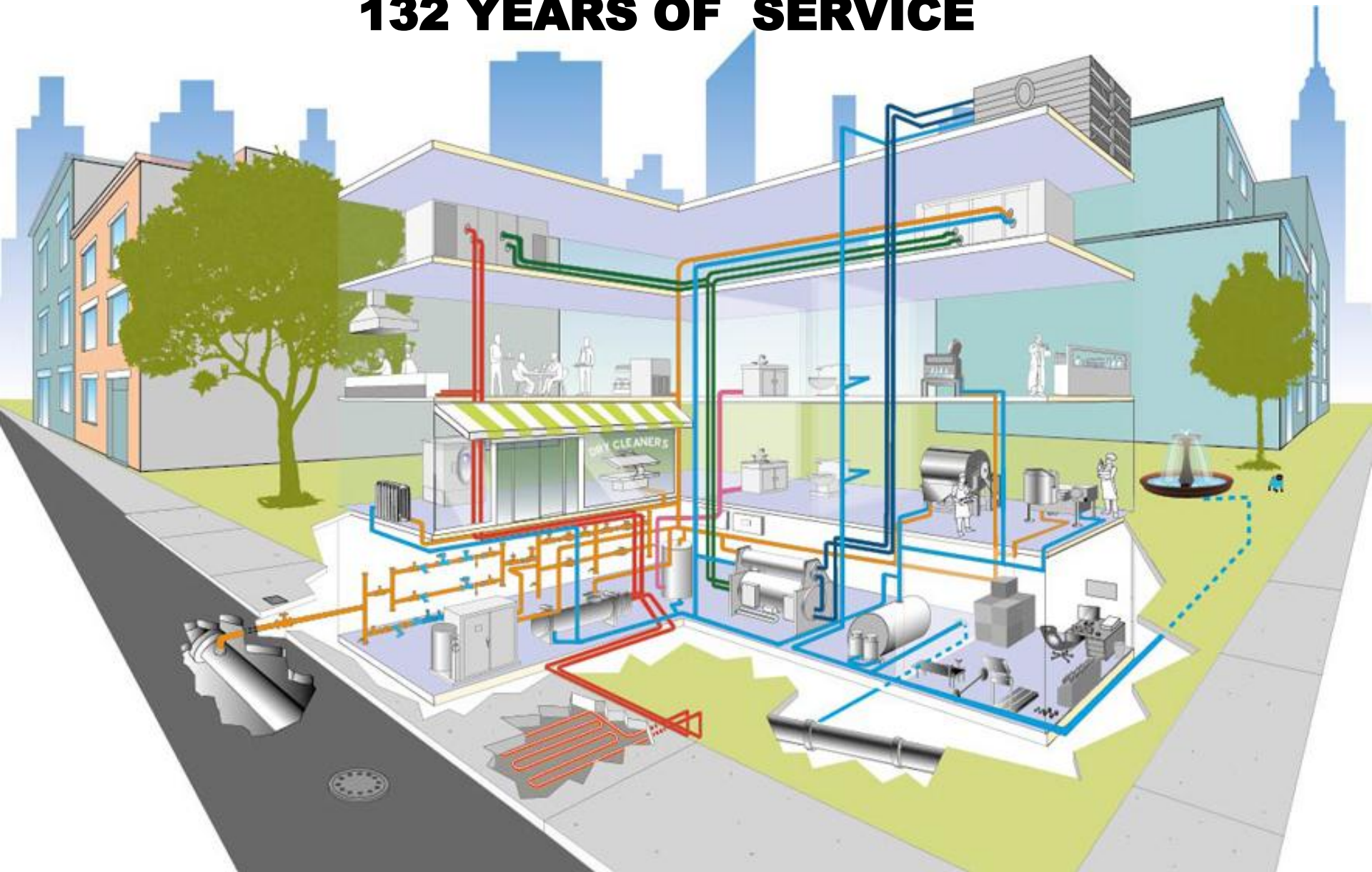
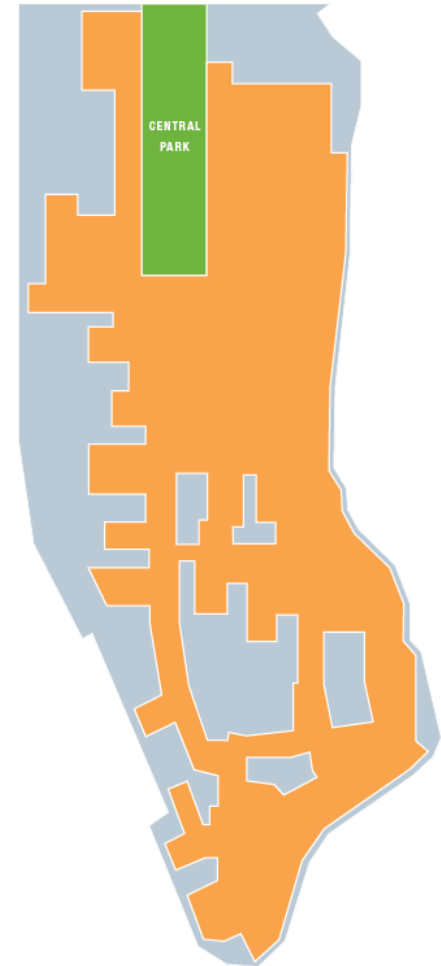


