It's Hard To Stop A Trane.®

DETAILED STUDY REPORT

ZALE CORPORATION

ENERGY SAVINGS PROJECT

Submittal Date: June, 2006

Presented by:
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Trane, a division of American Standard Inc.

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DISCLAIMER

This report is a Detailed Study, which serves to investigate possible energy conservation opportunities and is based on the plans available, fieldwork, and interviews of site operating and maintenance personnel. The recommendations are based on an analysis of conditions observed and information gathered at the time of the survey and costs are based on experience with similar projects. Statements concerning energy savings are projections only and actual savings to be realized by the customer are dependent upon many factors, including conservation measures implemented, seasonal weather variations, fuel price, and specific energy use practices of the facility occupants and workers. By this report, Trane makes no guarantee, whether express or by implication, of any savings. Any guarantee will be by contract executed by Owner and Trane.

This report, by itself, is not intended, as a basis for the engineering required to adopt any of these recommendations. Its intent is to interest the customer in the potential cost savings of the recommendations. Development of design documents and specifications may be required, conforming to the details of this audit, to successfully implement the energy conservation measures.

Disturbance, removal, or replacement of building material, insulation systems, high intensity discharge and fluorescent lamps, lamp ballasts, power factor correction capacitors, starting and running capacitors of motors and potentially other components which may contain asbestos, mercury, or PCBs require handling and disposal in accordance with applicable Federal and State laws and regulations.

Reference to specific products or manufacturers is not an endorsement of that product or manufacturer by Trane.

Executive Summary

Trane is pleased to submit the following Detailed Study report to Zale Corporation for a comprehensive energy savings project.

Trane's Value Proposition

> *Trane is committed to drawing from its global resources to develop and deliver customer-centric solutions addressing needs expressed by its customers across the Americas. Trane further commits that its solutions shall integrate state-of-the-art products and technologies, and unparalleled business services to provide optimal solutions that feature sustainable long-term economic value, as well as system performance and reliability. Trane's brand name is a promise that it will execute to achieve these outcomes.*

The information that follows is intended to clearly demonstrate Trane's competencies and its commitment to delivering on this value proposition.

The Zale Corporation Headquarters building is currently poised to spend in excess of **one million, eighty-five thousand dollars ($ 1,085,000) in annual energy expenditures**. Using your historical energy consumption figures expressed in annual "BTUs per SF per Year," the Headquarters building is consuming over 20,000 "BTUs per SF per Year" more in energy than an energy efficient building of comparable size in the region. The current level of 92,392 BTUs per SF per Year is above the regional average, according to the US Energy Information Administration data depicted in APPENDIX G.

The purpose of the Detailed Study was to identify potential energy savings measures that Zale Corporation could implement alongside the current asset modernization program to reduce current energy expenditure levels. Trane, in cooperation with the Zale Corporation facilities staff, has identified several energy savings projects for the Zale Corporation Headquarters site. Trane's preliminary estimates show that over **one hundred ninety-two thousand dollars ($ 192,000) in annual energy savings are achievable**.

Trane has specifically identified the following energy conservation strategies as being viable and has validated them during our detailed study process:

- Replace the existing water chillers with a new 400 ton and a new 600 ton Trane Centrifugal chiller
- Installation of a comprehensive lighting Retrofit
- Installation of Trane direct digital controls on existing air handling systems
- Installation of Trane direct digital controls on existing variable air volume boxes
- Installation of Trane direct digital controls on the central plant equipment
- Upgrade existing variable air volume air handling systems to incorporate variable frequency drives
- Installation of new condenser and chilled water pumps, to include variable frequency drives
- Convert existing chilled water distribution system to a variable flow primary system.

- Optimize the existing central cooling plant with Trane proprietary Chiller Plant Manager Software to enhance the sequence of operation of cooling resources

In addition to the aforementioned energy savings projects, Trane recommends incorporating the following asset renewal projects into a comprehensive retrofit project:

- Upgrade the existing Fire Alarm system
- Upgrade the existing Fire Suppression system
- Upgrade the existing central plant to meet ASHRAE 15 refrigerant handling recommendations
- Redesign and modify the existing condenser water piping system to alleviate further issues with condenser water flow

The cost to install the above asset modernization and energy conservation measures is approximately **one million, eight hundred sixty-five thousand dollars ($ 1,865,000)**.

In addition to the aforementioned energy savings, Trane worked with Zale Corporation to identify over **two hundred seventy-eight thousand dollars per year ($ 278,000)** in annual maintenance and operational savings by implementing the Trane recommendations.

Trane additionally recommends a comprehensive program of services, to include a support agreement to enable Trane to guarantee the energy savings, and a customized package of maintenance support services to ensure the overall project savings are sustainable. Trane is offering both the support agreement and the maintenance services for approximately **one hundred twenty-six thousand dollars per year ($ 126,000).**

To summarize the project costs and savings:

Project Implementation Costs (Taxes Excluded)	$1,865,000
Project Savings:	
Energy Savings	$192,000
Operation and Maintenance Savings	$278,000
Trane Support Services:	
Measurement & Verification Support Services	($12,000)
Comprehensive Maintenance Support Services	($114,000)
Net Annual Savings:	$344,000
Simple Payback:	5.42

Trane has partnered with Zale Corporation to develop the aforementioned opportunity using our unique project development process. The Trane process has been designed to enable an owner to stay focused on the desired results and not be distracted by the

nuances of the traditional construction contracting (bid-spec) process. Trane has positioned itself to take on long term accountability in the success of your building via our energy savings guarantee, extended equipment warranties, and our comprehensive maintenance program. Our interests are aligned in making your facility run as efficiently and cost effectively as possible.

