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# Energy Information System Overview

November 21st 2008

# TCHC Statistics:

- 2,200 Buildings (all types)
- 300 buildings with >30 units
- 60,000 units
- 160,000 residents (6% of Toronto)
- 2007 Utility Spend:
  - \$20M in Water
  - \$36 M in Electricity
  - \$44 M in Gas
- Average building age is 40 years.
- Energy is a large percentage of our controllable costs.
- Greenplan calls for 40% reduction by 2020  
*... Thus the Energy Management Program*

# The Goals of the Energy Management Program:



**1. Accountability.** *All TCHC employees, tenants and stakeholders should have the information and tools necessary to make organizational accountability for energy and water consumption a reality.*

**2. Sustainability.** *TCHC should meet its GreenPlan commitments and strive to become a sustainable organization. (330 000 tonnes of GHG emissions/year in 2002, Greenplan calls for a 40% reduction by 2020).*

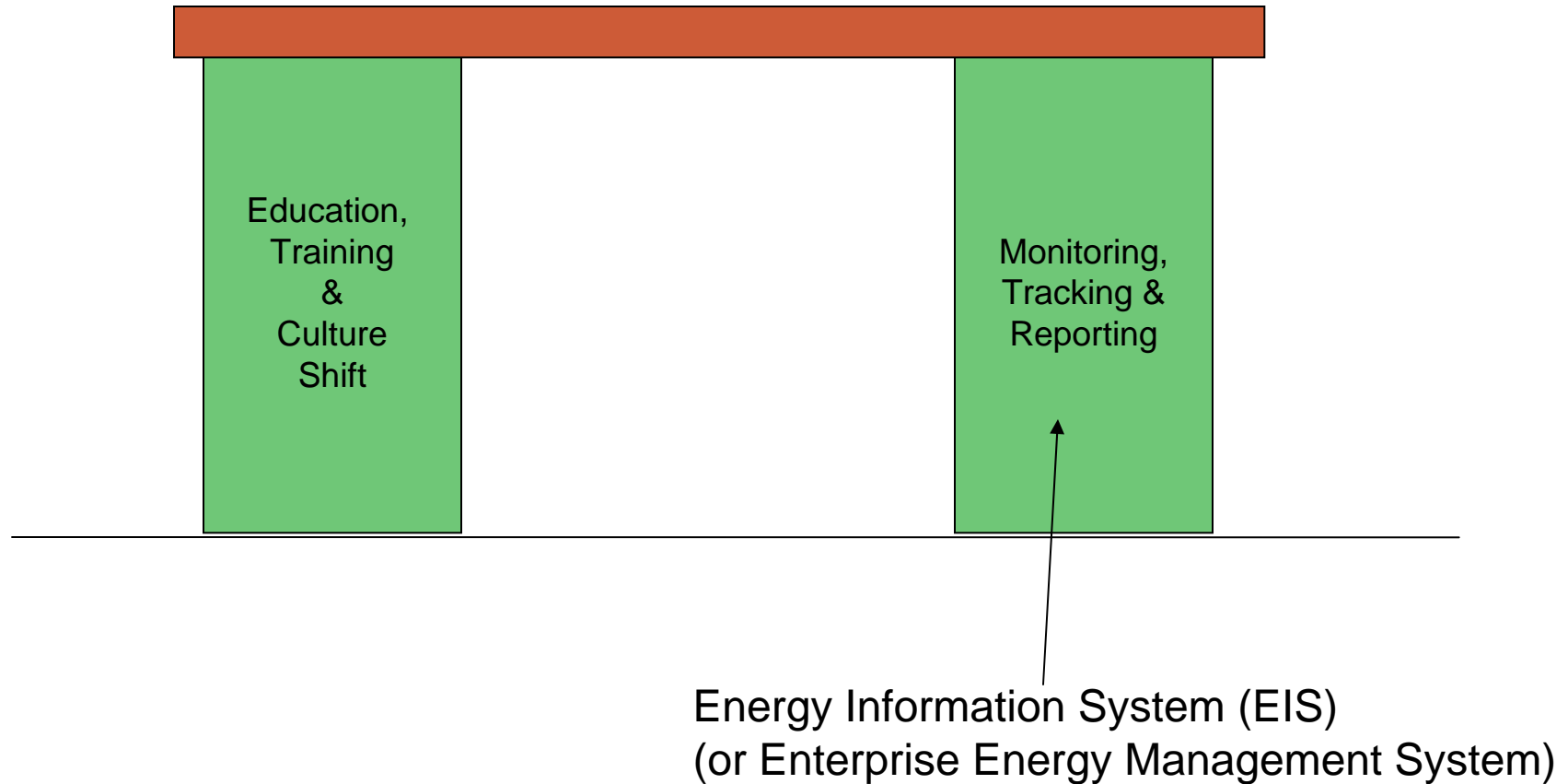
**3. Cost Reduction and Optimization.** *TCHC should optimize energy and water procurement, production and use. (20% reduction could finance \$330M in borrowing)*



The Energy Information System is one of the pillars supporting the Energy Management program.