“BUILDING ON STEAM” 132 YEARS OF SERVICE

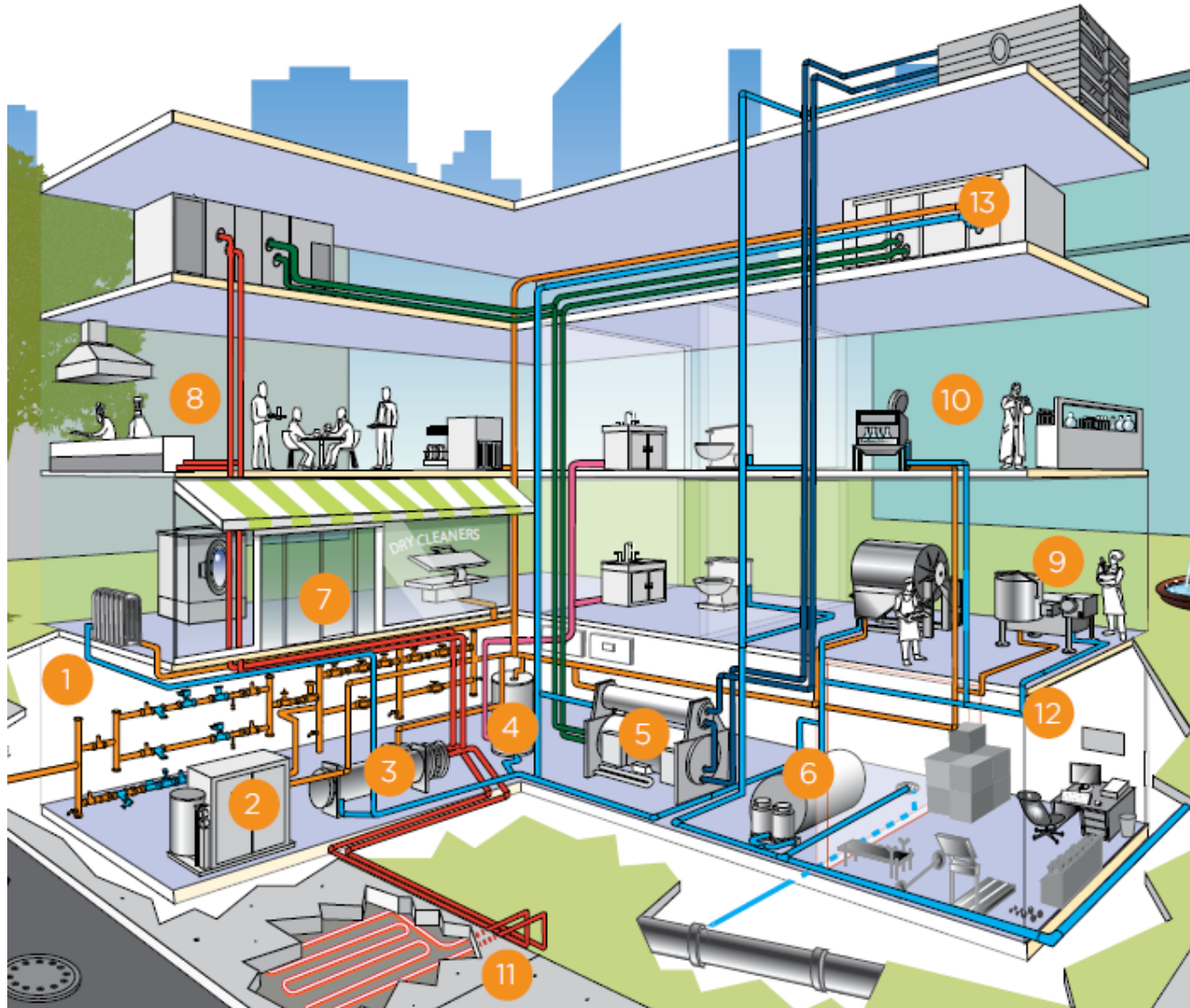


Who We Are

- **Largest district steam system in the U.S.**
- **Deliver energy at competitive costs**
 - Invest in our system to maintain reliability and reduce risk
- **Customer Focused**
 - 1,703 customer accounts
- **Long-Term Viability**
- **Leverage clean energy sources, energy efficiency, and new technologies**

