



Energy Analytics

Managing Utility Costs in School Buildings


NCSA Webinar
April 6, 2016

Introductions



- Presenters:
 - Dave Raymond - Trane
 - Larry Cihal - Trane
 - John Frankl - Trane
 - Brian Maschmann - Norris School District 160

2 | NCSA Webinar




ESCO Procurement Process

- Conceptual Meeting with Administration
 - Preliminary Building Audit
- School Board or Committee Meeting
 - Release RFQ
- Qualified PC Companies respond to RFQ
 - Proposals Evaluated
- School Board Meeting
 - Board selects a Partner (LOI)
- In-Depth Study
 - Final project developed
- Final Presentation
 - Board approves contract
 - Financing resolution
 - 3rd party Engineering review
- Implementation of Project

3 | NCSA Webinar




Number of Nebraska School Buildings

2013-2014 Statistics and Facts about Nebraska Schools
Full Membership in Public School Districts by Grade and Type of School
2013-2014

Type of School	Number of Schools	Grade Level											TOTAL					
		PK	K	1	2	3	4	5	6	7	8	9		10	11	12		
PK-6 ONLY	54	3,675																3,675
ELEMENTARY SCHOOL	572	10,762	24,025	21,860	23,269	22,911	22,962	21,449	10,804	197	169							158,528
MIDDLE SCHOOL	124					135	1,195	11,637	18,221	18,039								49,227
HIGH SCHOOL	105										17,907	17,852	17,558	18,834				72,201
SECONDARY	162										3,810	3,876	4,064	4,008	3,975	4,034		23,767
PUBLIC TOTAL	1,017	14,637	24,025	21,860	23,269	22,911	23,097	23,644	22,441	22,281	22,884	22,021	21,860	21,833	22,860	907,396		

4 | NCSA Webinar



Age of School Buildings


Table 1—Year of school construction and mean age of school, by school characteristics

School Characteristics	N=11,738			Mean Age
	Before 1950	1950-1999	2000-2013	
All public schools	29	45	17	10.42
Instructional level				
Elementary	29	46	15	11.43
Secondary	24	46	23	8.40
Size of enrollment				
Less than 100	40	39	14	8.46
100 to 999	24	48	12	11.40
1,000 or more	23	44	22	11.39
Location				
City	34	44	13	9.46
Urban fringe	20	53	17	10.40
Town	24	47	20	9.40
Rural	32	38	17	12.42
Region				
Midwest	30	49	15	4.46
Southwest	33	43	20	14.37
Central	31	46	14	8.46
West	25	44	19	13.39
Percent of students eligible for free or reduced price school lunch				
Less than 20 percent	20	48	20	11.39
20 to 49 percent	29	44	16	11.41
50 percent or more	14	37	14	10.44

NOTE: Percentages may not sum to 100 due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Forward Survey System, Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1999; FRED (Fall 1999), Survey on Advanced Telecommunications in U.S. Public Schools, K-12; FRED 27, 1998, Survey on Advanced Telecommunications in U.S. Public Schools, K-12; FRED 31, 1996.

