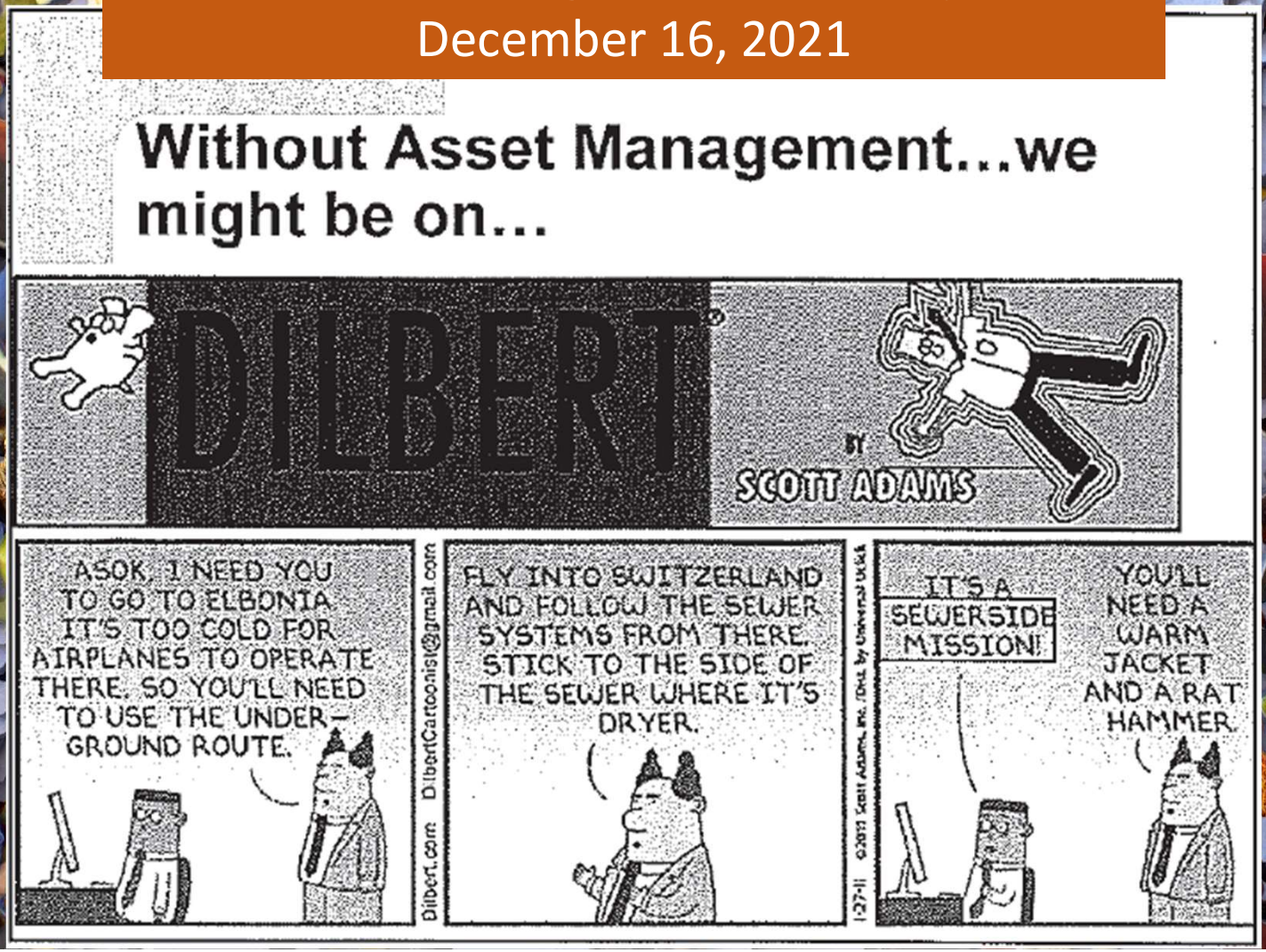
Asset Management Workshop
December 16, 2021



Asset Management Workshop
December 16, 2021

Identifying the Data Pieces You Need to Build Your Business Case

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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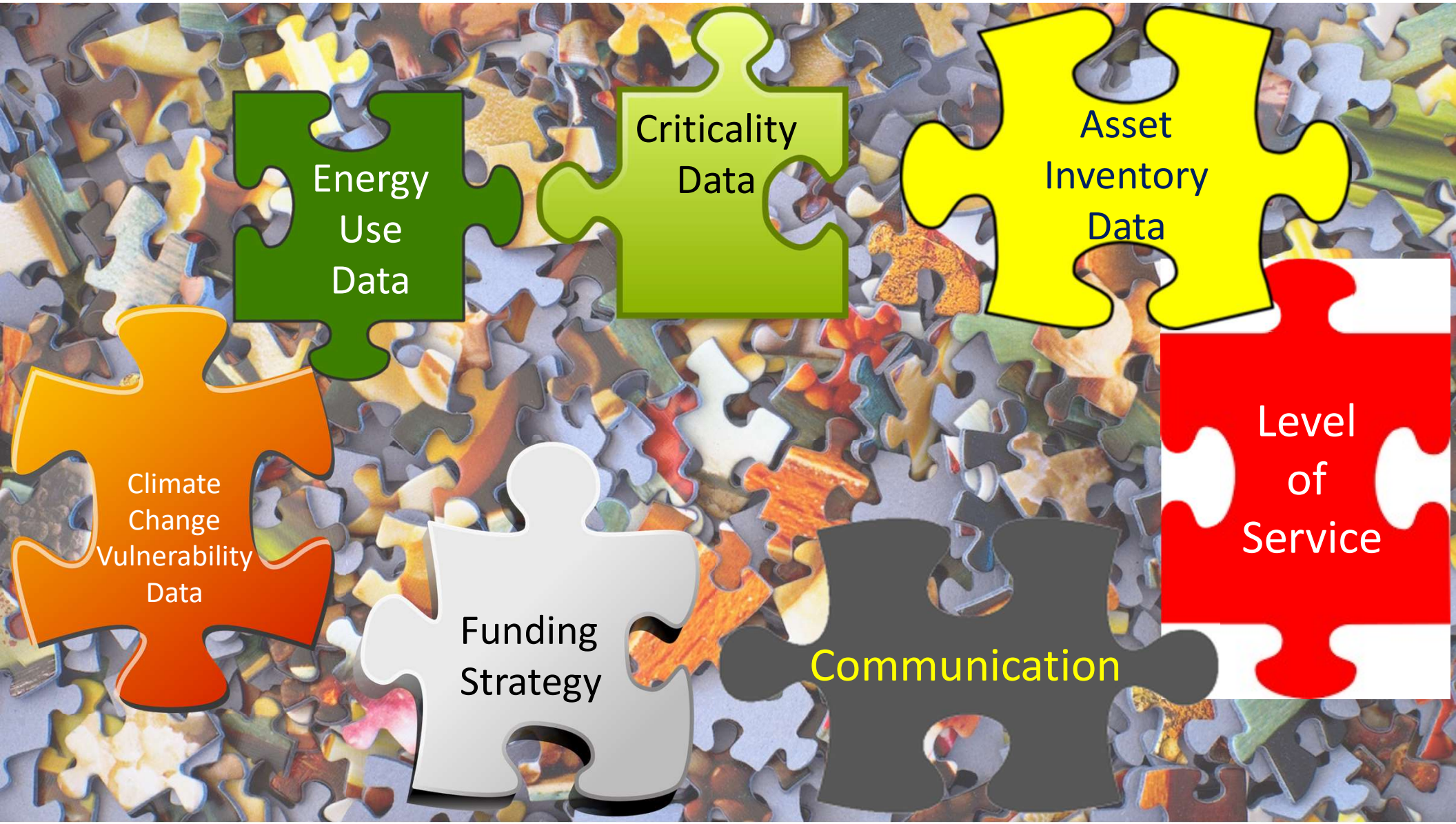
Have you ever had to ask management for money to support a project?
1. How did it go?
2. Did you use all the data available to you to build your case?

Were you able to:

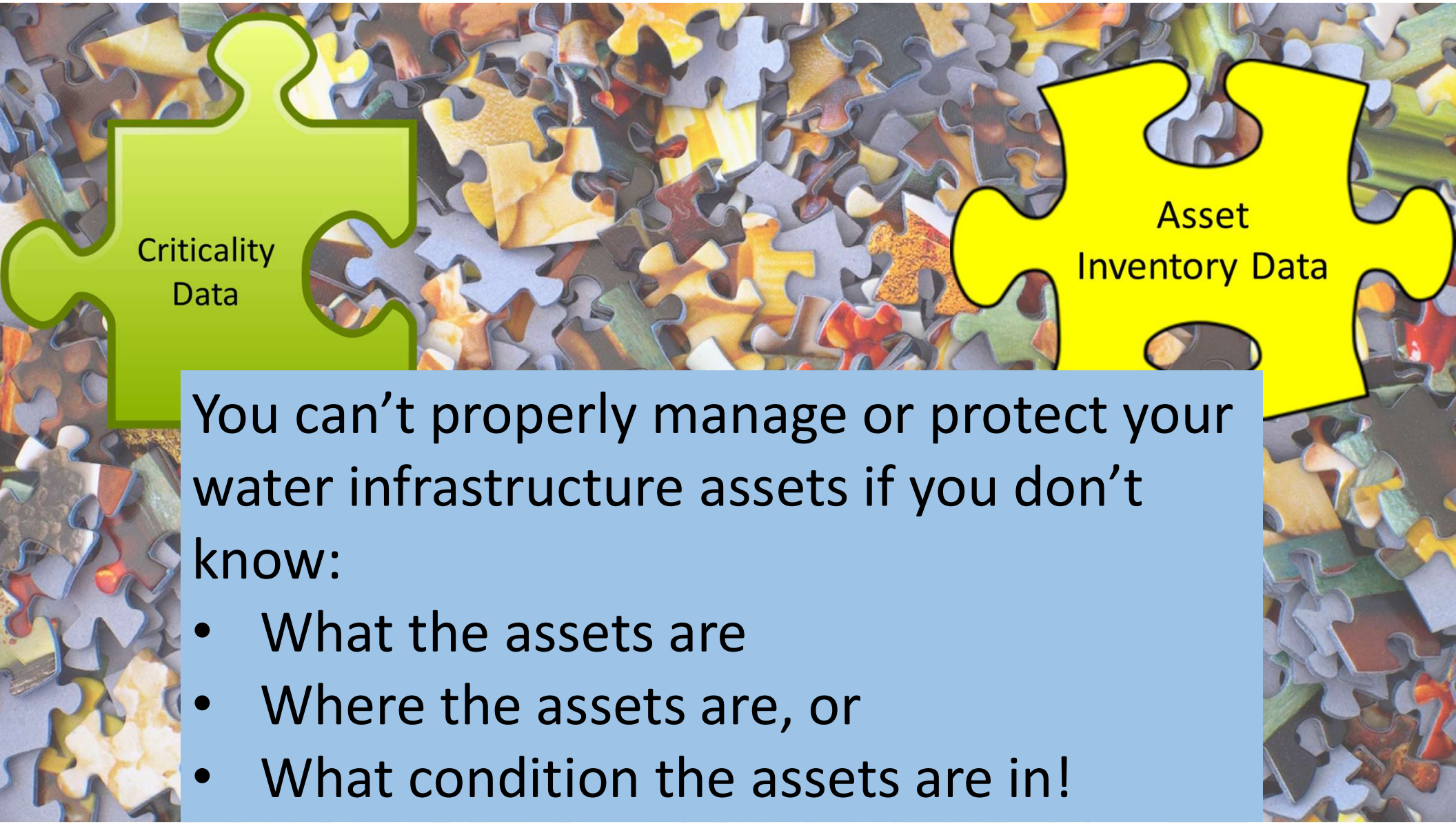
- Communicate your need clearly?
- Present data that supported your request?
- Get the knowledge out of your head in a way your decision makers could understand?