## Energy Management Program (Cost Reduction, Sustainability, Accountability)



## TCHC Energy Information Management to date:

- Hodgepodge of BAS systems
- Systems are not operated or commissioned
- Consumption Tracking System in 100 buildings
- System is not monitored regularly
- BAS systems are mostly standalone
- Some phone accessible systems
- Overheating and erratic performance is the norm.
- Billing information is holed up in Finance.
- Getting access to this information is difficult and Time consuming.

*...Thus the Energy Information System*

# REQUIREMENTS

## PRIMARY (ENERGY) DATA

EIS Hardware Installed in TCHC Buildings (Consumption & BAS Data)

Utility Billing Information

## OPERATIONAL DATA

Building Automation And Control

## SECONDARY DATA

Weather Information

Building Occupancy Information (HMS)

Building Information (Portfolio Database)

**Energy Information System**

## Cost Reduction Outcomes

Retrofits Targeted To Worst Performing Sites

High Energy Consumption Alarms

Energy Consumption Trending

Energy and Water Building Commissioning & Real-time Monitoring of BAS Data.

More Effective Preventative Maintenance And Asset Replacement

## Cost Tracking Outcomes

Energy Accounting: Budget Prediction, Tracking & Variance Reporting

Consolidated Utility Billing, Bill Verification & Rate Analysis

Energy Retrofit Savings Verification (Degree Day Corrected)

Energy Performance Benchmarking, Targeting, & Analytics.

## Revenue Outcomes

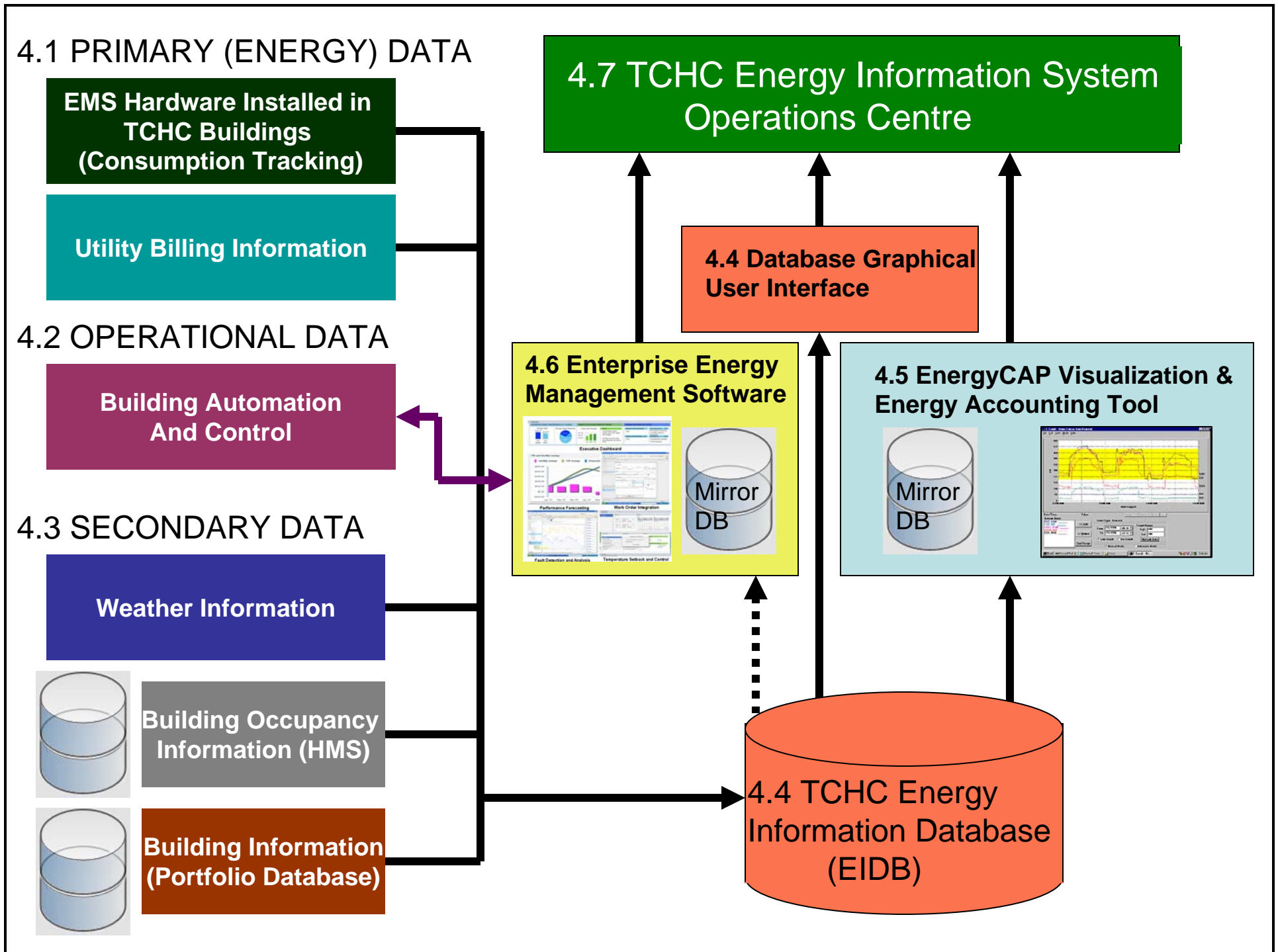
Demand Response And Peak Shaving (Real-Time)

