



CERTs



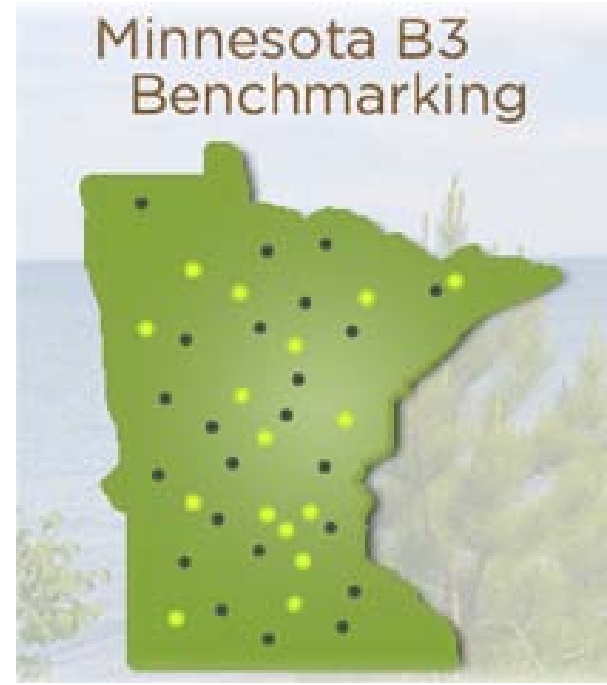
Energy Benchmarking Using B3

Katie Jones
CERTs GreenCorps Member



Contents

1. Why care about energy?
2. Managing energy
3. Benchmarking in B3: Step-by-Step



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Why care about energy?

Energy Costs

Serving as a model
for the community

Ocean acidification

Habitat disturbance

Mountain top
removal

Step toward self-sufficiency

Why do you care about energy consumption?