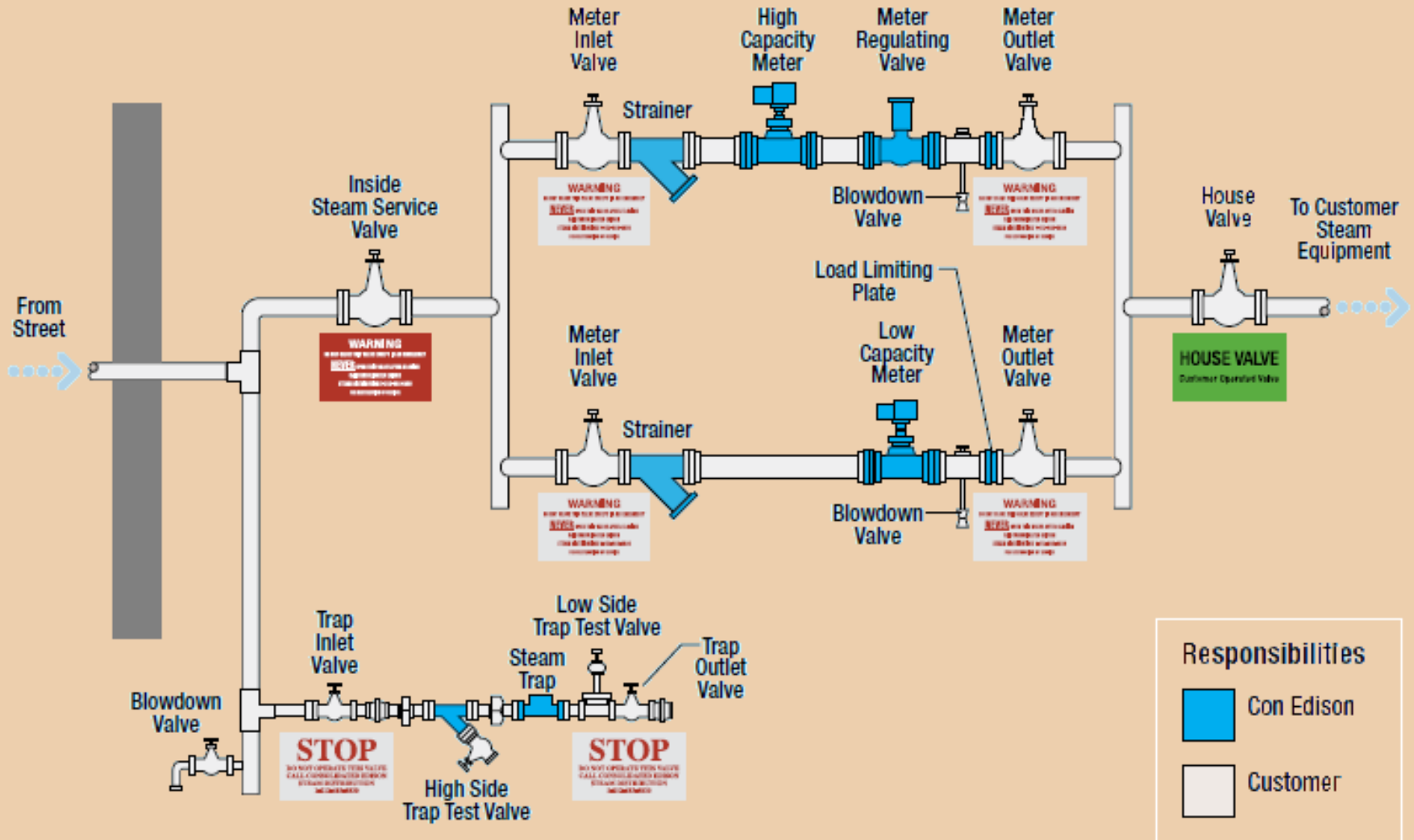


Customers and Uses of Steam



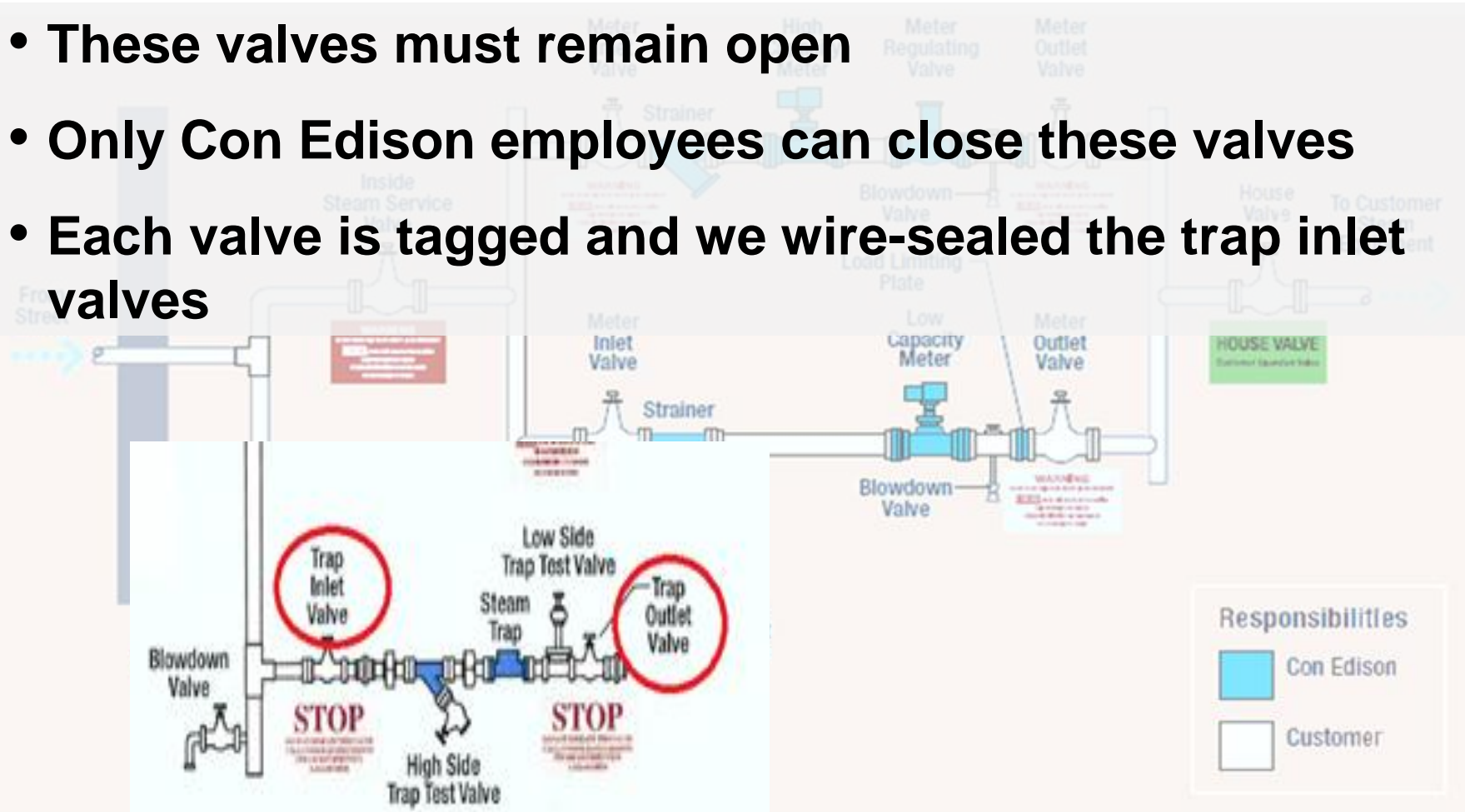
1. Metering/PRV Station
2. Energy Production
3. Heat/Hot Water Distribution Systems
4. Domestic Hot-Water Systems
5. Air-Conditioning
6. Condensate Collection and Reuse
7. Dry Cleaning
8. Cafeteria/Kitchen
9. Food Processing
10. Lab/Hospital
11. Cleaning
12. Recovered Space
13. Humidification

Typical Customer Meter Station



Trap Inlet and Outlet Valves – Leave Them to us

- These valves must remain open
- Only Con Edison employees can close these valves
- Each valve is tagged and we wire-sealed the trap inlet valves