## Culture Change Outcomes

OU by OU, Building by Building Accountability for Energy Consumption and Building Operation

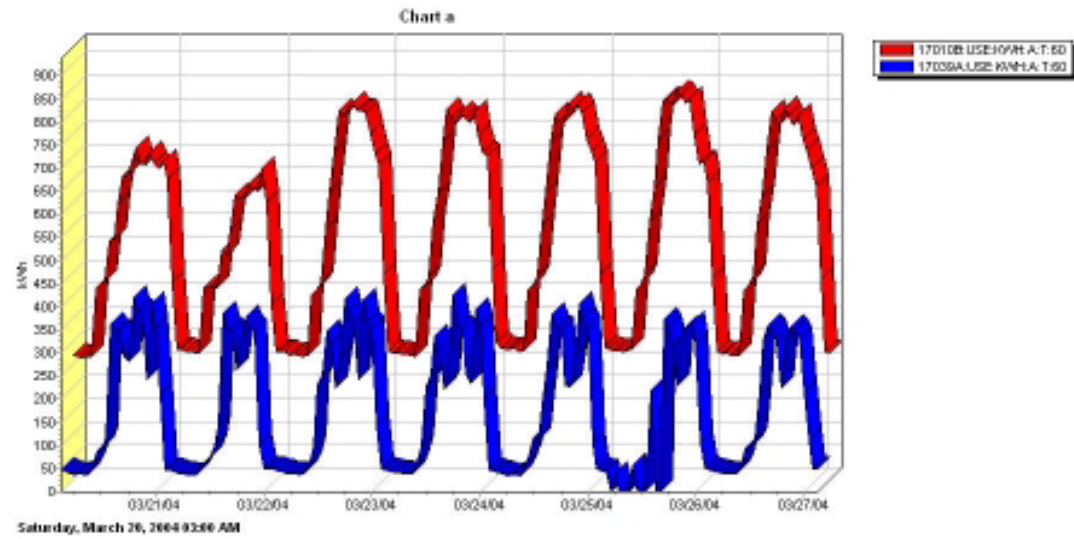
# Desired System Characteristics

- Collect information from entire portfolio
  - I. Real-time consumption information
  - II. Billing information
- IP addressable data server in each building.
- “Real-time” Data.
- Control potential (Demand Response, peak-shaving).
- Automated Reporting by Operating Unit, by Building, etc.
- TCHC IT & Finance division Buy-in.
- One Energy Information Database.
- Pervasive Building Automation System connectivity.
- Building operator to *USE* the system.