Energy Use Data
Criticality Data
Asset Inventory Data
Climate Change Vulnerability Data
Funding Strategy
Communication
Level of Service

Knowing what your stakeholders want and communicating with them frequently builds support and transparency!

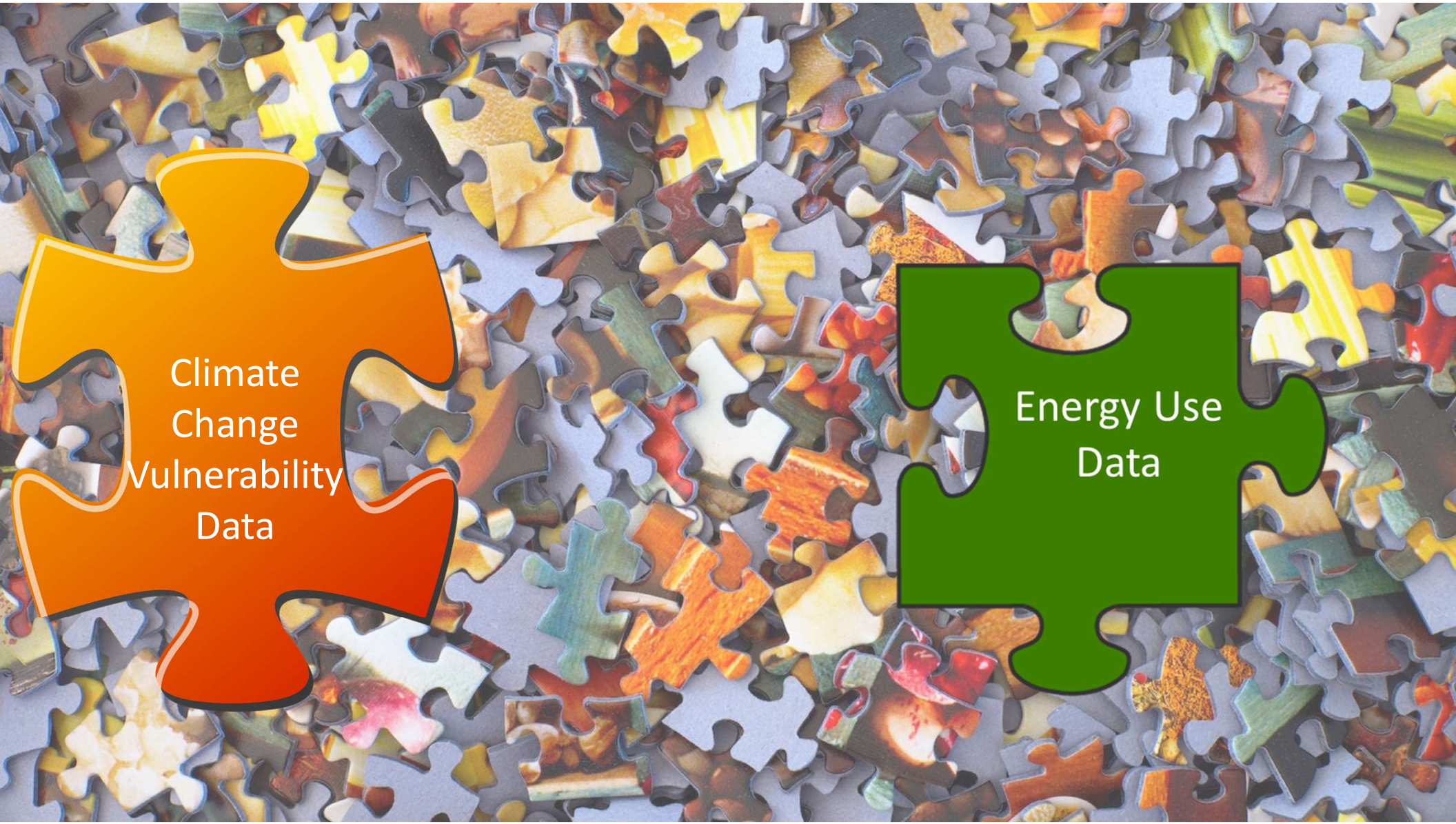
Key part for a successful business case!

- User rates
- Taxes
- Grants
- Loans



You can't properly manage or protect your water infrastructure assets if you don't know:

- What the assets are
- Where the assets are, or
- What condition the assets are in!


Climate Change Vulnerability Data
Energy Use Data

Keene – October 2005
The Remains of Tropical Storm Tammy

Total for the month: 17 inches

WWTP flooded on Oct 9 and again on Oct 16

The Keene WWTP flooded twice in October 2005:

#1: Oct 9 flood due to excessive I/I

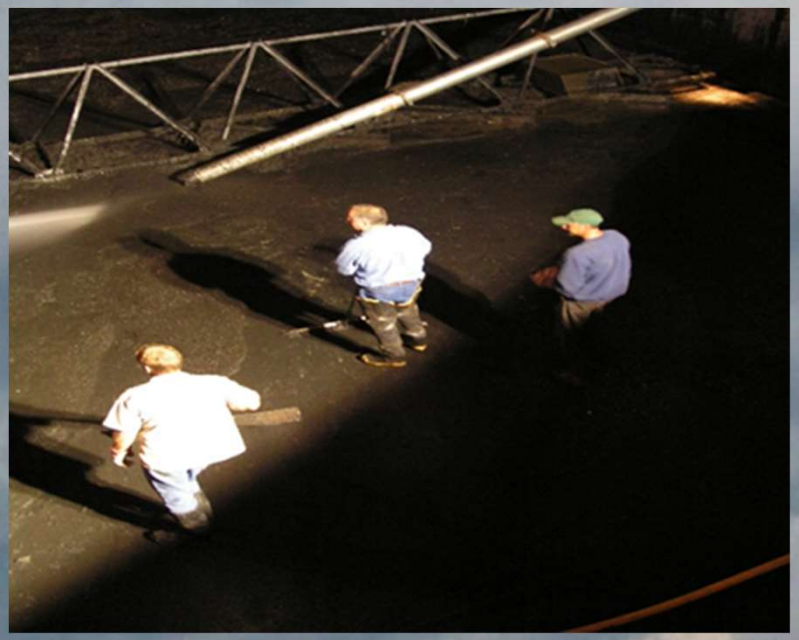
11 inches of rain in 2-3 days will do that!

And oh…the grit…

Climate Change Vulnerability Data

Cleaning the Clarifier

- 6 hours of grit removal to free the rake arm and get the clarifier back on line.
- Continued primary sludge pumping issues for another week.
- Nat'l Guard and Mutual Aid assistance needed.

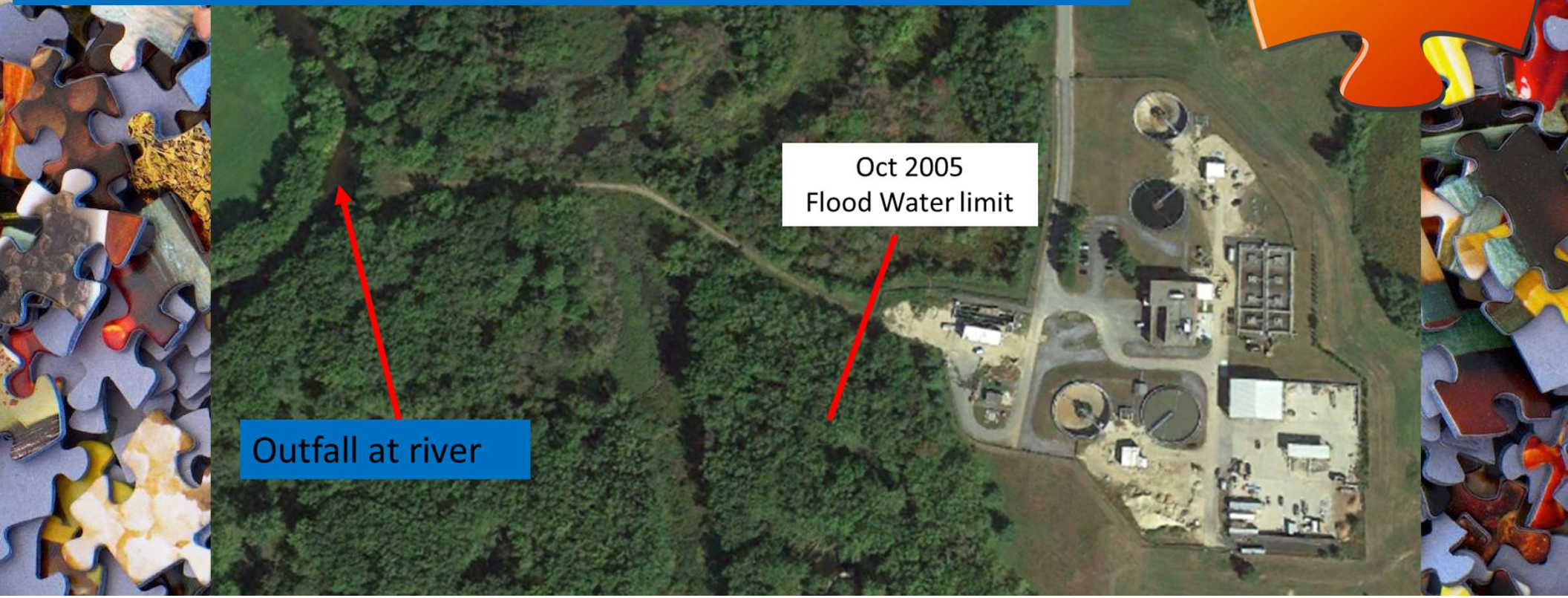


Slide provided by City of Keene

The Keene WWTP flooded twice in October 2005:

