TRANE BUILDING ADVANTAGE

Energy Analytics

Managing Utility Costs in School Buildings

NASBO State Convention
April 14, 2016

Ingersoll Rand

Introductions

TRANE BUILDING ADVANTAGE

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

ESCO Procurement Process

TRANE BUILDING ADVANTAGE

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

Number of Nebraska School Buildings

2013-2014 Statistics and Facts about Nebraska Schools
Fall 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	
PREK ONLY	54	3,675														3,675
ELEMENTARY	572	10,782	24,025	21,980	23,249	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											17,957	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	14,457	24,025	21,980	23,249	22,911	23,097	22,644	22,441	22,228	22,084	22,021	21,860	21,533	22,868	307,398

Age of School Buildings

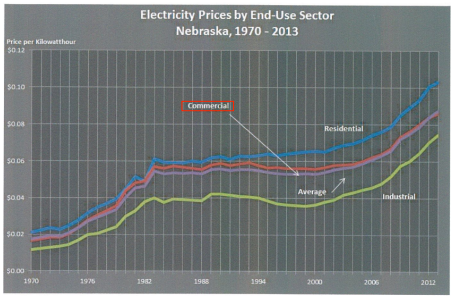
Table 1.—Year of school construction and mean age of school, by school characteristics

School characteristic	Year built: Before 1950	1950–1969	1970–1984	1985 or after	Mean age
	(Percent of schools)				
All public schools	28	45	17	10	42
Instructional level					
Elementary	29	46	15	11	43
Secondary	24	46	23	8	40
Size of enrollment					
Less than 300	40	39	14	8	48
300 to 999	24	48	17	11	40
1,000 or more	23	44	22	11	39
Locale					
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					
Northeast	30	49	15	6	46
Southeast	33	43	20	14	37
Central	33	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	34	42	14	10	44

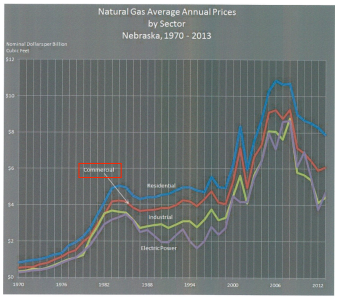
NOTE: Percentages may not sum to 100 due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1998," FRSS 61, 1998; "Survey on Advanced Telecommunications in U.S. Public Schools, K–12," FRSS 57, 1995; "Survey on Advanced Telecommunications in U.S. Public Schools, K–12," FRSS 51, 1994.

Historical Electricity Prices



Historical Natural Gas Prices

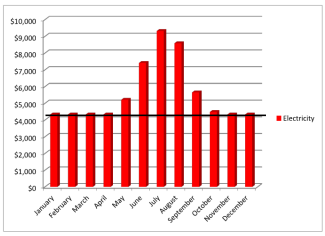


Utility Benchmark Information

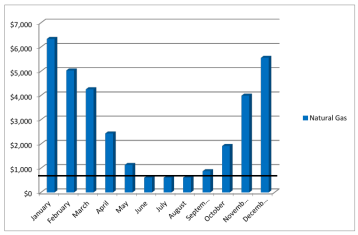
WEBINAR PUBLIC SCHOOLS
Utility Data

	Electric			Natural Gas					
Date	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	$4,251				
April	54,166		$4,333	3,241	$2,431				
May	65,166		$5,213	1,508	$1,131				
June	92,666		$7,413	815	$611				
July	116,499		$9,320	815	$611				
August	107,332		$8,587	815	$611				
September	70,666		$5,653	1,161	$871				
October	55,999		$4,480	2,548	$1,911				
November	54,166		$4,333	5,321	$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				
						$100,000	$		
	8.33	kWh/sf		44.44	cf/sf	100,000	sf	$8,333	$/month
						$1.00	$/sf		
	2,844,138,225	btu		4,444,400,000	btu	72,885	btu/sf		