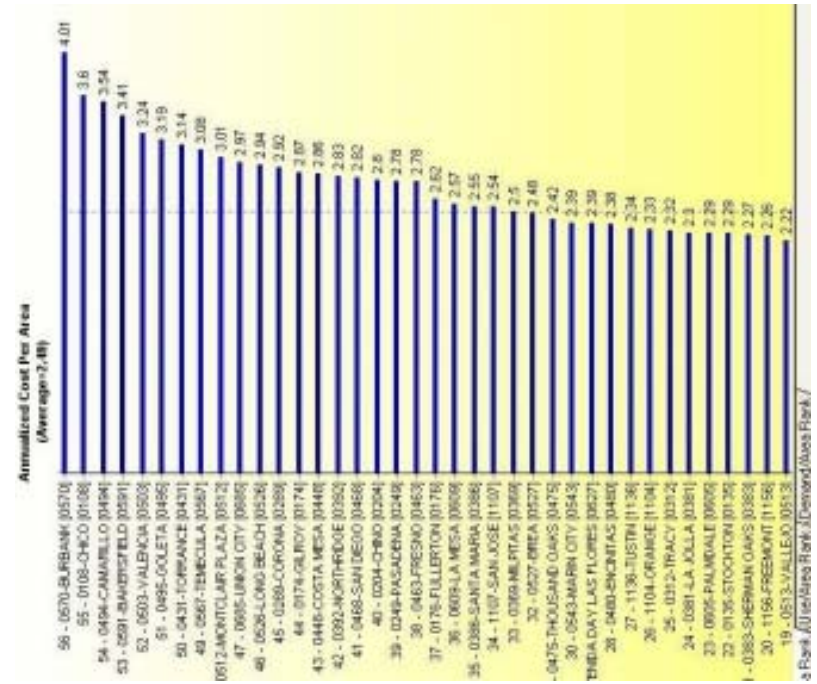
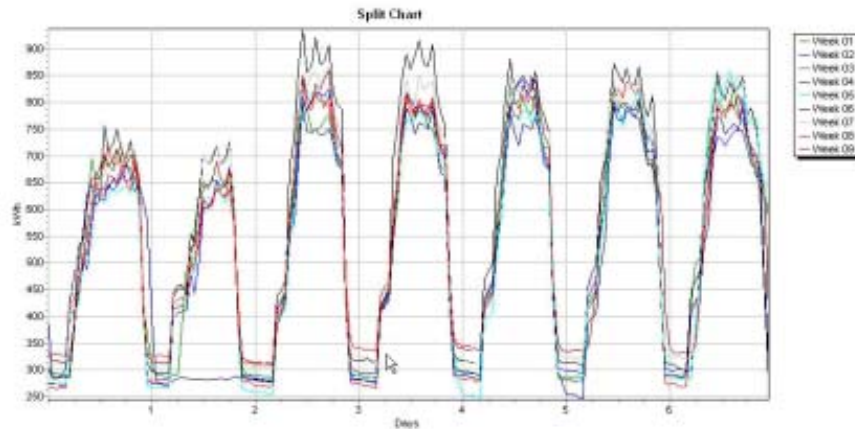
Data Charting