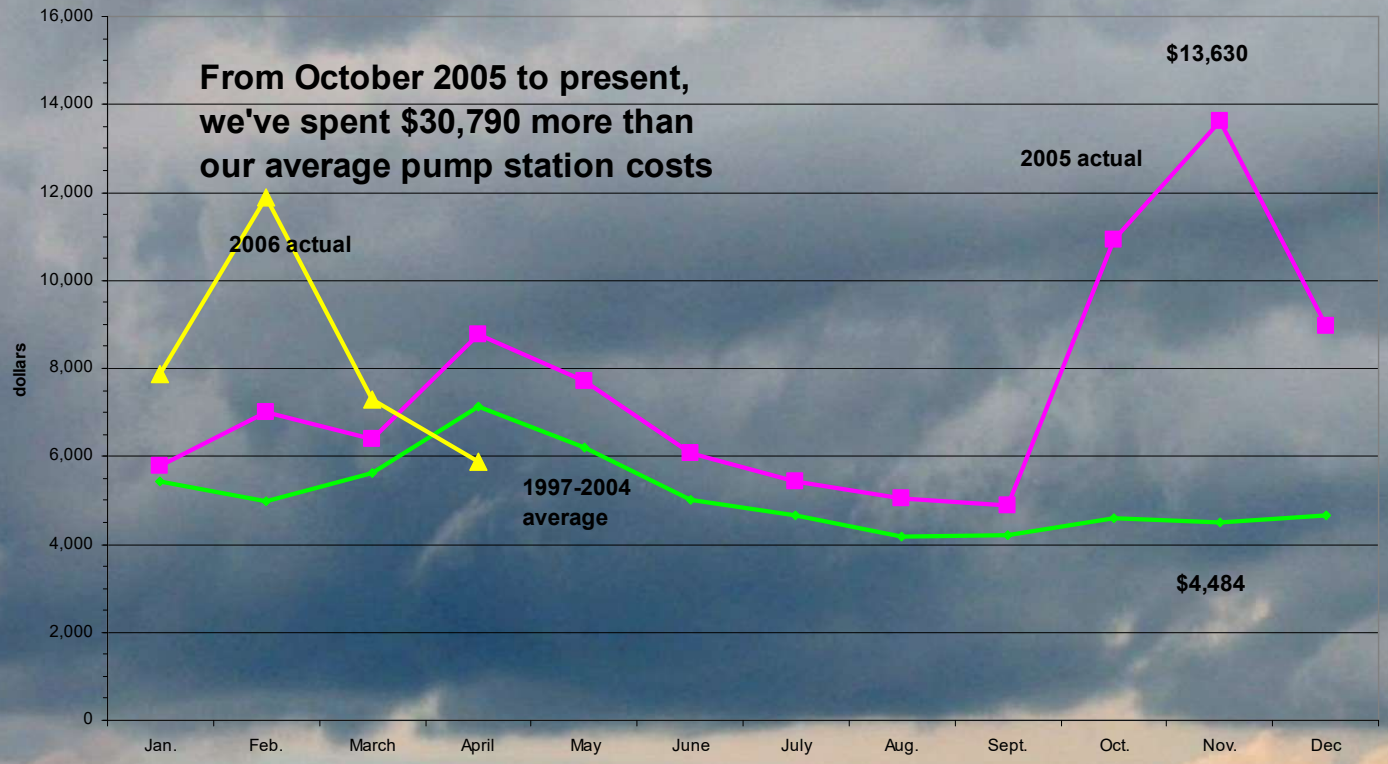
#2: Oct 16 flood due to the river backing up into the effluent channel!

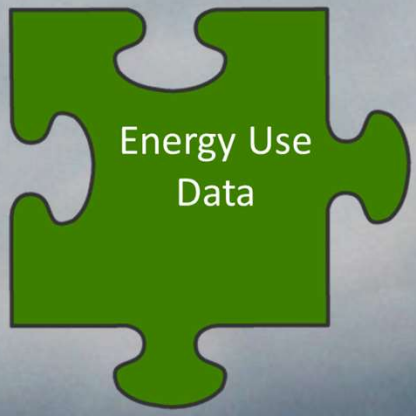
Climate Change Vulnerability Data




CAUTION
PROTECT EYES
AND SKIN FROM
UV LIGHT
Climate
Change
Vulnerability
Data

Martell Court Pump Station Electric Costs





Slide provided by City of Keene

Total $ cost:

- Electric: $30,900
- Personnel: $9,800
- Equipment Repair:$30,000
- Grit Removal: ~ $65,000

- Total: $135,700

Energy Use Data

Climate Change Vulnerability Data

Slide provided by City of Keene

Total non-$ costs:

- Stress
  - Personnel
  - Equipment
- Permit Violations
- What else?

Info/photo provided by City of Keene

In July 2021, Keene received 17 inches of rain in a month!

But this time no flooding and no grit issues in the CS or at the WWTP!

How is that possible?
What changed?

How is that possible?

Asset Management!

They used the data from the Oct 2005 flooding events to justify and support changes in O&M as well as design changes!

How is that possible?

Asset Management!

What changed?

- Increased targeted sewer maintenance to address grit – also helped with SSOs

How is that possible?

Asset Management!

What else changed?

During an upgrade, they changed the hydraulic profile at the WWTP!

How is that possible?

Asset Management!

Upgrades are a given

Use data to justify a better upgrade to:

- Improve EE
- Increase resilience/reduce vulnerabilities
- Right-sized equipment/automated controls = better operational control = better water quality = better customer service
- **Every $1.00 invested pro-actively saves $7.00 in recovery costs!**

How Can You Use Your Data and Knowledge to Adapt to Make Your Facility More Resilient to Changing Conditions?

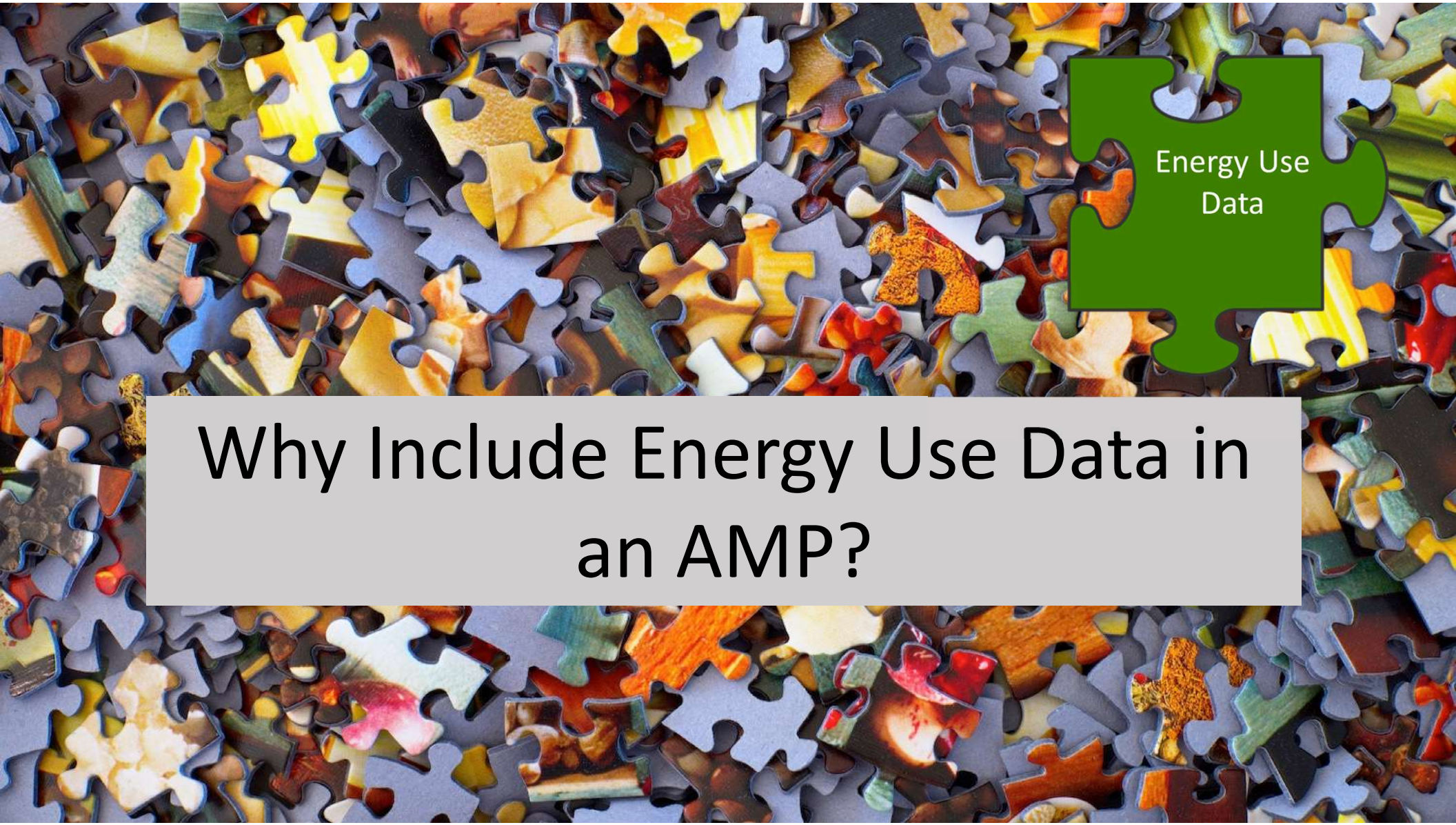
- Understand and ID Vulnerabilities!
  - Solutions are not always complicated or costly
  - Evaluate the adaptation options
  - Incorporate adaptation measures into planned upgrades

- Sometimes big changes do need to be made
  - Moving the entire facility to higher ground

- Adapting before an event can save $ and avoid potential loss of service

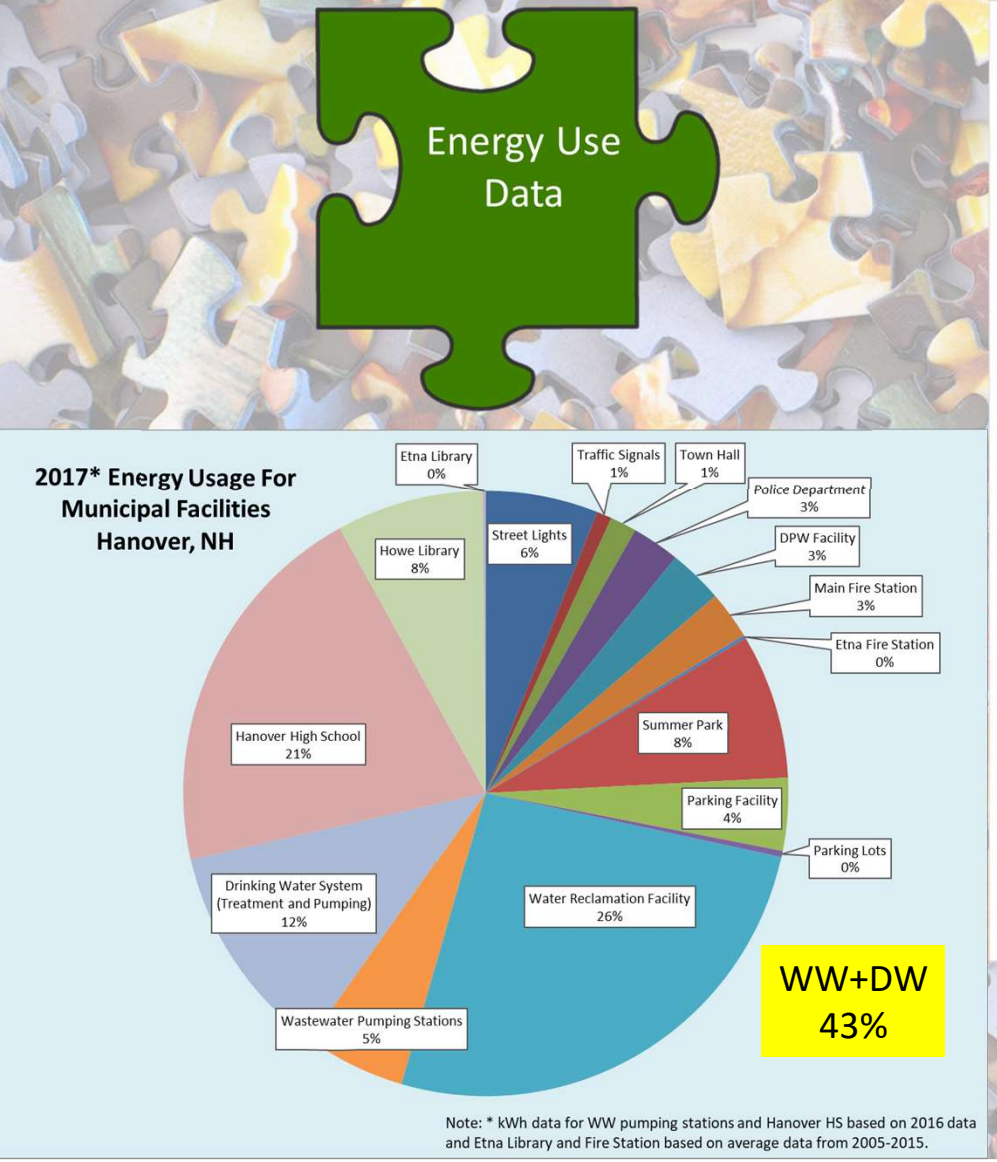
- **Every $1.00 invested pro-actively saves $7.00 in recovery costs!**