Inside Steam Service Valve – Always Keep Open

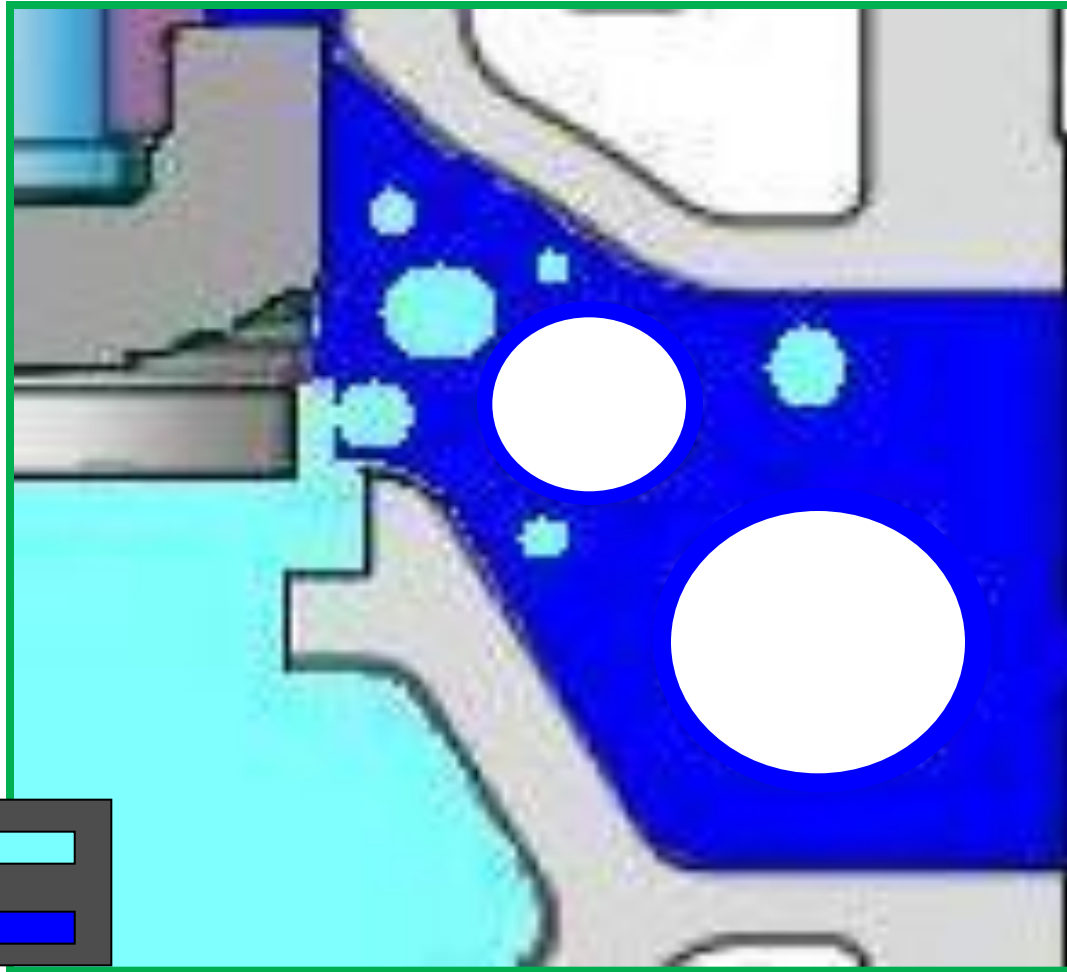
- Close only in an emergency
- Valve tagged with a warning sign
- If the valve is closed, call us immediately at 1-800-75 CONED (1-800-752-6633) so we can open it.



Watch Your Valves and Traps to Prevent Water Hammer

- **Cause:** When condensate is not effectively removed
- **Most common type:** A traveling slug of water
- **Our #1 operational priority** is to prevent it
- A Con Edison Engineer must be present before the steam main can be put back into service
- If you think you have water hammer, shut down your steam system and call Con Edison

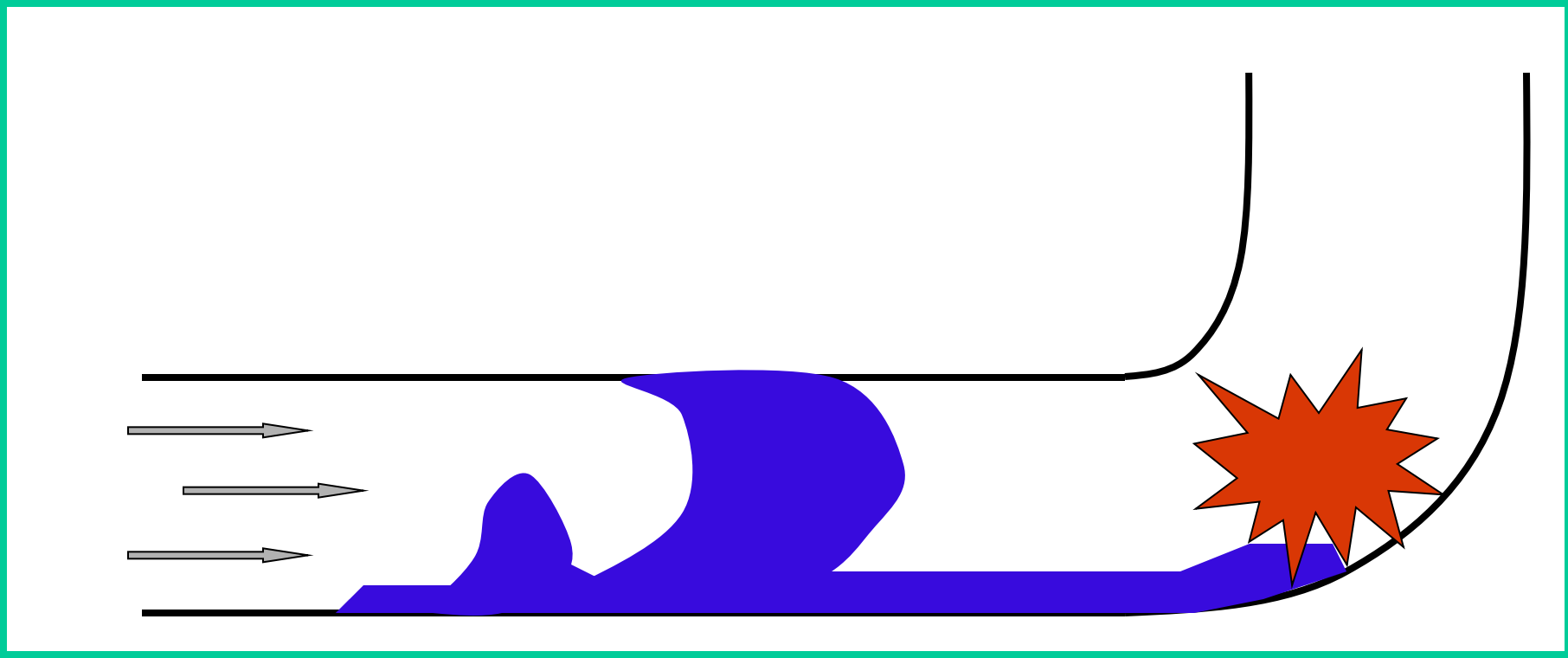
Bubble Collapse



Steam
Condensate



Slug Water Hammer



Recent Steam System Enhancements

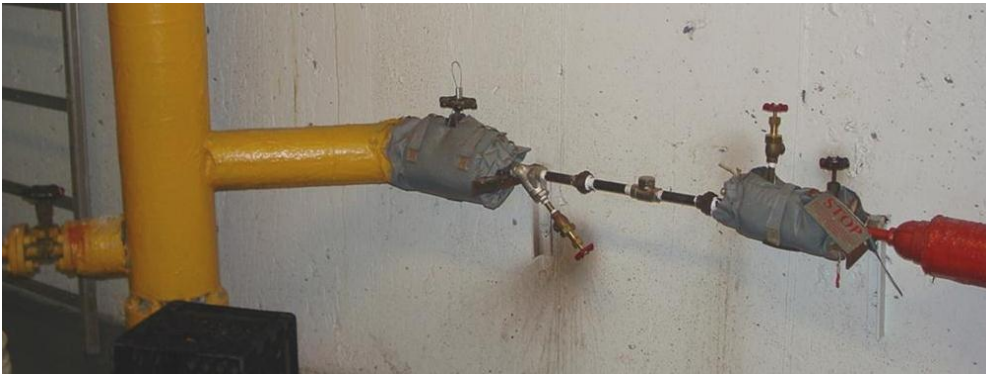
- Vortex metering & Customer benefits
 - Can communicate with Building Management Systems (BMS)
- State-of-the-art remote monitoring on our distribution system