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# EnergyCAP

Data Charting

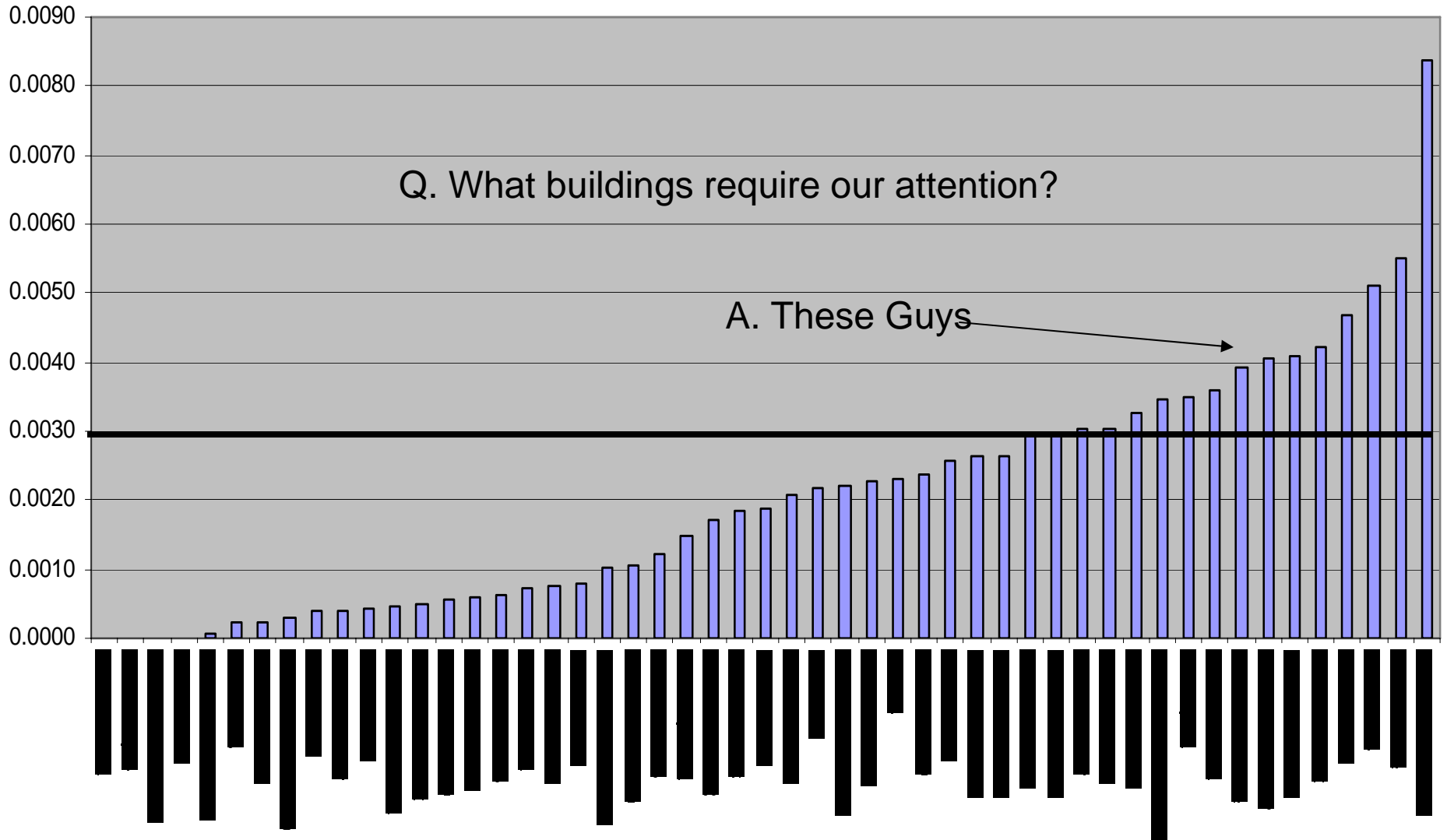


# EnergyCAP answer the WHAT Question...



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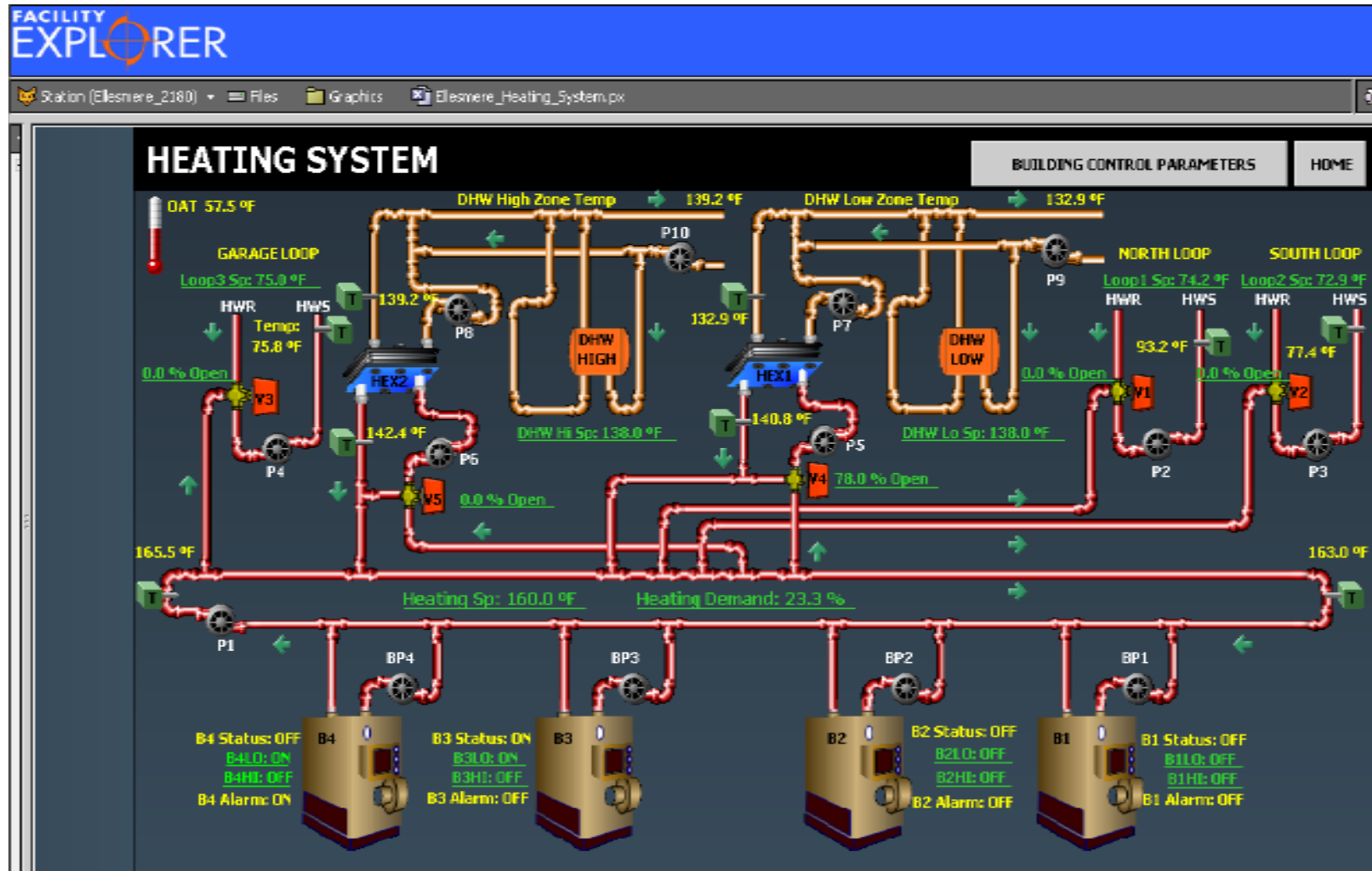
Gas consumption per sq.ft per day