National security

Mercury deposition

Acid rain

Air quality

Acid mine drainage

Responsible use of
tax dollars

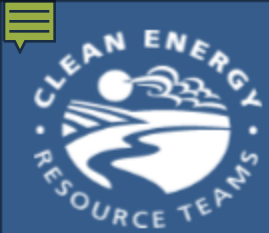
Accidental spills

Groundwater
contamination

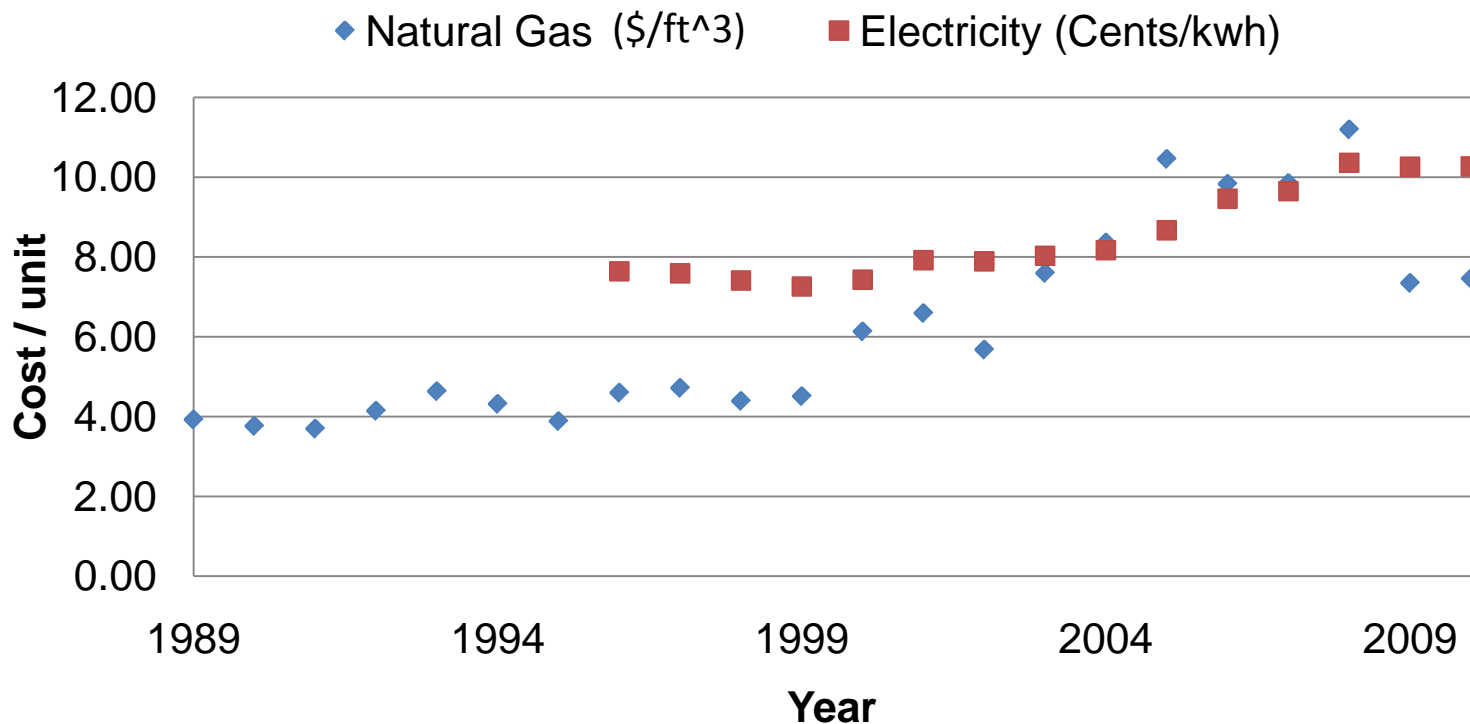
Money

www.CleanEnergyResourceTeams.org/





Energy Cost Trends



Average Retail Commercial Price of Electricity and Natural Gas in MN:
Overall increase in energy price over the last two decades. Data from the US Energy Information Administration.¹



Managing Energy

“You can’t manage what you don’t measure.”

-unknown-



Student’s knowledge
measured by a report
card



Thermal comfort
measured by a
thermostat



Building performance
measured by energy usage by
benchmarking



Energy Management Strategy

1. Develop an energy management team.

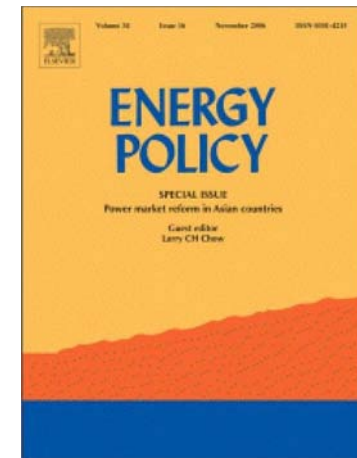
Stakeholders?

Building managers
Accounts payable staff
Administrators
Maintenance workers
City officials
Principals
Teachers
Community members
Students