STEAM Conservation Tips

- S** Shield Pipes and Valves from Heat Loss
- T** Thermal Energy Recovery from Condensate
- E** Ensure Vacuum at all Times, if Intended
- A** Avoid Space Overheating
- M** Maintain Steam Traps and Repair Leaks

Steam Meter Room Overview



- Trap inspection
- Tags & Seals
- Equipment operation and responsibility



Insulation

Insulate piping and fittings



Poorly maintained insulation



Missing insulation on valves/fittings



Proper insulation on pipes, valves, and fittings

Insulation - Annual Economics

Assuming Saturated Steam at 150 PSIG

	Size	Energy Lost, Bare	Energy Lost, Insulated	Energy Savings (Mlb)
Pipe (per ft-year)	12"	18.3	1.8	16.5
	8"	12.9	1.3	11.6
	4"	7.1	0.7	6.4
Gate Valve	12"	87.2	8.7	78.5
	8"	58.0	5.8	52.2
	4"	24.7	2.5	22.2

Based on data taken from US Department of Energy for heat loss and insulation efficiency

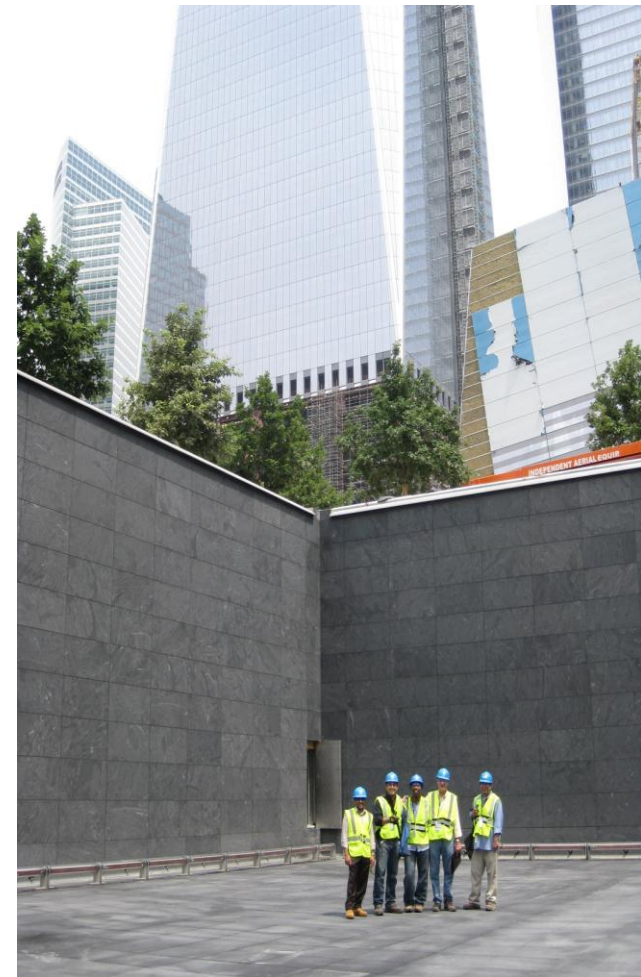
Condensate Re-Use and Thermal Recovery

- Install condensate heat recovery units
 - Preheat Domestic Hot Water (DHW)
 - Preheat Outside Air in Air Handling Units (AHU)
 - Heating fountains, swimming pools, spas
- Water Make-up/ Re-Use
 - Cooling tower, green roofs, toilets
 - Floor washing, watering plants



Condensate Re-Use and Thermal Recovery(Cont.)

- Condensate reuse guidance sketches are available at www.coned.com/steam
- Why re-use condensate?
 - Steam and water savings
 - The DEP charges for discharge into sewers. If you re-use condensate, you can apply to the DEP for a discount
 - Resulting water savings may help gain points in case the building is looking for LEED certification



Ensure Vacuum at all Times, if Intended

- If your steam system is designed to operate under vacuum, maintaining vacuum will ensure optimal operation.
- Loss of vacuum may occur if:
 - Traps are not maintained
 - Leaks
 - Pumps not working properly



Improve Space Heating



- Temperature Control
 - Reduce Overheating
 - Lower Space Temperature
- Controls through
 - Building-Wide: Building Management System (BMS)
 - Local: Thermostatic Radiator Valves
 - Steam A/C Turbine Chiller

Trap Inspection



- Blow-through can cause
 - Increased return condensate temperature
 - Steam balancing problems
→ occupant discomfort
- Routine maintenance to reduce these issues
- Typically less than 1 year payback

Steam Trap Evaluation

STEAM PRESSURE	TRAP SIZE	STEAM FLOW		LOSSES		
		Hourly	DAILY	\$/MLB	\$/DAY	\$/YEAR
(150 psig)	TD					
150	½	105	2.5Mlb	\$25.	\$63.	\$23,000
150	¾	152	3.6Mlb	\$25.	\$90.	\$33,000
150	1"	230	5.5Mlb	\$25.	\$138	\$50,000