Climate Change Vulnerability Data

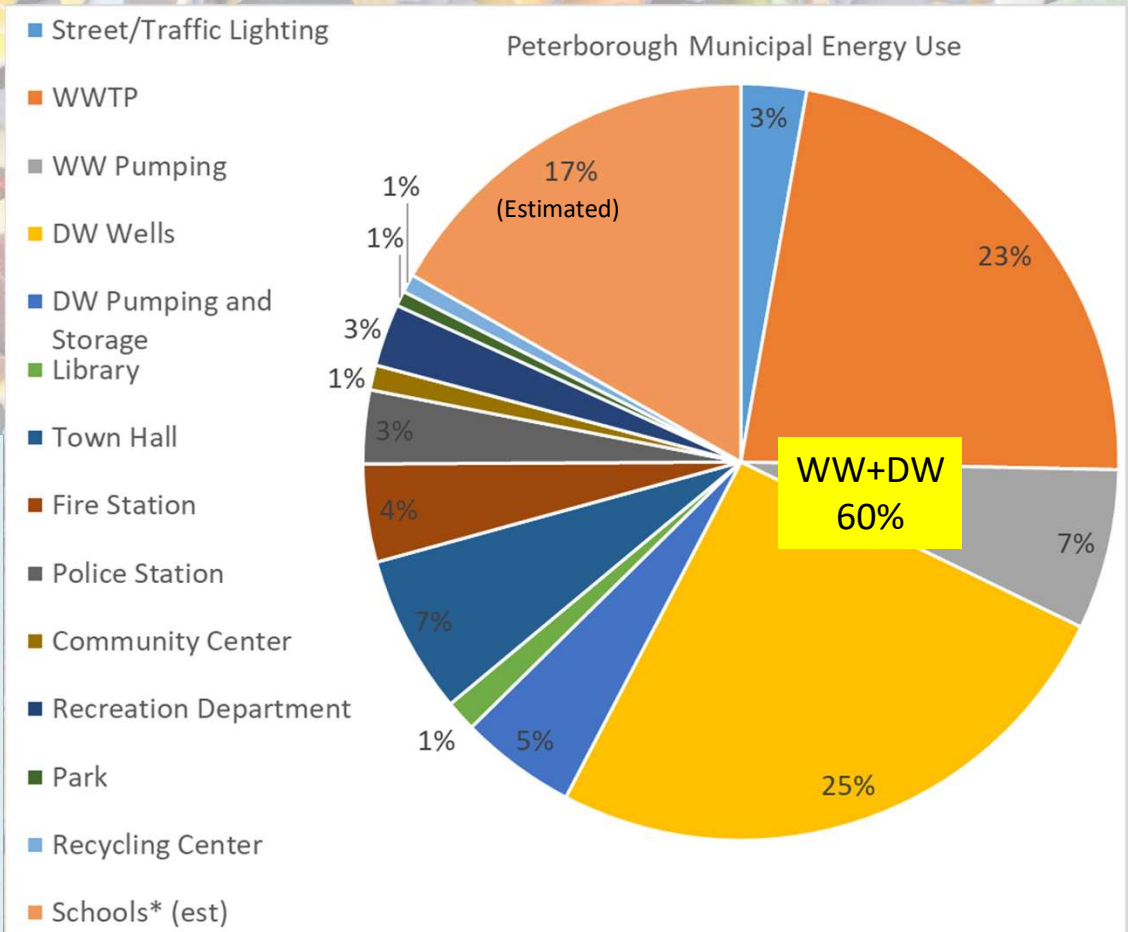


Why Include Energy Use Data in an AMP?

Energy Use Data



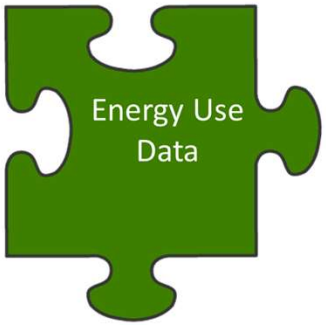
Note: * kWh data for WW pumping stations and Hanover HS based on 2016 data and Etna Library and Fire Station based on average data from 2005-2015.

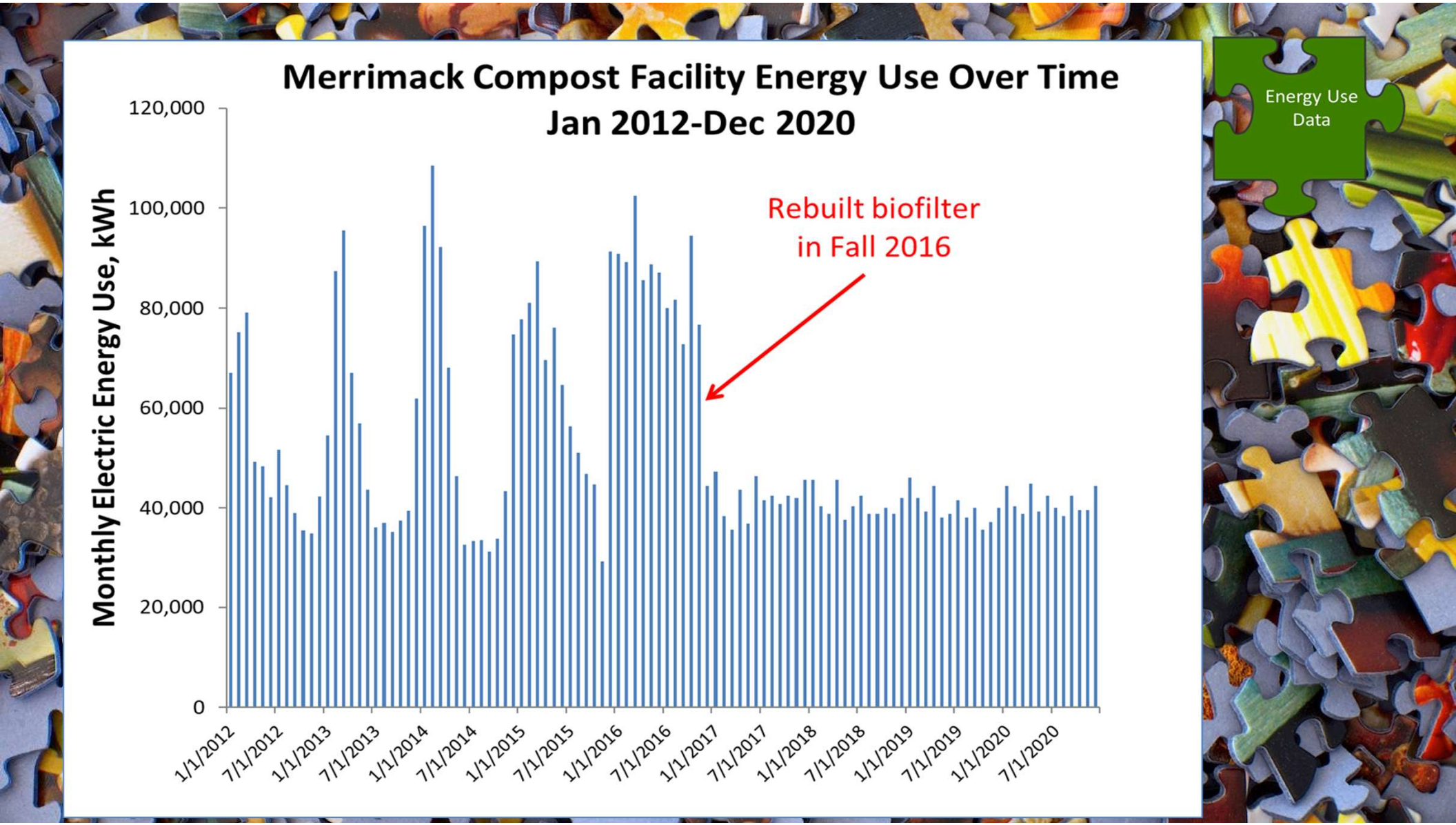


Why Include Energy Use Data in an AMP?

- EE will save you money!
- EE will reduce GHG emissions!
- Tracking energy use will provide key data for LCCA equipment replacement decisions.
- Tracking energy use will provide information on equipment O&M issues.