2. Schedule regular meetings (monthly/bimonthly).

3. Determine if an energy policy already exists and investigate it.



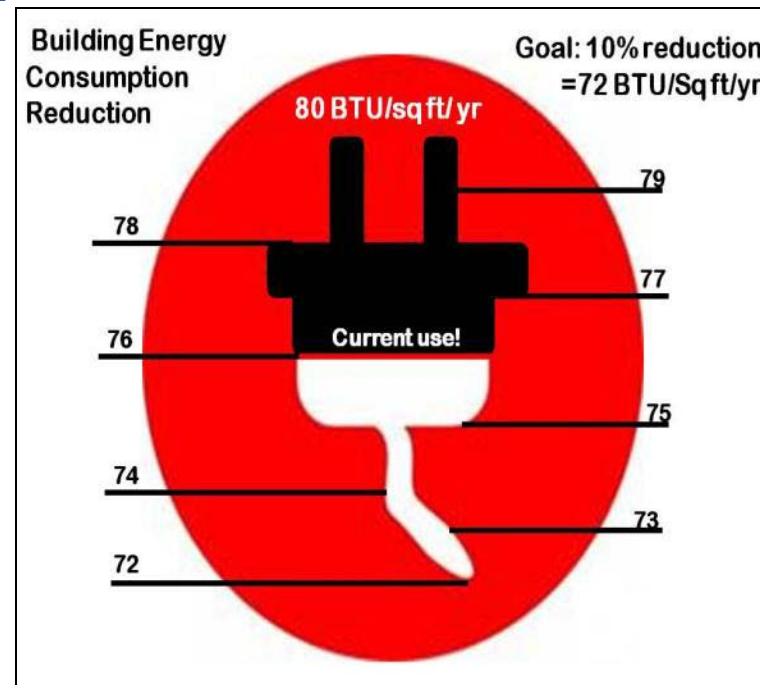
Accountability

4. Set goals. Hold one another accountable.

Make goals concrete, easily understandable, and comparable (kBTU/ft²/yr)

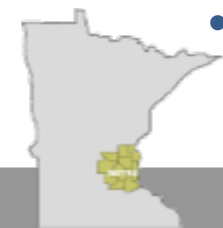
Make goals public

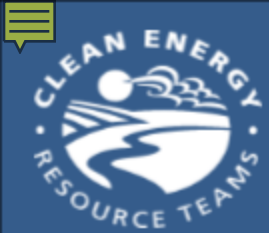
- Newsletters
- Signage
- TV and radio
- Website



5. Provide fun rewards

- Limbo by a principal, mayor, students etc. for each met goal
- Host tour of building improvements





Energy Management Strategy

Quick review:

1. **Develop energy management team**
2. **Schedule regular meetings**
3. **Investigate energy policy**
4. **Set goals.**
5. **Provide fun rewards**



B3 Basics

B3 = Buildings, Benchmarks, and Beyond

Uses engineering algorithms to model how much energy buildings should be using based on current building code.

2000 – B3 Sustainability Guidelines developed

2002 – Law c398-H.F. No.2972 enacted

2004 – MNBenchmarking.com launched⁶

2011 – Coming soon, redesign!



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B3 Tool Snapshot

B3 Benchmarking - Mozilla Firefox
 http://www.mnbenchmarking.com/B3EMSLaunch.aspx
 Logged in as Katie Jones

B3 BENCHMARKING

My Organizations and Sites:

- Public Schools, ISD 2
- Public Schools, ISD 6
- Public Schools, ISD 7
- Public Schools, ISD 5
- Public Schools, ISD 2
- Public Schools, ISD 9
- Public Schools, ISD 1
- Public Schools, ISD 8
- Public Schools, ISD 9
- Public Schools, ISD 1
- Public Schools, ISD 6
- Public Schools, ISD 4
- Public Schools, ISD 3
- Public Schools, ISD 8
- Public Schools, ISD 2
- Public Schools, ISD 5
- Public Schools, ISD 7
- Public Schools, ISD 2
- Public Schools, ISD 2
- Public Schools, ISD 6
- Public Schools, ISD 2
- Public Schools, ISD 4
- Public Schools, ISD 5
- Public Schools, ISD 2
- Public Schools, ISD 7
- Public Schools, ISD 6

Organization - Public Schools, ISD 182, Crosby-Ironton

Organization Summary | Reporting

View: Benchmarks Baselines

All Data

	Sites	SF	Buildings	Meters
Total	2	317,914	2	6
Complete	2	317,914	2	6
Incomplete	0	0	0	0

Site Floor Area SF %

- Complete
- Incomplete

Showing 2 of 2 Sites

Fuel	Meters kBtu/SF	Benchmark kBtu/SF	% Ratio Mtr To Bnchrk
Total	51.1	110.9	46.0%
Electric	19.6		
Natural Gas	31.5		