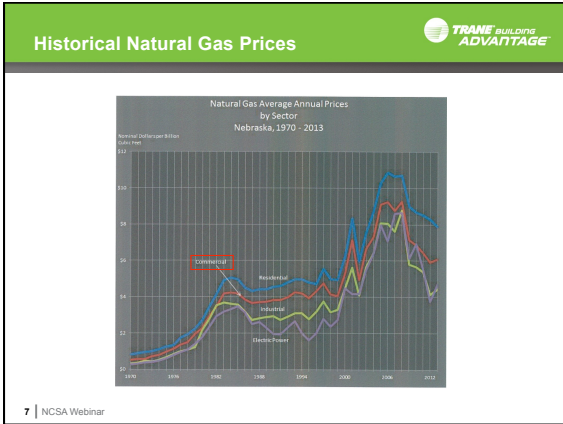
5 | NCSA Webinar



Historical Electricity Prices

Electricity Prices by End-Use Sector
Nebraska, 1970 - 2013

6 | NCSA Webinar

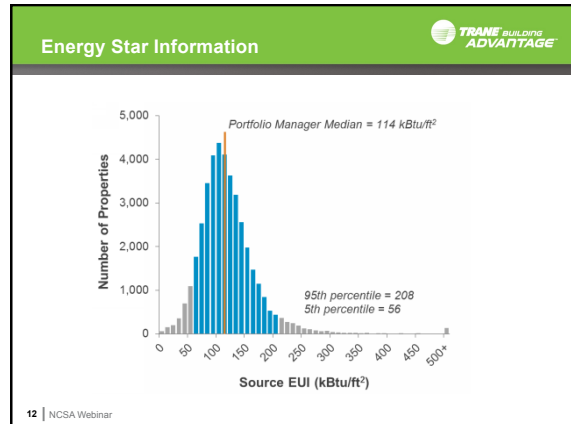
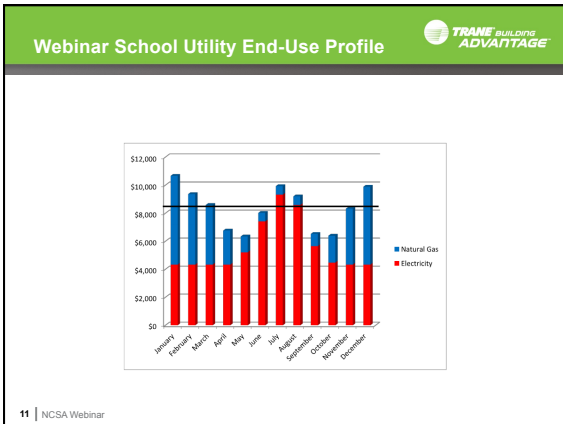
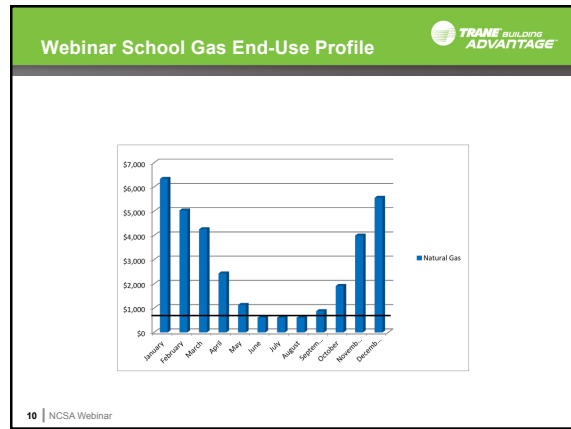
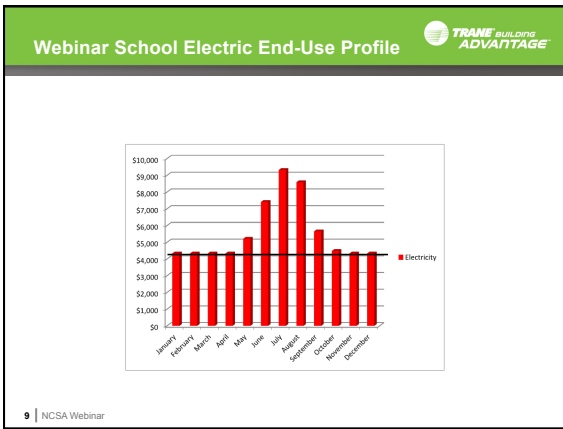