J F M A M J J A S O N D
0 1 0 0 0 0 0 0 0 0 0 0




Merrimack Compost Facility Energy Use Over Time
Jan 2012-Dec 2020
Monthly Electric Energy Use, kWh
120,000
100,000
80,000
60,000
40,000
20,000
0
Rebuilt biofilter
in Fall 2016
1/1/2012
7/1/2012
1/1/2013
7/1/2013
1/1/2014
7/1/2014
1/1/2015
7/1/2015
1/1/2016
7/1/2016
1/1/2017
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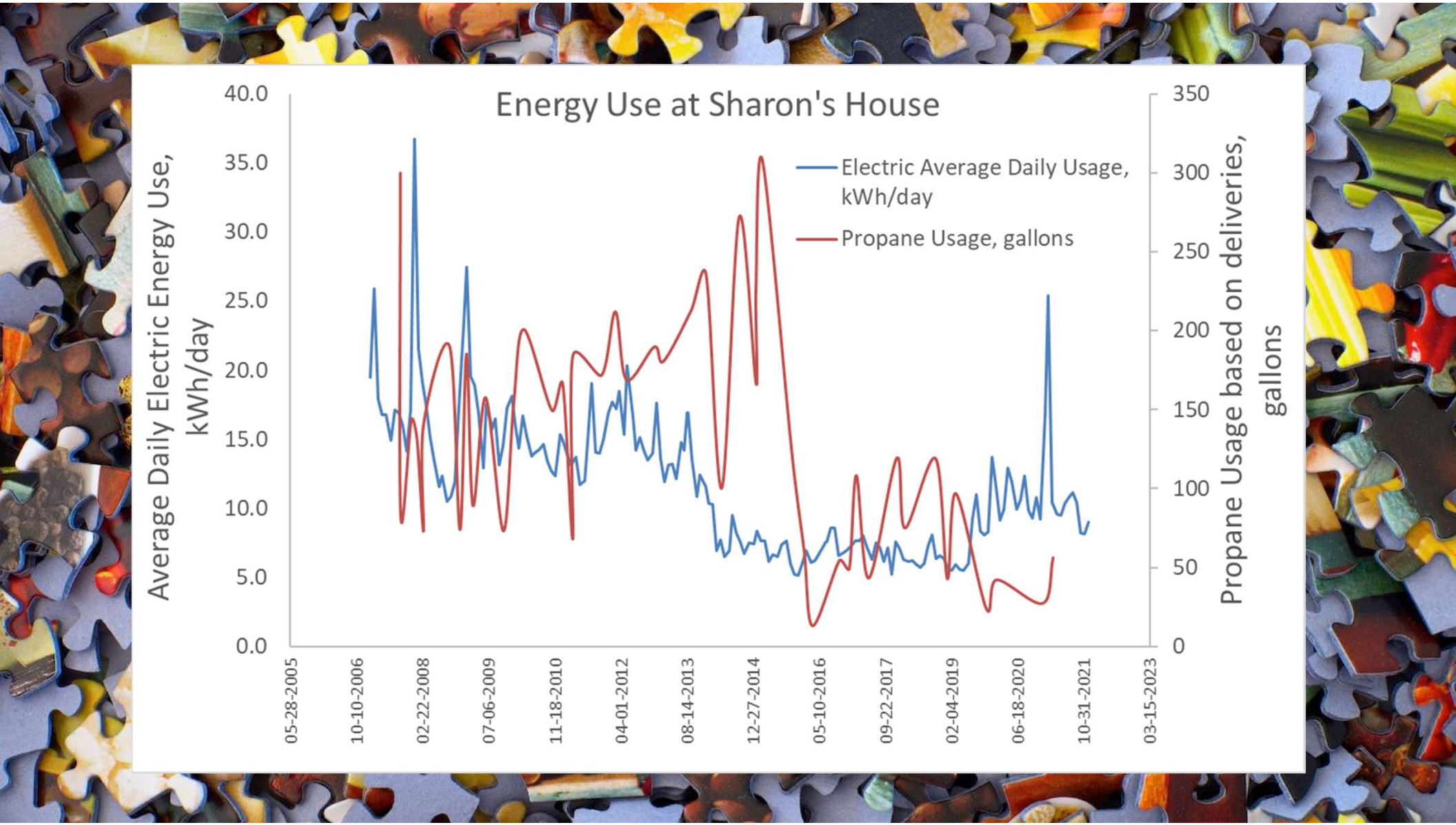
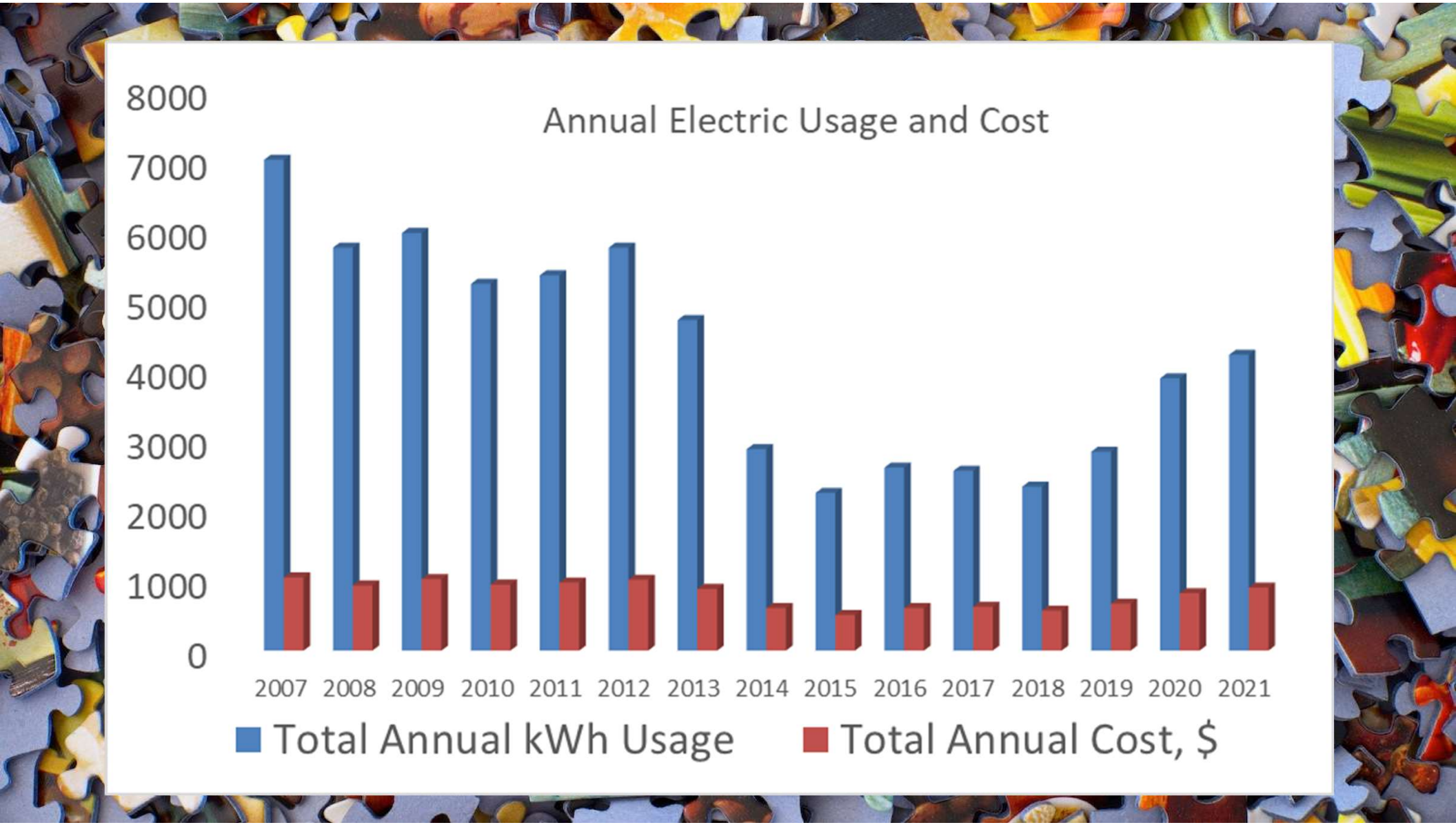
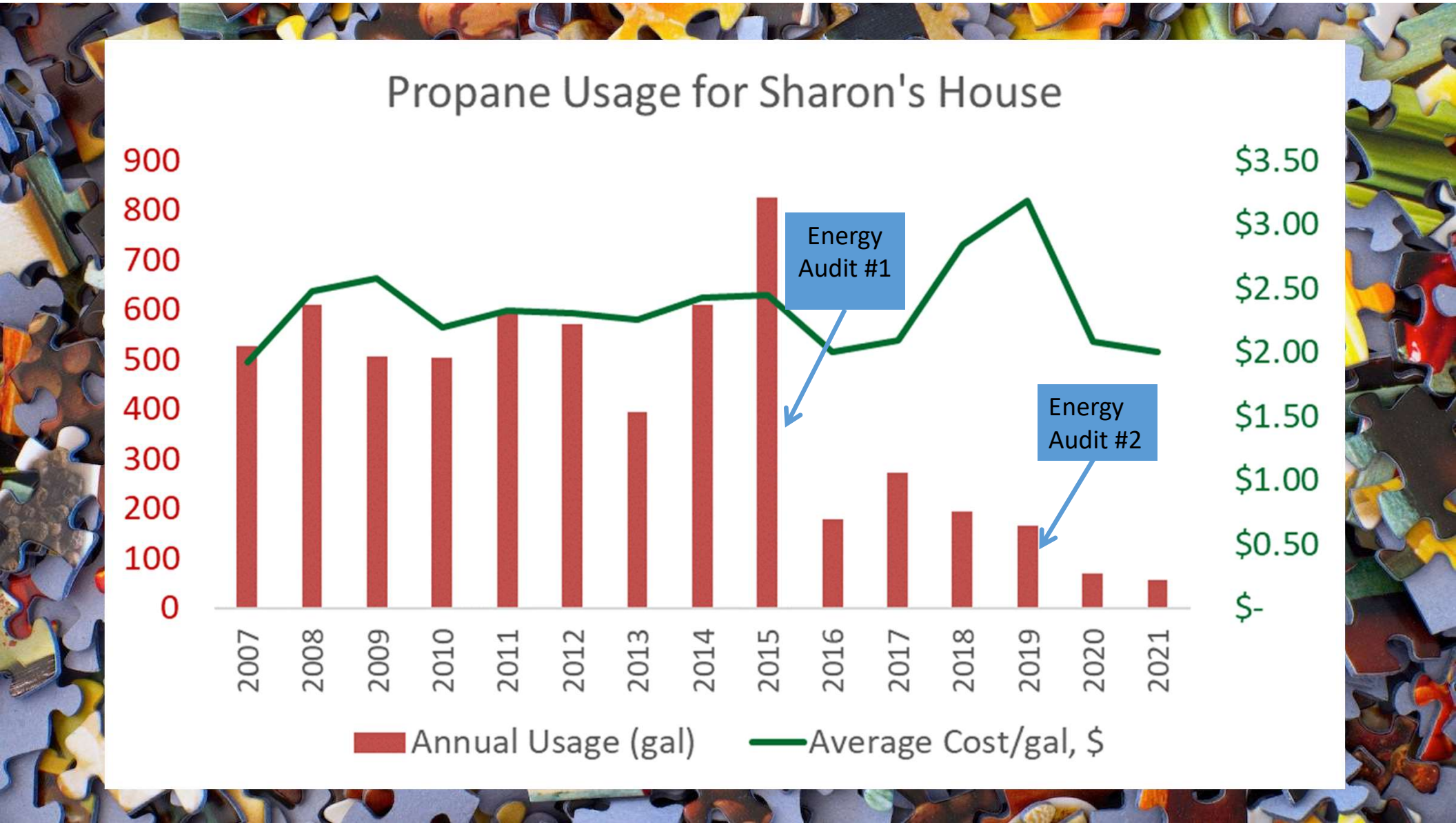
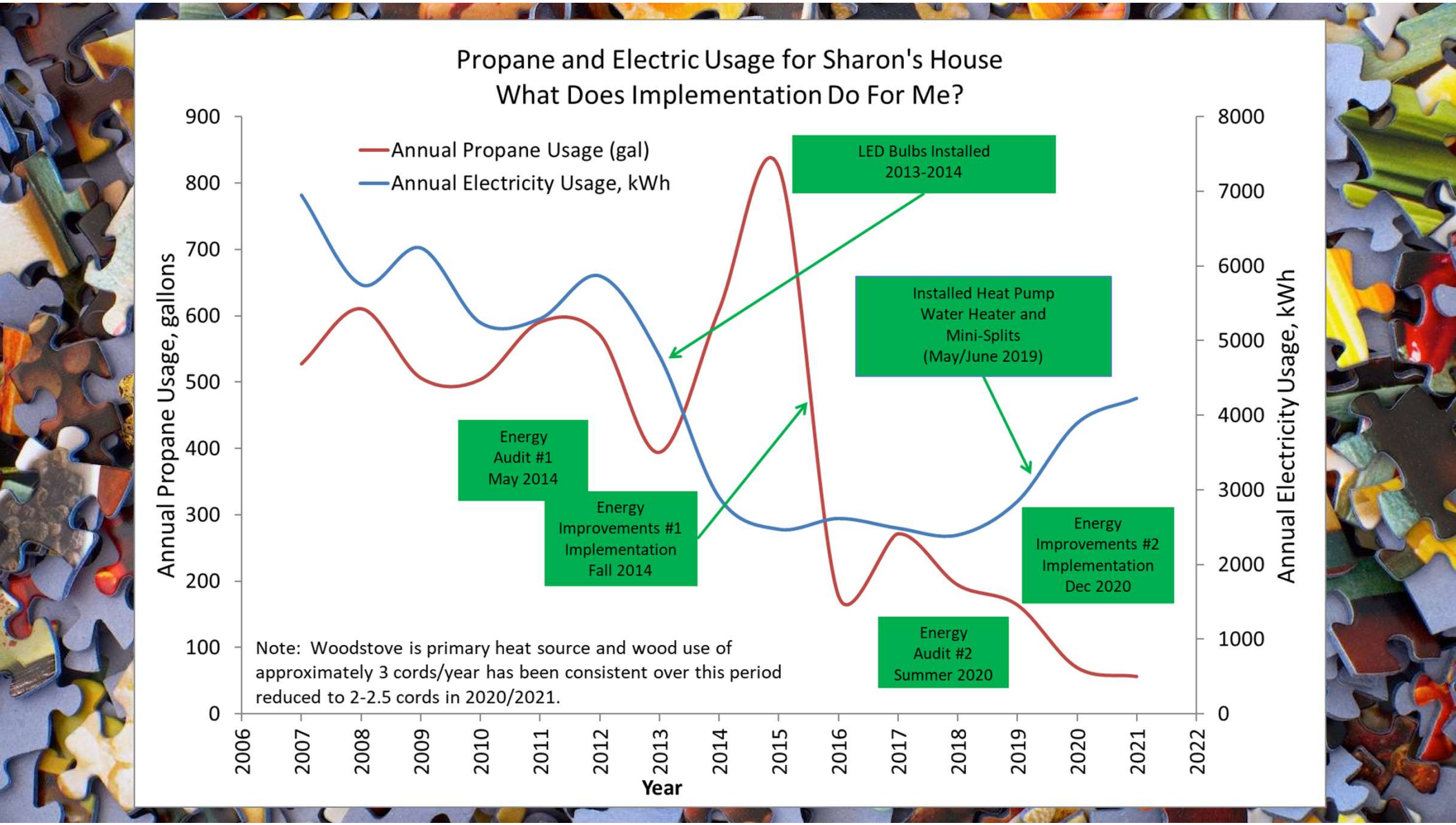
1/1/2019
7/1/2019
1/1/2020
7/1/2020
Energy Use
Data