# Building Automation answers the WHY question...



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## Building Automation answers the WHY question...



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Q1. TCHC has committed to install a BAS of some variety in every building with more than 30 units (approx. 300 sites), but how?

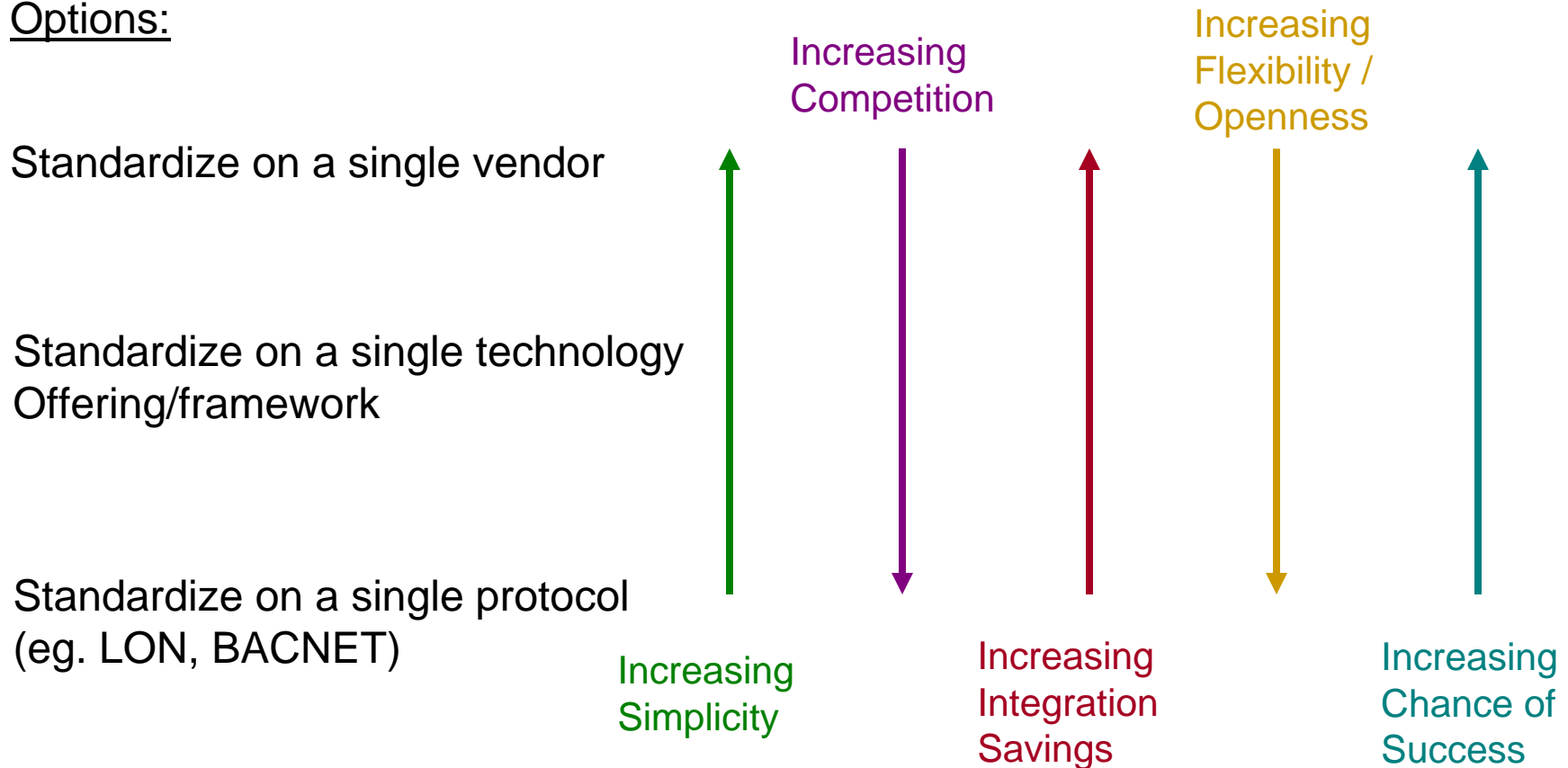
Q2. How to proceed to allow for true enterprise functions of unlimited portfolio-wide central trending alarming, benchmarking, and demand response?  
(i.e. we cannot log into every system every day)

# Building Automation answers the WHY question...



Q1. TCHC has committed to install a BAS of some variety in every building with more than 30 units, but how?