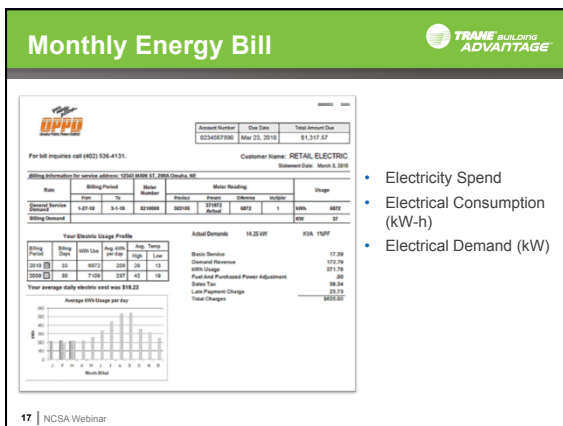
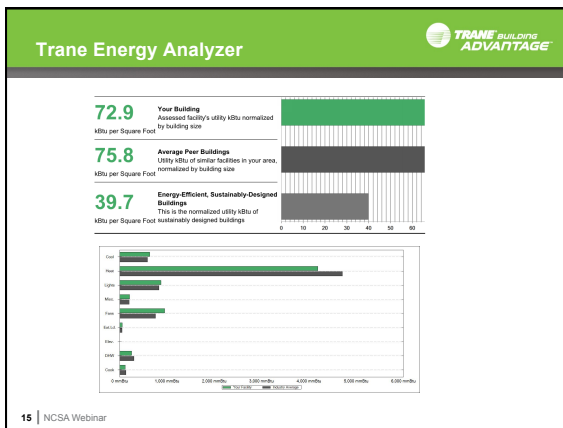
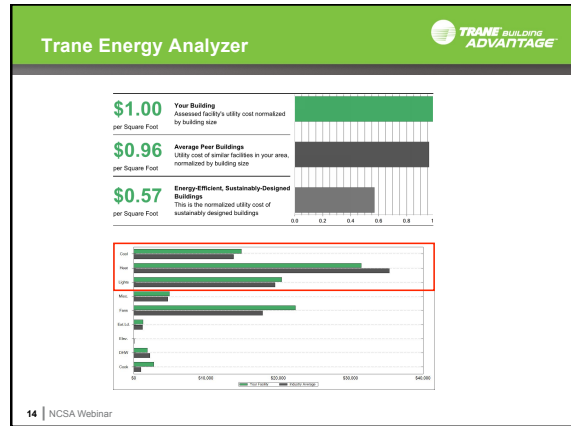
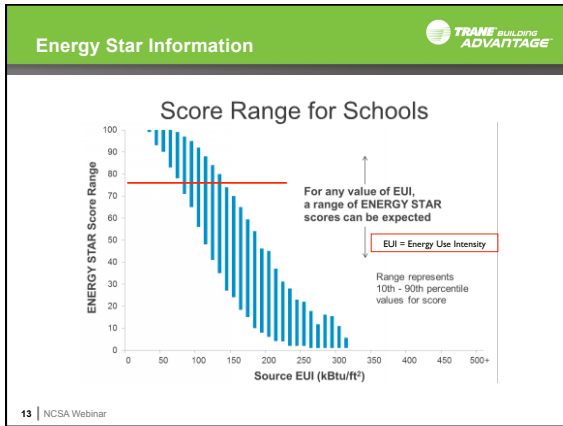
Utility Benchmark Information

WEBINAR PUBLIC SCHOOLS

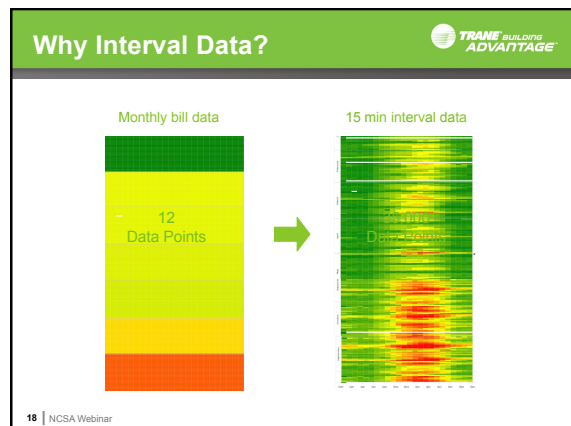
Date	Electric			Natural Gas		
	kWh	kW	Cost	Therm	Cost	
January	54,166	\$4,333		8,441	\$6,331	
February	54,166	\$4,333		6,708	\$5,031	
March	54,166	\$4,333		5,668	\$4,291	
April	54,166	\$4,333		3,241	\$2,431	
May	65,166	\$5,213		1,508	\$1,123	
June	92,666	\$7,413		815	\$611	
July	116,499	\$9,320		815	\$611	
August	107,332	\$8,567		815	\$611	
September	70,666	\$5,653		1,161	\$871	
October	55,999	\$4,400		2,548	\$1,911	
November	54,166	\$4,333		5,311	\$3,991	
December	54,166	\$4,333		7,401	\$5,551	
833,325		0	\$66,666	44,444	\$33,333	
		\$0.0800	\$/kWh	\$0.750	\$/Therm	
8.33		kWh/kY		44.44	cf/Y	\$8,333 \$/month
				\$1.00	\$/M	
2,844,138,225		Btu		4,444,400,000	Btu	72,885 Btu/kY

8 | NCSA Webinar





- Electricity Spend
- Electrical Consumption (kW-h)
- Electrical Demand (kW)