Steam Leaks

- Sources:
 - Flanges and gaskets
 - Valve stems and bonnets
 - Pipes



Physical Improvements

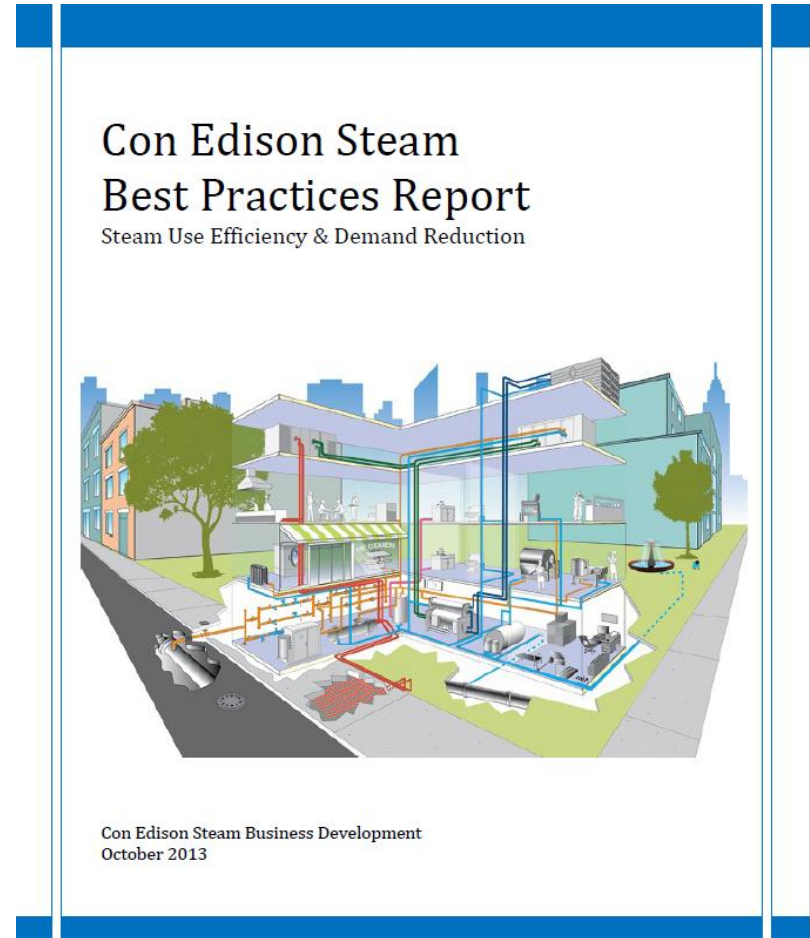
Leaks

- Annual Potential Savings from Steam Leak Repairs

Leak Pressure (PSI)	Hole Size (inches)	Steam Loss (lb/hr)	Consumption Savings (Mlb)
165	1/16	22	188.5
45	1/16	6	52.6
15	1/16	2	17.5
165	1/8	86	754.1
45	1/8	23	201.5
15	1/8	8	70.1

Steam Best Practices Report

- Available on the website www.coned.com/steam



Steam Operations



STEAM REPAIRS

Building Repairs

- Must Conform with the NYC Building Code
 - December 2011 NYC added insulation requirements to the Building Code
- Remember: Asbestos abatements require a final Air-clearance Report
- Major repairs and any welding on Meter Station require coordination with Con Edison Steam Engineering
- Take advantage of Con Edison outages
 - Please remember to notify Con Edison Steam of your repairs
 - Generally, Con Edison system repairs are scheduled between 11:00 p.m. – 6:00 a.m.