Options:



## Building Automation answers the WHY question...

Q2.. How to proceed to allow for true enterprise functions of unlimited portfolio-wide central trending alarming, and benchmarking?

Options:

Is it really an option  
(i.e. Will it work)?:

Standardize on a single vendor

YES

Standardize on a single technology  
Offering/framework

MAYBE

Standardize on a single protocol

NOT REALLY



# Building Automation System Inventory:



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<b>Control System</b>	<b>Approximate Number of Existing Installations*</b>
Johnson Controls N30	65
Tekmar	29
RTS	25
Barber-Coleman	21
Johnson Controls Metasys/FX40	15
KMC	11
Siebe	10
New Laars Boilers with built-in controls	6
Honeywell Standalone	5
Honeywell Micronet	5
Honeywell	5
Anderson	5
Gordon-Piatt	4
Andover	3
Bryan	2
Weishaupt	2
Kivic	1
Energy Management	1
Umilux	1
EMC	1
White Rogers	1
Weil - Mclain	1
Unknown or None	81
<b>TOTAL</b>	<b>300</b>

Human Resources Layer

Energy Performance Operations Centre:  
Responsible for Efficient Operation of TCHC Buildings

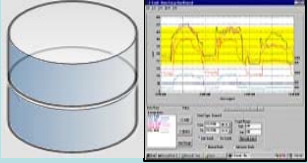
**Enterprise Energy Management Software**

- Integration of disparate BAS systems
- Exception Reporting (Alarming)
- Centralized Trending (Unlimited Capacity)
- Demand Response & Peak Shaving
- Central Control Optimization
- \$/Operating-hour Metrics

TCHC Energy Information Database (EIDB)

EnergyCAP Visualization & Energy Accounting Tool

Mirror DB



Enterprise Layer:  
BAS Operating Data Integration

Operations Tracking, Auditing & Benchmarking

Consumption Tracking, Auditing & Benchmarking

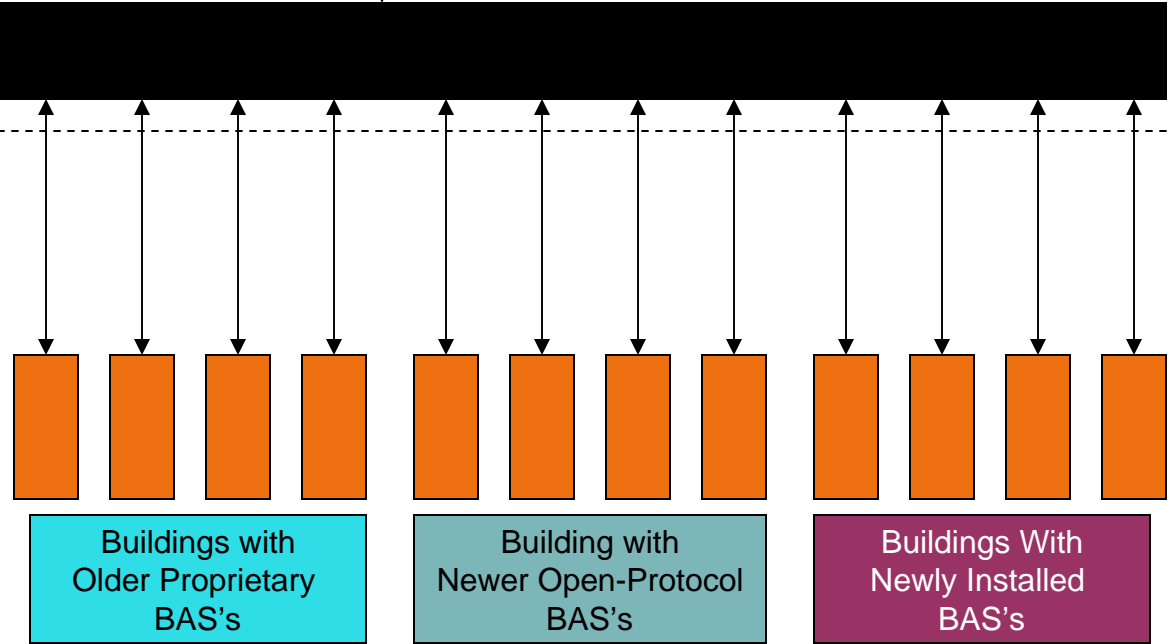
Magical Spec.