Sites

Site Name	Status	Current Meter Data	SF	Primary Space Usage	Bldg Qty	Meter Total kBtu/SF	Bnchrk Total kBtu/SF	Ratio Meter /Bnchrk	Potential Savings kBtu
Crosby-Ironton High School	✓	12/31/2010	212,914	High School	1	54.3	111.2	48.8%	-12,117,163
Cuyuna Range Elementary	✓	12/31/2010	105,000	Elementary Schc	1	44.5	110.4	40.4%	-6,910,273

v2.2.0.1147 | Copyright © 2011

Transferring data from www.mnbenchmarking.com...



B3 Step 1 - Profile

1. Create complete profiles for all buildings

Building Editor - Public Schools, ISD 182, Crosby-Ironton, Crosby-Ironton High School - Crosby-Ironton High School #7810 ?

Building Information #7810 ?

Building Name: Statewide ID:

Building Address: Floor Area SF: (sq. ft.) Comments:

City: Original Occupancy:


State:

Zip Code:

Space Use ?

Identify your composite space use, occupied periods and percent heated and cooled using the table below.

Space Usage Type	% Usage	Hrs/Day	Days/Week	Months/Year	Hrs/Year	Default Hrs/Year	% Heated	% Cooled		
Education: High School	<input type="text" value="100"/>	<input type="text" value="14"/>	<input type="text" value="6"/>	<input type="text" value="10"/>	<input type="text" value="3,640"/>	<input type="text" value="3,241"/>	<input type="text" value="100"/>	<input type="text" value="100"/>	<input type="button" value="Reset"/>	<input type="button" value="Delete"/>

% Usage 

Add New Space Usage

Special Use Conditions ?

Identify special use conditions for your building. Please leave blank any that do not apply.

Pool Size: (sq. ft.)

Data Center Size: (sq. ft.)

Dedicated Kitchen/Food Prep Size: (sq. ft.)

Parking Lot Size: (sq. ft.)

Optional Building Information

Help us identify possible areas for improvement for your building.

General ?



B3 Step 2 – Utility data

2. Update utility data going back at least 3 years if the data is available

Meter Editor - Public Schools, ISD 182, Crosby-Ironton, Crosby-Ironton High School - HS Main Meter - Electric

My Meter Name: Meter is connected to: Crosby-Ironton High School Comments:

Meter Services: Utility Company:

Emissions: CO2 1813.81 lbs/MWh CH4 0.026 lbs/MWh

Account #: Meter ID:

Connection Date: Disconnection Date:

Meter Readings (Bills)

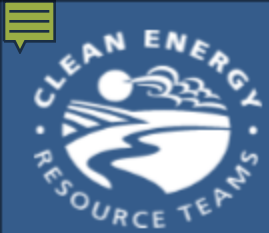
Start Date	End Date	Usage	Cost	Balance	Amount	Rate	Action
4/12/2007	5/9/2007	129,600.0	611.00	\$0.00	\$10,581.30	\$0.08	Delete
5/9/2007	6/12/2007	162,240.0	677.00	\$0.00	\$13,120.78	\$0.08	Delete
6/12/2007	7/11/2007	114,240.0	440.00	\$0.00	\$9,073.76	\$0.08	Delete
7/11/2007	8/13/2007	160,320.0	637.00	\$0.00	\$11,542.42	\$0.07	Delete
8/13/2007	9/15/2007	172,800.0	753.00	\$0.00	\$12,790.61	\$0.07	Delete
9/15/2007	10/15/2007	152,640.0	669.00	\$0.00	\$11,152.23	\$0.07	Delete
10/15/2007	11/15/2007	150,720.0	525.00	\$0.00	\$10,144.29	\$0.07	Delete
11/15/2007	12/15/2007	150,720.0	479.00	\$0.00	\$10,366.34	\$0.07	Delete

[Add New Reading](#) | [Re-sort Readings](#)

NOTE: Meter readings should be contiguous, with each start date matching a prior end date. You may enter new readings in any order. Click the 'Re-sort Readings' link to refresh.