Steam Operations

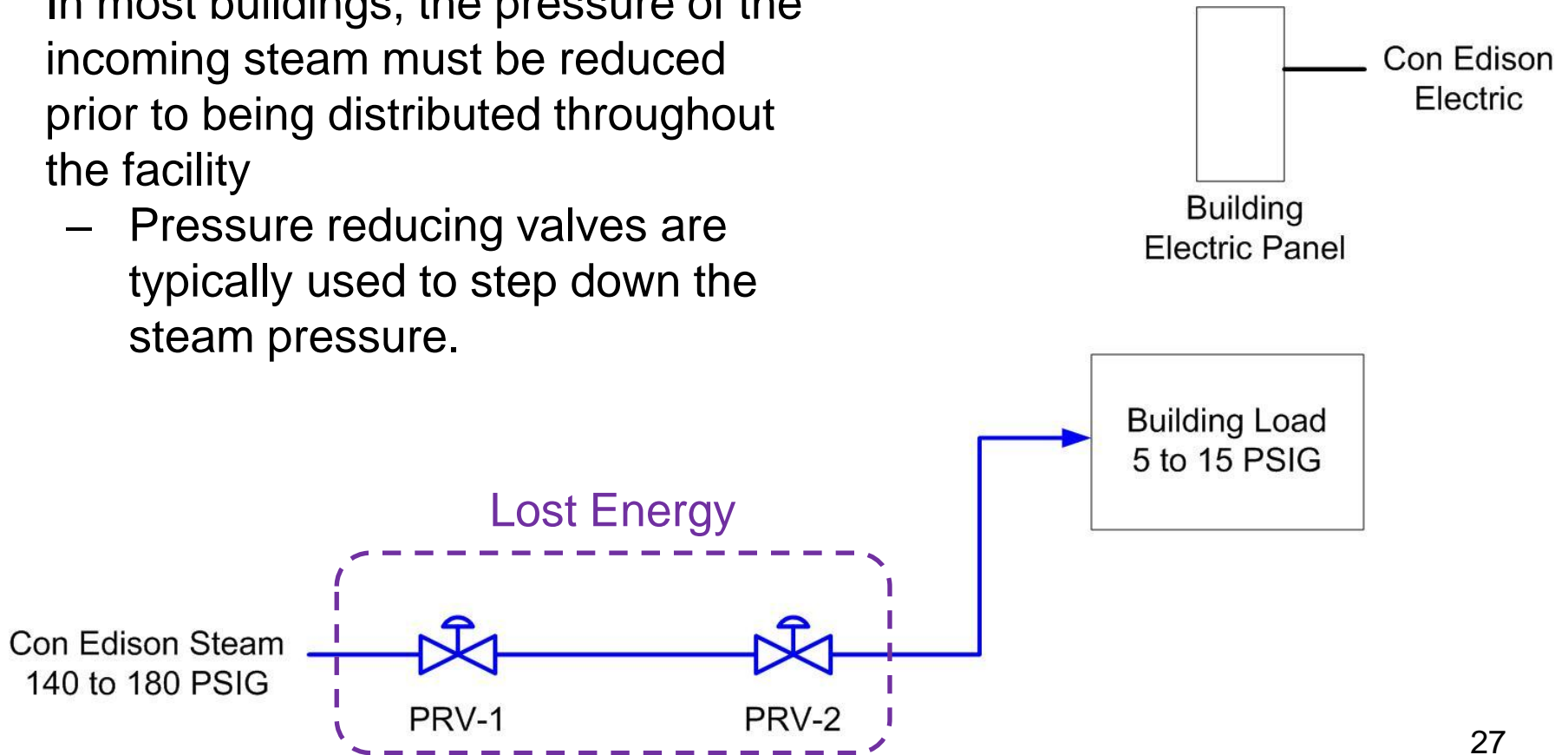


NEW TECHNOLOGIES AND STRATEGIES

Typical Configuration

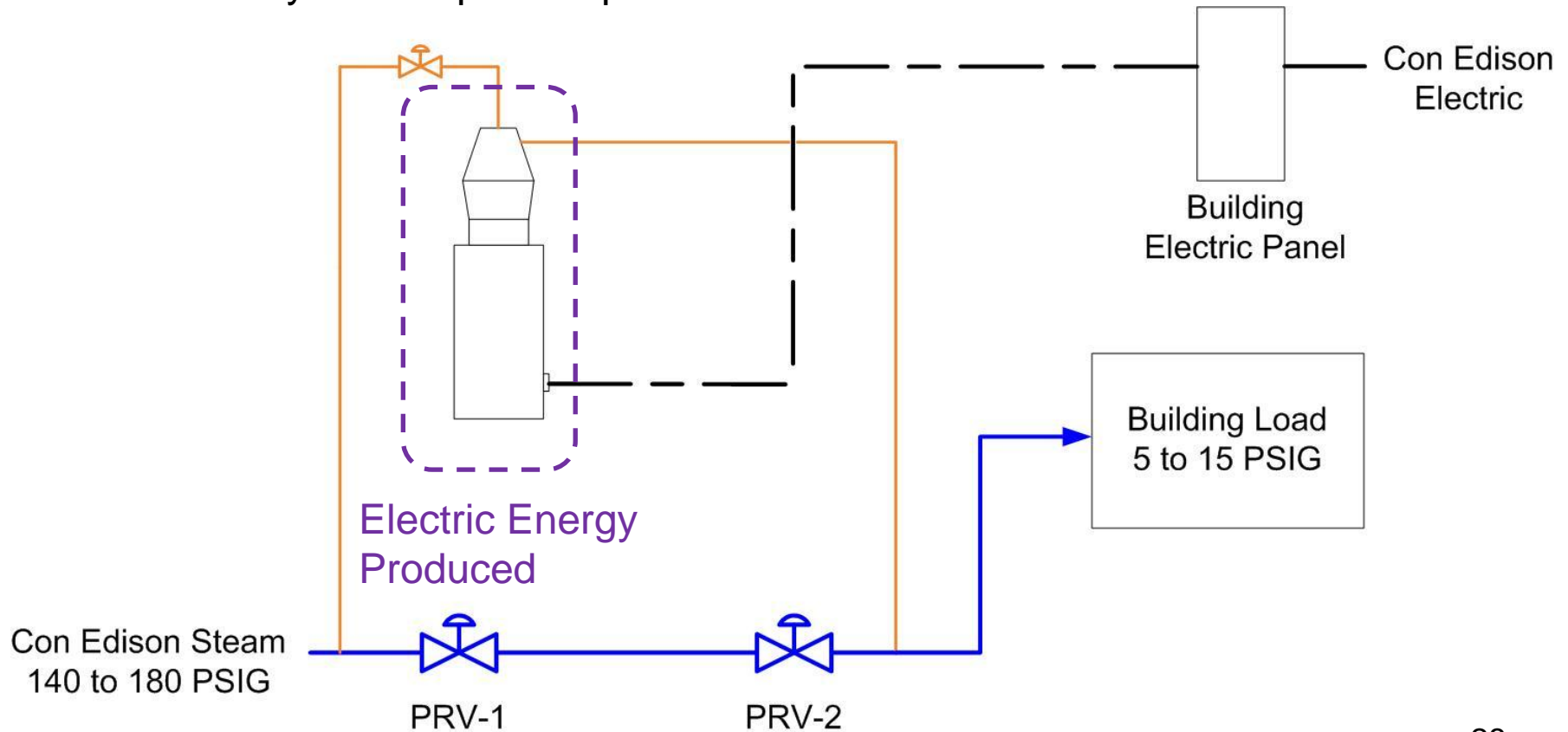
Typical Customer Configuration with Heating, Hot Water, and/or Low Pressure Steam AC

- In most buildings, the pressure of the incoming steam must be reduced prior to being distributed throughout the facility
 - Pressure reducing valves are typically used to step down the steam pressure.



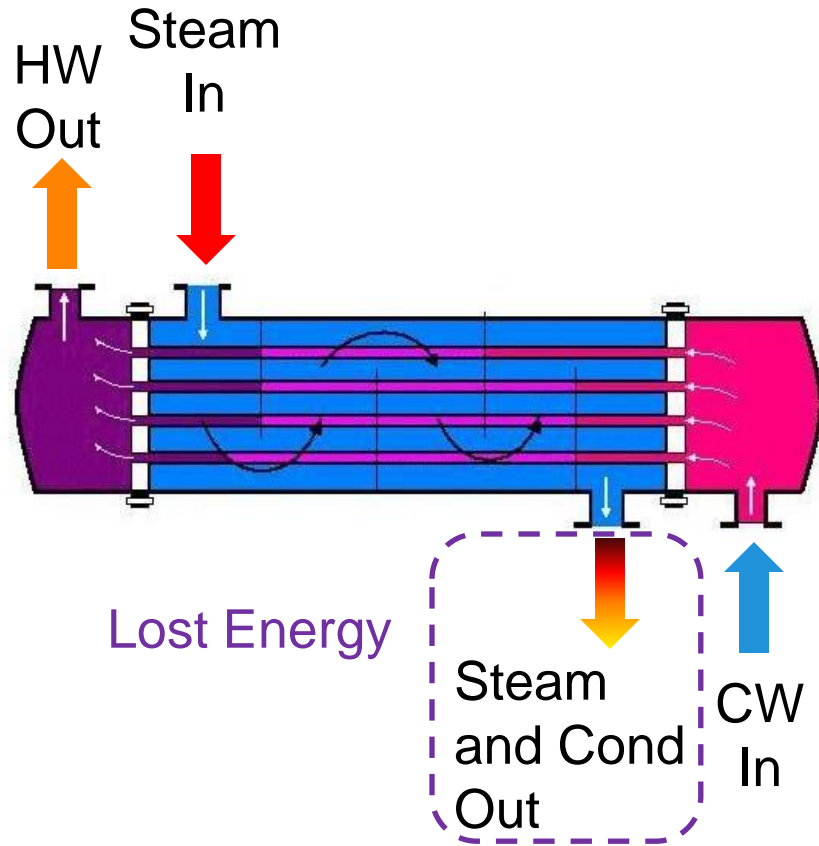
Steam Turbine Generator Application

- Steam Turbine Generators are devices that can be used for steam pressure reduction in parallel with pressure reduction valves
 - These units use incoming high-pressure steam to produce electricity and output low-pressure steam.