Integration Strategy

Option 3: Standard Protocol

Site-Level Layer:  
BAS Installation & Configuration

TCHC Buildings  
BAS Hardware



Human Resources Layer

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Responsible for Efficient Operation of TCHC Buildings

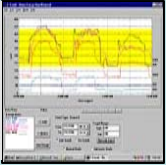
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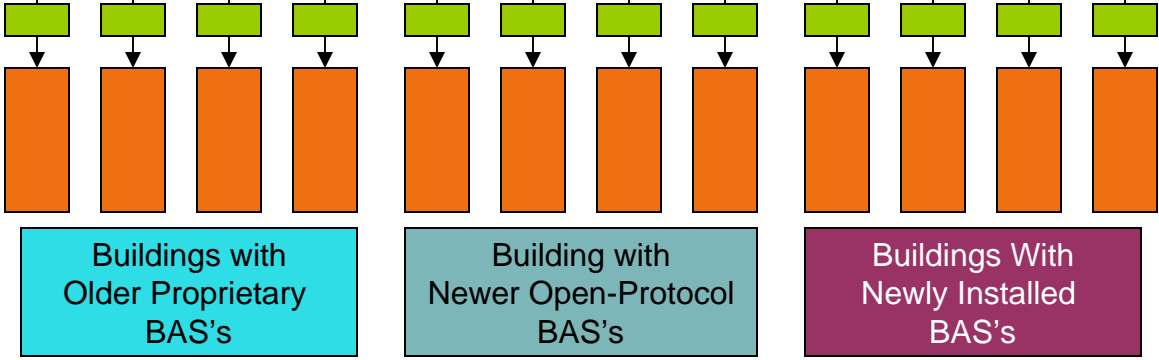
Integration Strategy

Standardized Framework

Option 2: Standard Framework

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TCHC Buildings  
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Human Resources Layer

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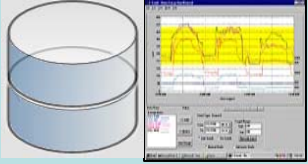
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Enterprise Layer:  
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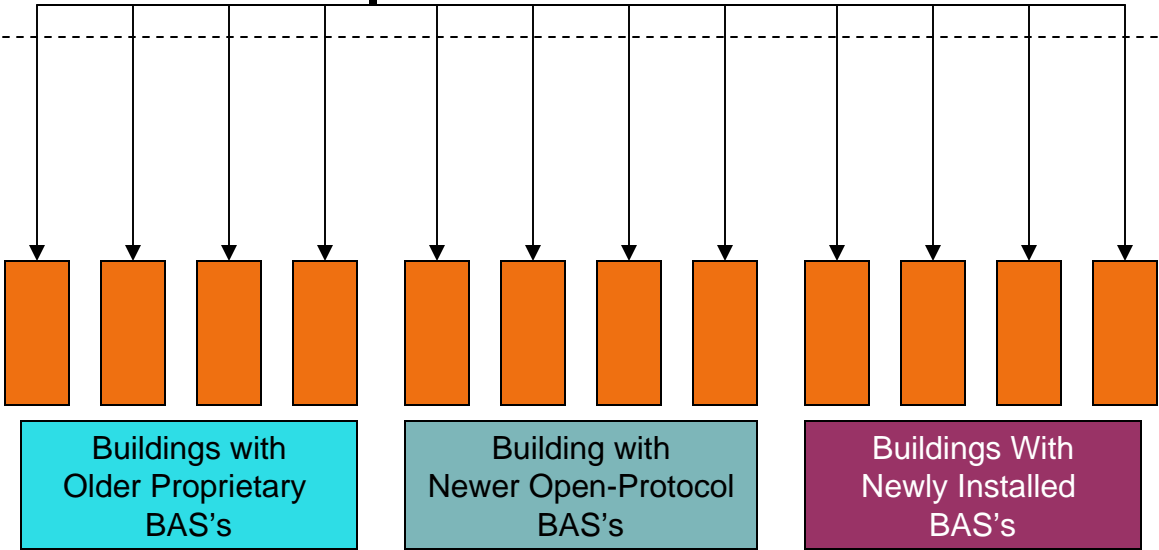
Consumption Tracking, Auditing & Benchmarking

Integration Strategy

Option 1: Standard Vendor

Site-Level Layer:  
BAS Installation & Configuration

TCHC Buildings  
BAS Hardware



## Energy Information System Overview:



1. Need is present and pressing.  
*(“Never let a good crisis go to waste”)*
2. Corporate Will and Executive Sponsorship is present.
3. Funds are available.

Only remaining question:

How to do it, do it fast, and make it work?

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**Thank You**