Trane Energy Optics

19 | NCSA Webinar

Optics – Middle School Example

20 | NCSA Webinar

Real Time Information

Real-time group:
Energy use: -22%

21 | NCSA Webinar

Real-time Energy Management

Easily identify energy waste

- Energy Analytics
- Tracking & Reporting
- Spectral Analysis

22 | NCSA Webinar

Energy Analytics

Zero In Quickly on Wasteful Procedures

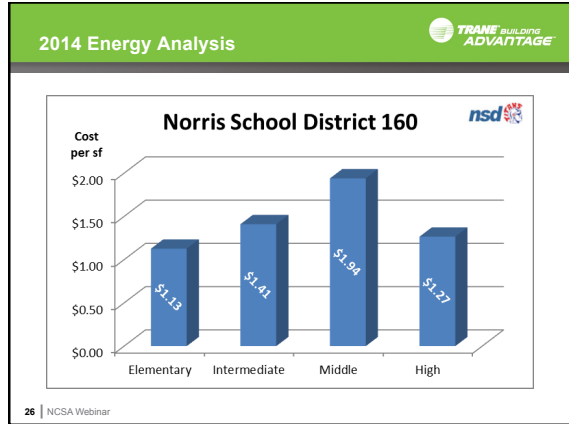
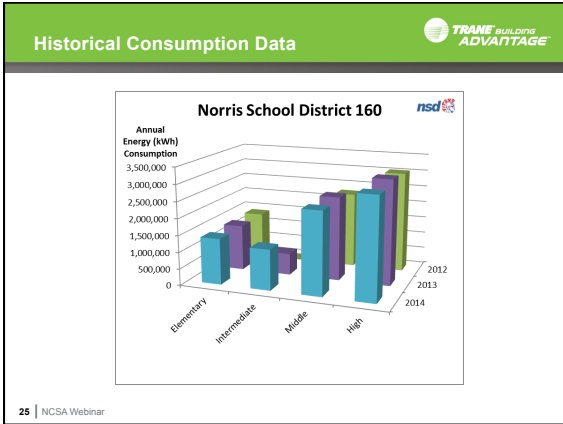
Month	Excess Usage Cost (\$)	Hours	Actions
Jan	6,742	1,203	
Feb	605	112	Diagnose Spectral Schedule Edt
Mar	3,123	214	Diagnose Spectral Schedule Edt
Apr	323	115	Diagnose Spectral Schedule Edt
May	1,643	315	Diagnose Spectral Schedule Edt
Jun	536	321	Diagnose Spectral Schedule Edt

23 | NCSA Webinar

Norris Public Schools

Analyzing an Existing Facility for Energy Efficiency

24 | NCSA Webinar

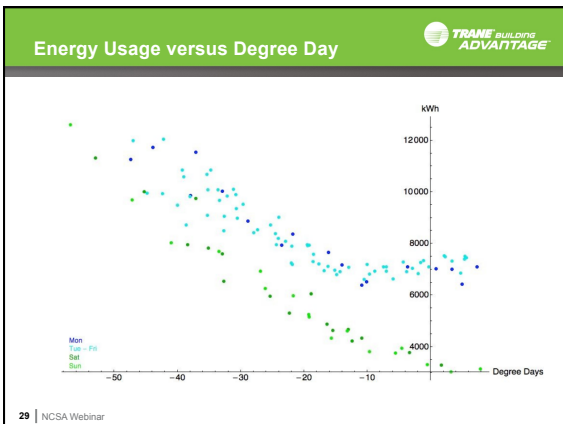
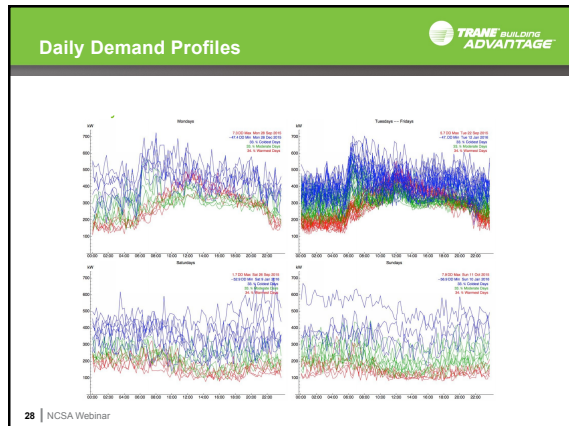


Optics Information

Detailed Graphical Utility Analysis
Norris Middle School

23 January 2016

27 | NCSA Webinar



Questions and Contact Information

- Norris Public Schools District 160
 - Brian Maschmann – (402) 791- 0000
- Trane – (402) 331- 7111
 - Dave Raymond
 - Larry Cihal
 - John Frankl

30 | NCSA Webinar