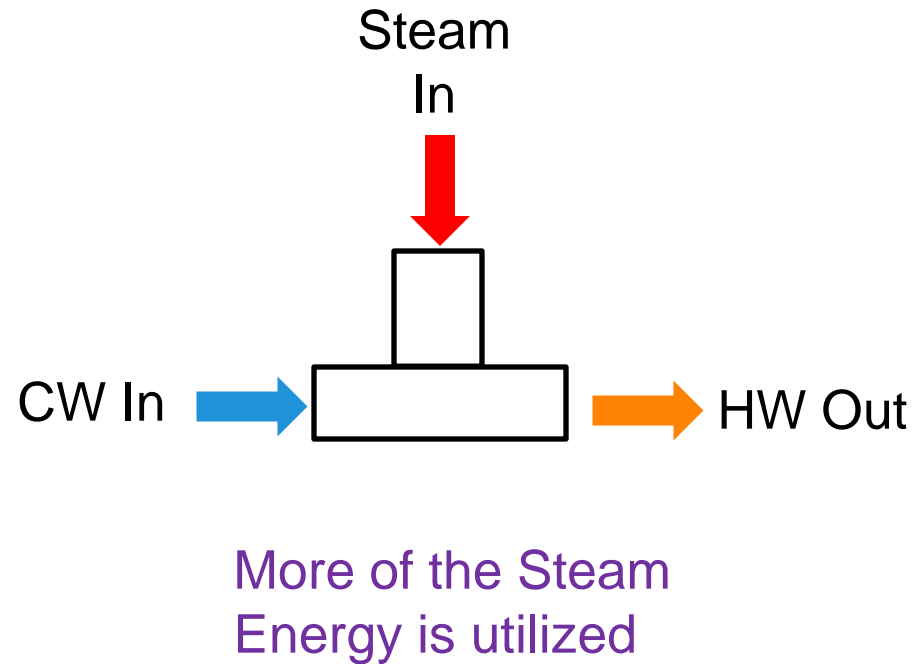


Direct Heat Exchanger (DHX) Systems (*non-potable application*)

Indirect Heat Exchanger System Shell and Tube HX



Direct Heat Exchanger System



DHX Systems

Application

- Extracts more energy from your steam supply
- Applicable to customers with hot water distribution and/or production
- Could reduce customer bills due to the reduced steam consumption through the reuse of condensate energy
- If a customer is installing one of these devices, they need to submit a new load letter so we can determine if any meter size modifications need to be made

**Steam
Operations**



STEAM AIR CONDITIONING INCENTIVE PROGRAM

Year Two Improvements

- Implemented Improvements:
 - All incentives have increased
 - Addition of Single Stage Absorption Chillers
 - Addition of Custom Project Option
 - Incentives will be reviewed and determined on a case-by-case basis.
 - The incentives will be available to all customers within the Manhattan electric networks.
- **Projects must be completed and fully operational by June 1, 2016**

Equipment Incentive Levels

Steam AC Equipment Type	Capacity Range	Incentive Level (\$ per ton)	Incentive Limit
Steam Turbine Chiller	Less than or equal to 1,700 tons	\$600	Up to 65% of the delivered equipment cost
	Greater than 1,700 tons	\$525	
Double Stage Steam Absorption Chiller	All	\$480	
Single Stage Steam Absorption Chiller	All	\$325	
Custom Chiller Project	All	Incentives determined on a case-by-case basis. Con Edison shall review the required material to determine the incentive offering for each eligible project.	

Large Project Bonus	
Electric Avoidance (kW)	Bonus
500 – 999	+10% of base incentive
>= 1000	+15% of base incentive

Projects must be completed and fully operational by:

June 1, 2016

Maintenance Incentive Levels

- Steam Chiller Maintenance Incentive (available for projects that have received the equipment incentive)

Maintenance Incentive Type	Incentive Level	Incentive Limit	Term
Maintenance Costs (Must have service contract w/ manufacturer)	\$5 per ton annually	\$3,000 annually	Up to ten years on an annual schedule
Remote Monitoring Bonus	\$2 per ton annually	\$1,000 annually	

Note – Both types of maintenance funding are contingent on submission of an executed preventive maintenance contract with the chiller manufacturer, or an authorized service provider, and invoices for the maintenance expenses incentivized by Con Edison.

Projects must be completed and fully operational by June 1, 2016

Program Information

- Joint effort between Energy Efficiency and Steam Operations
- Contact us today:

Program Staff

Targeted Steam AC Incentive Program

212-460-2011

steamAC@coned.com

www.conEd.com/steamAC

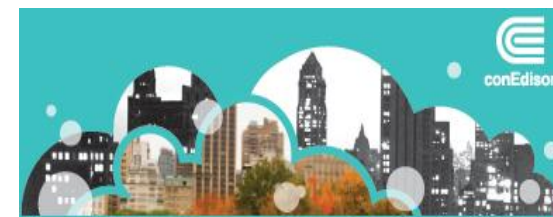
Steam Operations



PROGRAMS

Monthly Customer Seminars

- **Free** Steam Safety, Efficiency, and Maintenance seminar at Con Edison's Training Facility in Long Island City, NY
 - CEU credits available
- Open to building owners, managers, engineers, and maintenance staff
 - Consultants to building owners with proper authorization
- If you support a Steam Customer, you can attend by receiving a consent letter from our customer
- To register, contact:
steamcommunications@conEd.com



Con Edison Steam Operations
BUILDING ON STEAM

Monthly Customer Seminars

Seminar Schedule

May 14, 2014

June 18, 2014

July 16, 2014

August 20, 2014

September 17, 2014

October 22, 2014

November 19, 2014

December 10, 2014

Reducing our Carbon Footprint

- LEED credits for Steam Customers
- Fuel burn ~ 94% Gas in 2013
- Reduced carbon emission rates by 37% since 2007
- Increased Gas Burning Capability at 59th & 74th St Stations



Energy Assessment Program

- Free one-time energy efficiency assessment for customers
 - Steam Benchmarking
- An engineer reviews the steam system and makes site-specific and common recommendations such as:
 - Steam trap maintenance and/or assessment
 - Terminal unit controllability and monitoring
 - Condensate recovery
 - Insulation



Steam Operations



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Sheria Stallings
Christina Vlachos

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QUESTIONS?