Institutionalize the process – Accounts payable person, few minutes per month entering data





B3 Step 3 – Focus Building

3. Prioritize buildings with greatest potential for improvement

All Data					Showing 2 of 2 Sites				
	Sites	SF	Buildings	Meters	Fuel	Meters kBtu/SF	Benchmark kBtu/SF	% Ratio Mtr To Bnchrk	
Total	2	317,914	2	6					
Complete	2	317,914	2	6					
Incomplete	0	0	0	0					
Site Floor Area SF %									
● Complete									
● Incomplete									
									
Sites									
Site Name	Status	Current Meter Data	SF	Primary Space Usage	Bldg Qty	Meter Total kBtu/SF	Bnchrk Total kBtu/SF	Ratio Meter /Bnchrk	Potential Savings kBtu
 Crosby-Ironton High School	✓	11/30/2010	212,914	High School	1	63.6	111.8	56.9%	10,251,206
 Cuyuna Range Elementary	✓	11/30/2010	105,000	Elementary Schc	1	53.7	111.5	48.2%	-6,061,404

Energy Use Intensity ←

Use ratio of actual to “expected” use




Potential building energy savings ↓



B3 Step 4: Energy sectors

4. Get a sense of the sector with the greatest share of energy use/cost

		Dollars per SF per Year			kBtu per SF per Year			CO2 lbs per SF per Year		
		Actual	Baseline	Change from Baseline	Actual	Baseline	Change from Baseline	Actual	Baseline	Change from Baseline
Electric		\$0.51	\$0.52	\$-0.01	18.07	22.71	-4.64	9.65	12.13	-2.48
Natural Gas		\$0.17	\$0.27	\$-0.10	28.80	32.42	-3.62	3.37	3.79	-0.42
Steam/Hot Water		-	-	-	-	-	-	-	-	-
Chilled Water		-	-	-	-	-	-	-	-	-
Propane		-	-	-	-	-	-	-	-	-
Fuel Oil		-	-	-	-	-	-	-	-	-
Wood		-	-	-	-	-	-	-	-	-
TOTAL		\$0.68	\$0.79	\$-0.11	46.87	55.12	-8.26	13.02	15.92	-2.90
% Change from Baseline		-13.72%			-14.98%			-18.21%		