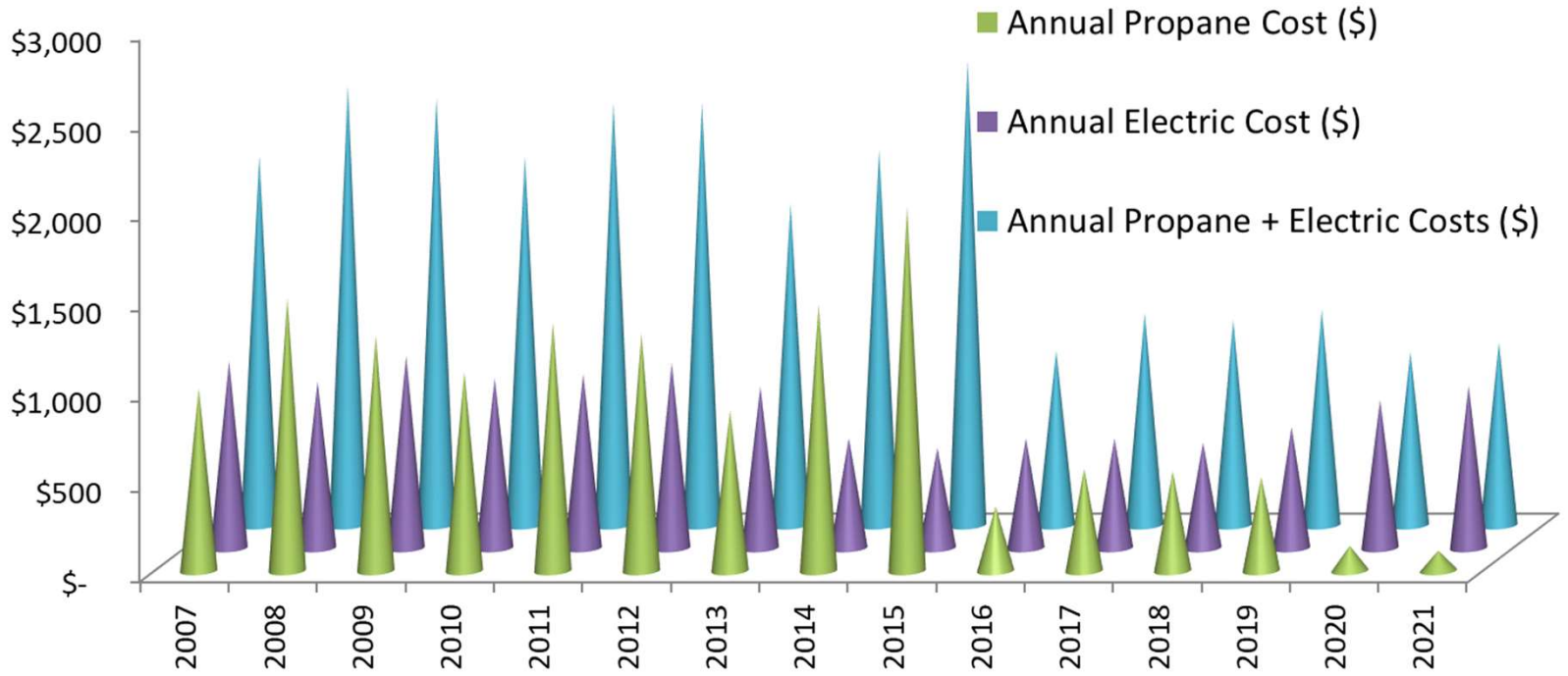

Energy Use at Sharon's House
Average Daily Electric Energy Use, kWh/day
Propane Usage based on deliveries, gallons
Electric Average Daily Usage, kWh/day
Propane Usage, gallons
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
350
300
250
200
150
100
50
0
05-28-2005
10-10-2006
02-22-2008
07-06-2009
11-18-2010
04-01-2012
08-14-2013
12-27-2014
05-10-2016
09-22-2017
02-04-2019
06-18-2020
10-31-2021
03-15-2023


Annual Electric Usage and Cost
8000
7000
6000
5000
4000
3000
2000
1000
0
2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021
Total Annual kWh Usage
Total Annual Cost, $

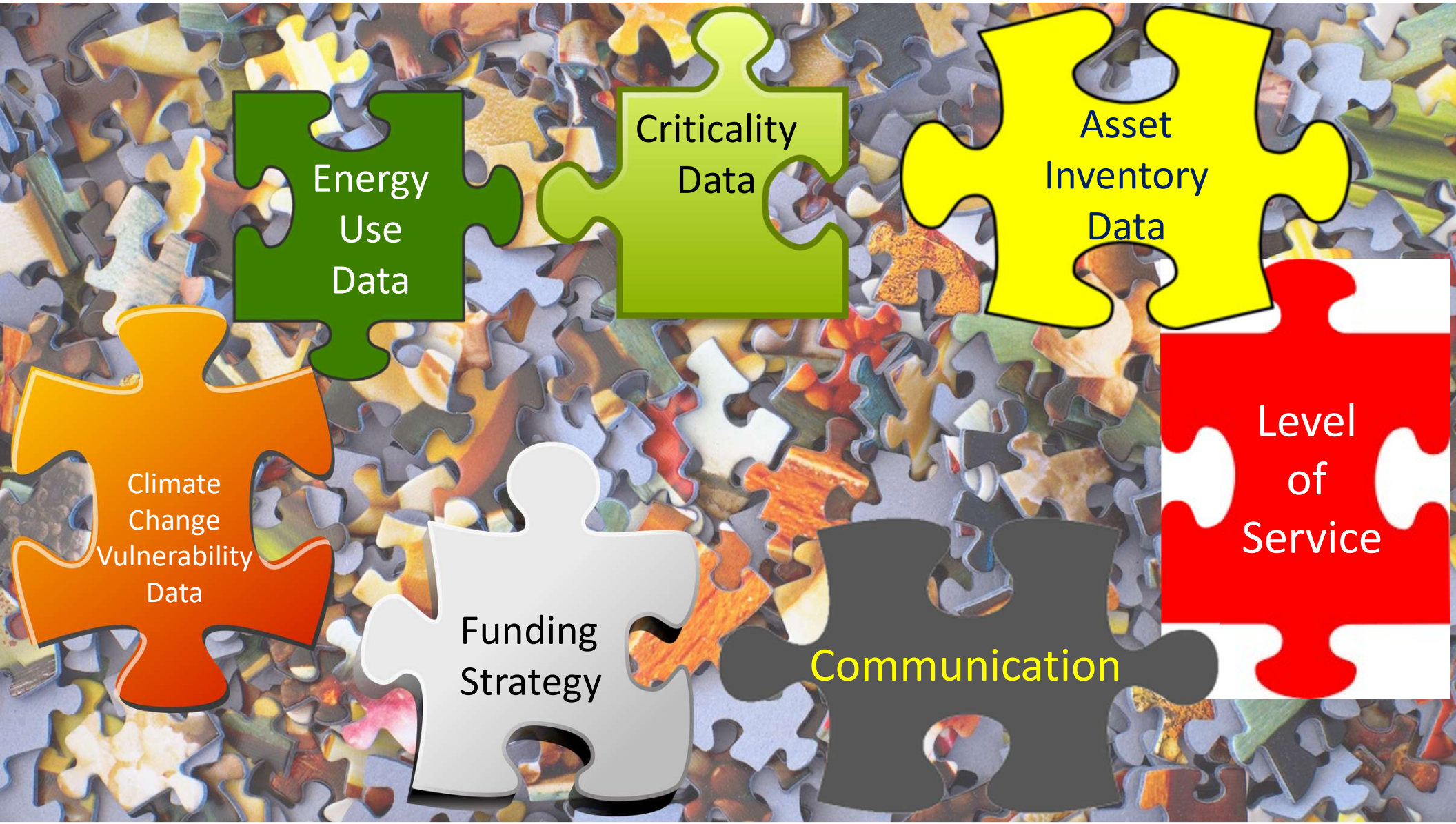

Propane Usage for Sharon's House
900
800
700
600
500
400
300
200
100
0
$3.50
$3.00
$2.50
$2.00
$1.50
$1.00
$0.50
$-
Energy Audit #1
Energy Audit #2
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Annual Usage (gal)
Average Cost/gal, $