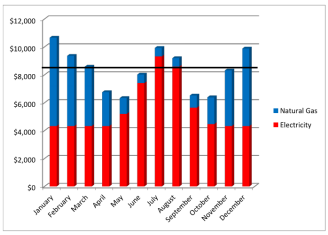
Webinar School Electric End-Use Profile



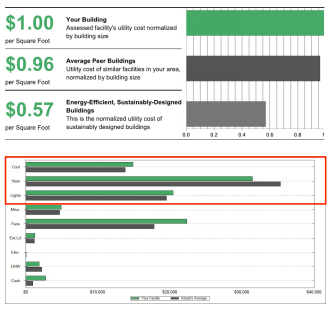
Webinar School Gas End-Use Profile



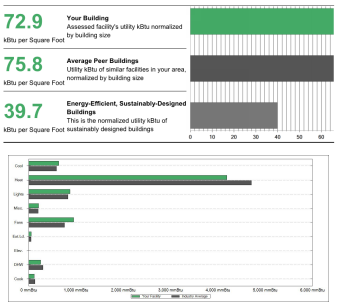
Webinar School Utility End-Use Profile



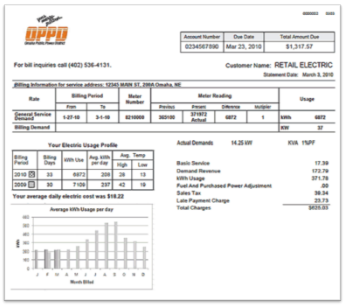
Trane Energy Analyzer



Trane Energy Analyzer

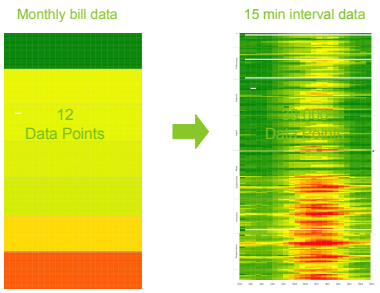


Monthly Energy Bill



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

Why Interval Data?



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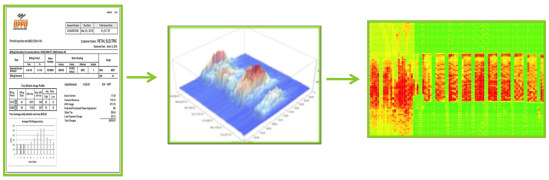
Trane Intelligent Services



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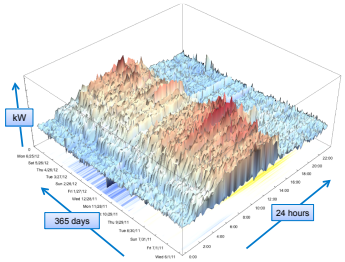
Optics – Middle School Example



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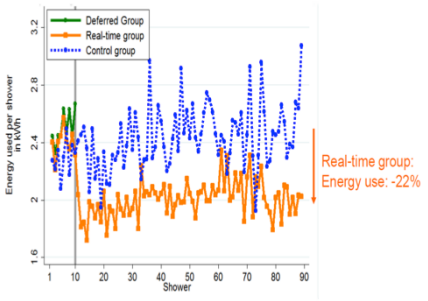
Real Time Information



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Trane Energy Performance

Norris Public Schools

Analyzing an Existing Facility for Energy Efficiency

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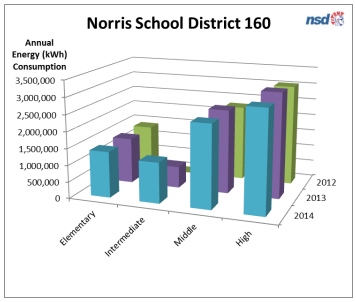
Historical Consumption Data



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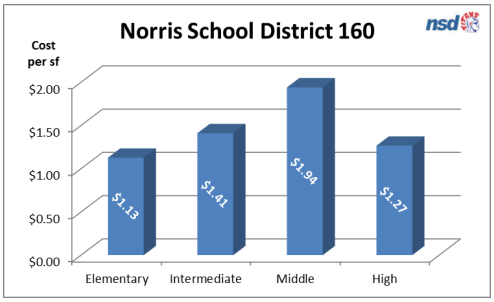
2014 Energy Analysis



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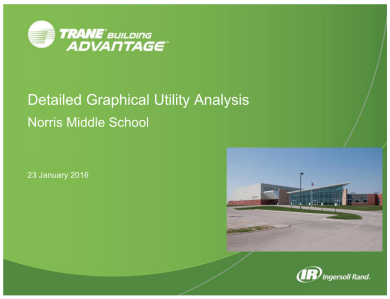
Optics Information



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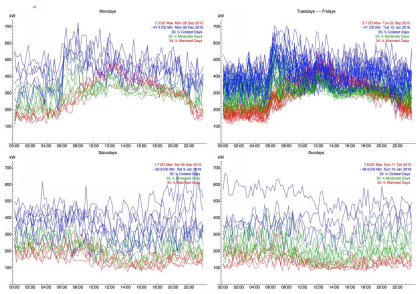
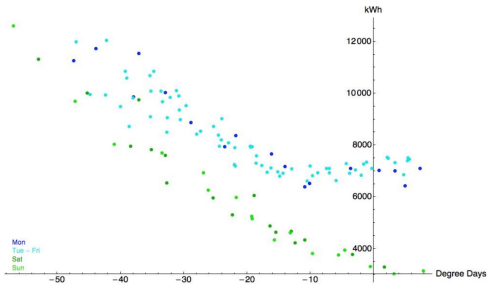
Daily Demand Profiles



Energy Usage versus Degree Day



Questions and Contact Information

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  - Dave Raymond
  - Larry Cihal