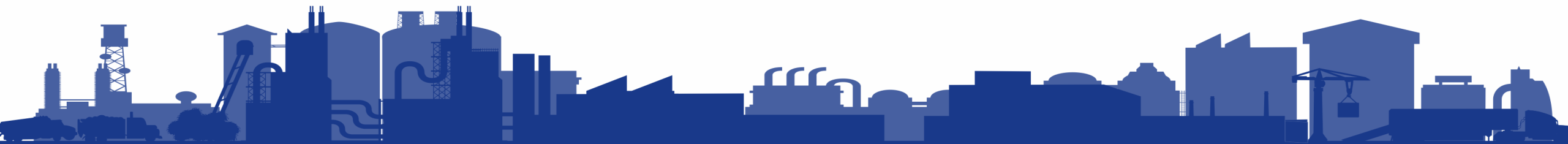
PARTICIPANT PRESENTATIONS



BREAK



PARTICIPANT PRESENTATIONS



EVALUATION