Propane and Electric Usage for Sharon's House
What Does Implementation Do For Me?
Annual Propane Usage (gal)
Annual Electricity Usage, kWh
LED Bulbs Installed 2013-2014
Installed Heat Pump Water Heater and Mini-Splits (May/June 2019)
Energy Audit #1 May 2014
Energy Improvements #1 Implementation Fall 2014
Energy Improvements #2 Implementation Dec 2020
Energy Audit #2 Summer 2020
Note: Woodstove is primary heat source and wood use of approximately 3 cords/year has been consistent over this period reduced to 2-2.5 cords in 2020/2021.
Annual Propane Usage, gallons
Annual Electricity Usage, kWh
Year
0
100
200
300
400
500
600
700
800
900
1000
2000
3000
4000
5000
6000
7000
8000
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

Propane and Electric Expenses for Sharon's House
Pre and Post Energy Audit Performed and Implemented



Note: Woodstove is primary heat source and wood use of approximately 3 cords/year has been consistent over this period. In 2020/2021, wood use decreased to about 2-2.5 cords.


Energy Use Data
Criticality Data
Asset Inventory Data
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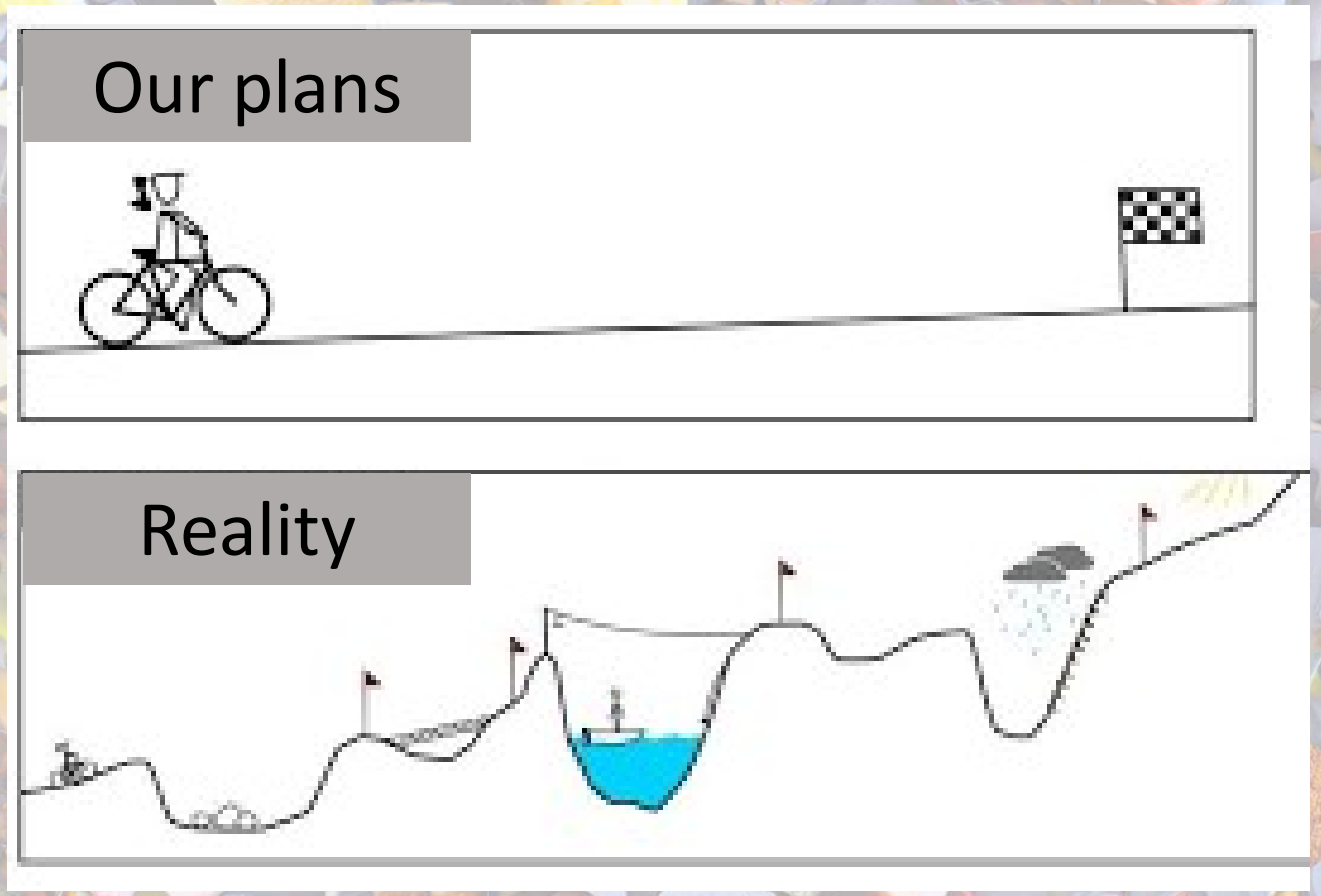
Funding Strategy
Communication
Level of Service

Expect the Unexpected and Make a Plan!




Asset Management Workshop
December 16, 2021
Business Case Development Workshop
Kevin Campanella
Chairman, AWWA Asset Management Committee
Sharon Nall
NHDES WWEB

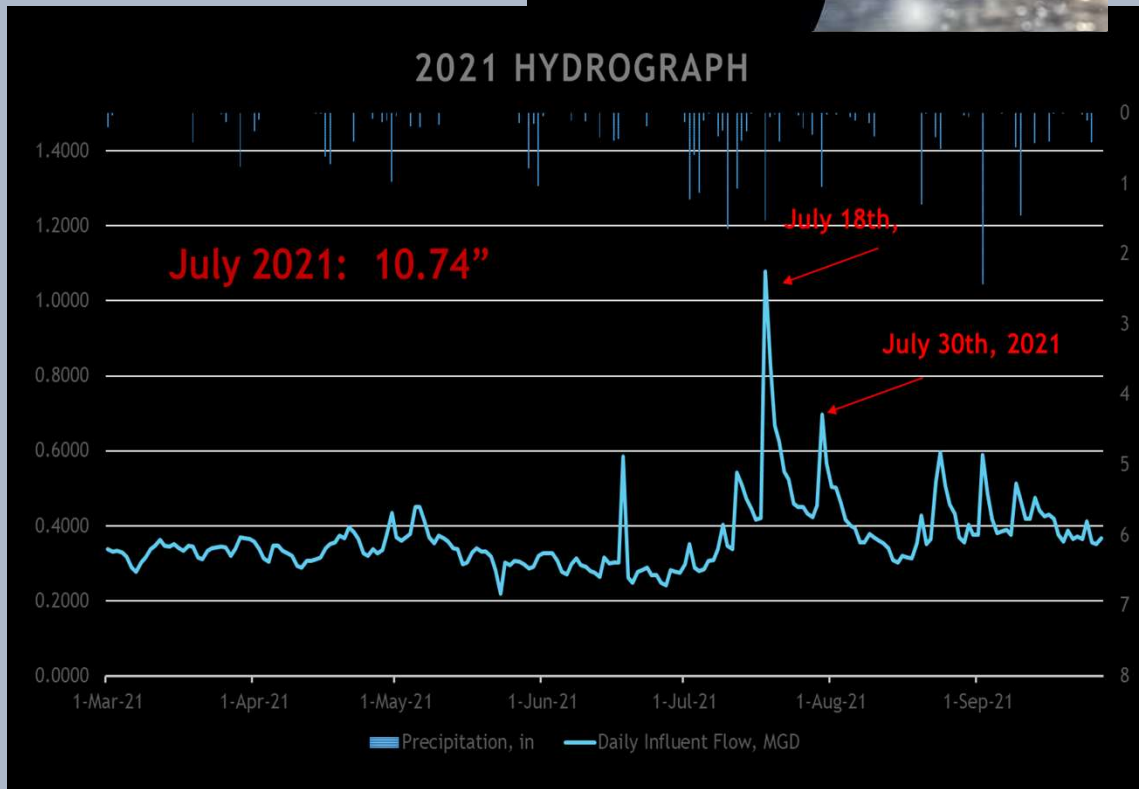

Ready to put the puzzle together?

Business Case Development

- **Step 1: Identify Problem**
- Step 2: Identify Solution/Project
- Step 3: Gap Analysis/Criticality Assessment
- Step 4: Develop Business Case

Identify the Problem

- July 2021
- Starting to recover from over a year of drought conditions,
- It started to rain, and rain, and rain, and rain, and…
- Saturated soils etc.
- No “named” storms – just rain
- Influent flow started to increase dramatically



Problem ID continued

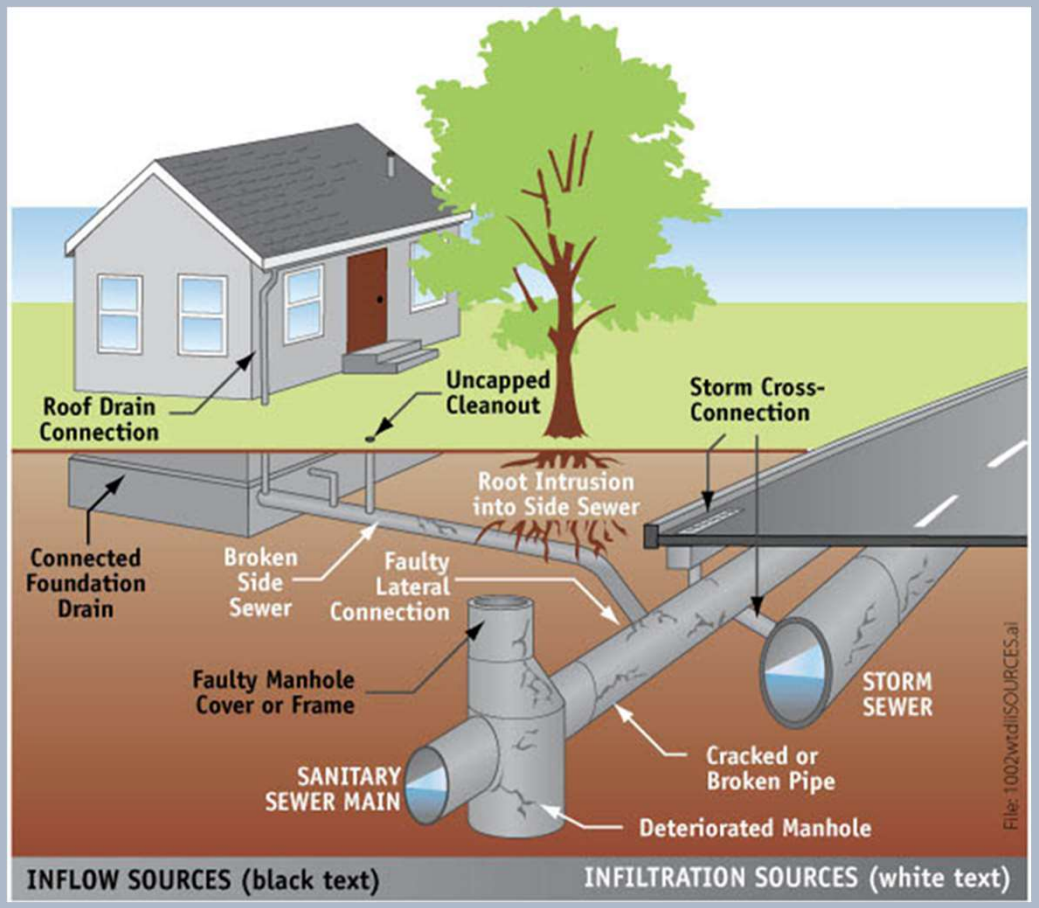
infiltration project wastewater - Bing images