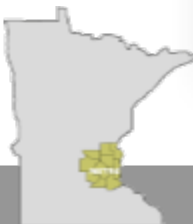
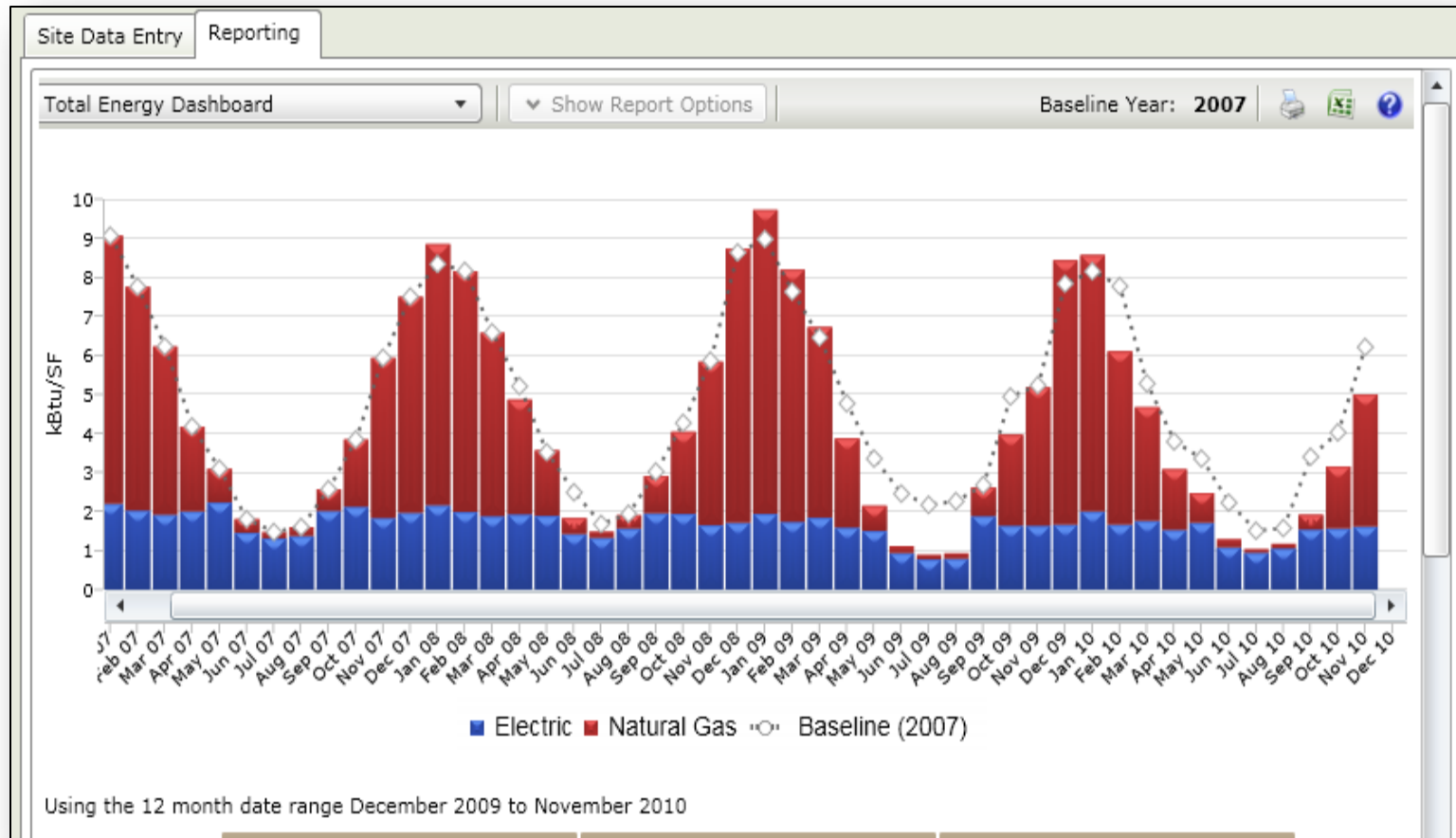
<p>Dollars per SF - Actual</p> 	<p>kBtu per SF - Actual</p> 	<p>CO2 per SF - Actual</p> 
--	--	--

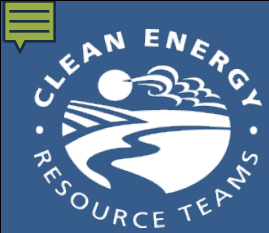
Electricity = 75% of energy cost Natural Gas = 25% of energy costs



B3 Step 5: Track energy

5. Track energy use over time





B3 Review

- 1. Profile – Enter complete building profile data.**
- 2. Utility data – Enter complete utility data.**
- 3. Focus building - Determine the focus building.**
- 4. Energy type – Understand the energy make-up of the building.**
- 5. Track energy – Evaluate building performance over time**





Entire Process Review

1. **Develop/update energy management strategy**
 - Remember team regular meetings!
2. **Enter/update all utility data and building profile information in B3**
3. **Use B3 to determine your spaces with greatest saving potential**
4. **Focus on the chosen buildings, examine, and implement Best Management Practices**
5. **Track usage and evaluate effectiveness of BMPs**
6. **Repeat Steps 1-5**





Questions?

And then...a quick poll!

Contact me with other questions:
Katie Jones
katie@cleanenergyresourceteams.org





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