- Extremely High flows at Plant
  - Too high for plant to operate correctly
- Higher Operating Costs (energy)
- Increased equipment maintenance
- Violated Permit
- Overtime
- Stress/Fatigue
- Additional Expenses (equipment failures)

Problem ID continued

Due to infiltration and inflow the WWTF's influent flow increased

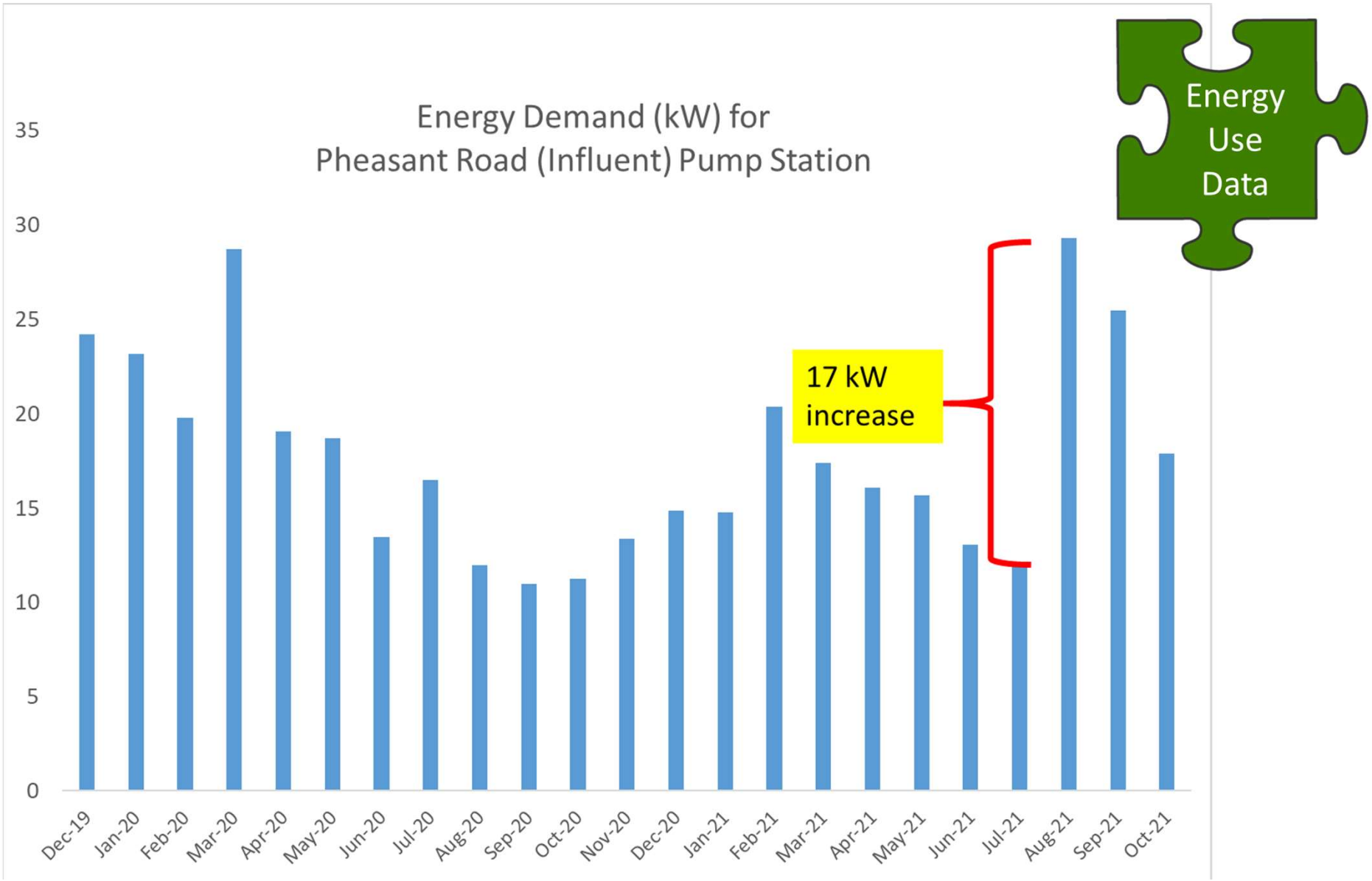
Operator suspects the bulk of the I&I came from a neighborhood in a low, wet area

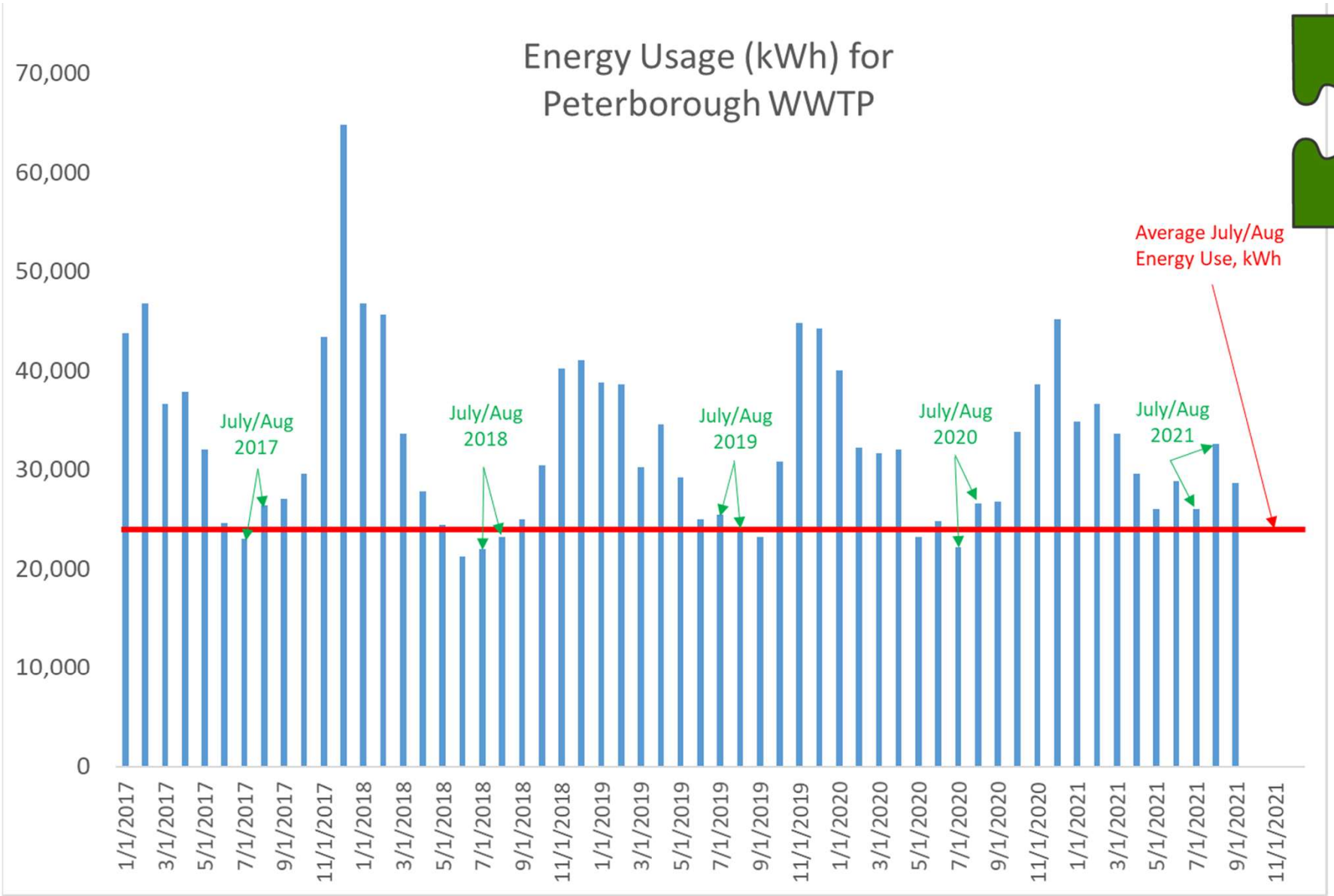


[Inflow and Infiltration (I&I) (envirosight.com)]

Business Case Development

Step 1: Identify Problem


Energy Demand (kW) for
Pheasant Road (Influent) Pump Station
35
30
25
20
15
10
5
0
17 kW
increase
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
Jan-21
Feb-21
Mar-21
Apr-21
May-21
Jun-21
Jul-21
Aug-21
Sep-21
Oct-21
Energy
Use
Data



Energy Use Data

Why I/I Matters

- Expensive Treatment of Clear Water
  - EPA's 2014 O&M rate for WW systems is $2 to $5 per thousand gallons
- Reduced Interceptor and WWTP Capacity
  - 35% of water entering a treatment plant is I/I

    (according to Chalmers University of Technology's Division of Water Environment Technology)
  - Another 35% is stormwater, and
  - The remaining 30% is sewage
- Water Quality
  - Sanitary Sewer Overflows
- Less Recharge to Aquifers

Short Term Projects

- Vactor Truck Purchase
  - External Costs: $1000 for 1,000 LF of collection system
- Infiltration/Inflow Investigations
  - Smoke Testing
  - Pipe and Manhole Inspections
  - Routine Pipe Cleaning
  - Private I/I Sources
    - Sump Pumps/Disconnection Programs
    - Building Inspections
    - Lateral Inspections

wastewater vactor truck - Bing images

Longer Term Project

- Correct/Remove Infiltration/Inflow

Overview

- Demonstrate your problem
  - Photos
  - Energy Data
  - Known Problem Areas
  - Data
- Present Proposed Project
  - I/I Investigations
  - Vactor Truck Purchase
- Provide Gap Analysis Results
  - Inspections
  - I/I Sources
- Provide Cost Estimates
  - Include Savings
- Provide Summary of Benefits