The energy savings mentioned in this report have been fully evaluated using Trane's industry-standard design / analysis tool, TRACE 700 Software. **Tr**ane **A**ir **C**onditioning **E**conomics (TRACE) 700 has been an invaluable tool for the consulting engineering community since the late seventies, and continues to be a very powerful analysis tool to this day. A synopsis of the TRACE 700 software tool can be previewed in APPENDIX A.

Trane stands ready to implement the above program in approximately six months, and will provide professional project management as the prime contractor for the project.

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Trane Background and Capabilities

Trane, a division of American Standard Inc., is the world's leading manufacturer of commercial heating, ventilating, air conditioning, and building management systems equipment. Millions of people worldwide rely on Trane and the American Standard family of residential and commercial products to enhance comfort and to ensure health and safety. The following is a brief overview of our organization.

American Standard Inc.

American Standard Inc. is a global, diversified manufacturer with sales of over $4.8 billion annually. Headquartered in New Jersey, American Standard is a Fortune 250 company with three business segments:

- Air Conditioning Products develops and manufactures equipment for central air conditioning systems in commercial, institutional, and residential buildings.
- Plumbing Products develops bathroom fixtures and fittings with the names American Standard, Ideal Standard, Standard, and Porcher.
- Automotive Products manufactures and develops the WABCO brand of commercial and utility vehicle braking and control systems.

American Standard is a worldwide leader in Demand Flow® technology, which gives our customers the best possible service through speed in product design and order fulfillment, as well as total product quality and productivity.

Trane Company

Trane is the world's leading manufacturer of reliable and efficient air conditioning equipment. We are also the leading single-source provider of equipment, controls, installation, training, and support. Since our incorporation in 1929, Trane has been an innovator. Today, we offer a complete line of highly efficient, state-of-the-art heating and cooling equipment for commercial and residential use. Trane's Earth•Wise™ CenTraVac® chiller, for example, is the most energy efficient air conditioner on the market.

Our Integrated Comfort Systems are state-of-the-art and user-friendly, allowing you, the customer, to remotely monitor your equipment. Integrated direct digital controls are a standard offering for every one of Trane's commercial products.

Trane's sales professionals participate in the company's Graduate Engineer Training Program. Acknowledged as the industry's finest, this program recruits engineering graduates from the best schools and gives them intensive post-graduate training.

Trane is a global company that firmly believes in a strong local presence in the markets we serve. We have more than 125 sales offices in the major metropolitan areas of the United States and Canada. Each office is staffed with experienced engineers and sales professionals who provide comprehensive service, training, and support for our customers long after the sale.

In May, 2004, Trane received accreditation as an Energy Services Company (ESCO) from the National Association of Energy Services Companies (NAESCO). In receiving this accreditation, Trane has demonstrated its core competencies in all aspects of Energy Services contracting. It also assures that Trane's standard contracting business practices meet or exceed the high quality standards established by the industry's most recognized leader in the development of quality standards.

This accreditation has been received following a rigorous evaluation of Trane's capabilities, track record, policies and practices by a NAESCO committee of industry professionals. This process assures Trane's customers that, as an accredited ESCO, Trane will develop its projects with demonstrated competency and accepted industry practices proven to deliver successful projects.

This accreditation is not a certification by NAESCO that Trane's Performance Contracting customers will achieve its performance guarantees, nor is it a sponsorship of Trane.

Trane Contracting

Trane's contracting group provides building owners with comprehensive complex solutions that include turnkey installations, performance contracting, outsourcing chilled water production, and cogeneration.

Our solutions-based approach is called the Performance Agreement for Comfort from Trane (PACT™). The PACT Program integrates everything Trane has to offer into a unique solution for the customer. The solution can address facility infrastructure concerns and improve operating efficiencies with no up-front capital required. Trane guarantees that the solution designed for the customer will reduce risk and alleviate facility concerns.

Trane is a global leader in the comfort and facility solutions industry. For over seventy years, our mission has been to help building owners create efficient, safe, and comfortable environments. As our customers' needs have changed over the years, we have adapted by broadening our services and solutions offerings to meet those needs.

Our principal objective is to provide building owners with comprehensive solutions that are efficient and sustainable. We understand the challenges of managing a quality facility with a fixed budget and resources. With this in mind, Trane operates by listening to our customers, understanding their unique circumstances and by assembling the "right" set of solutions to their needs. Additionally, we understand that our customers require a variety of flexible purchasing options. Therefore, Trane is equipped to offer options ranging from flexible payment terms to third-party financing. In short, we understand that the key to our mutual success is founded in Trane's ability to sell to our customers however they wish to buy.

With Trane as your partner, you will receive the results you expect. Our relationship does not end once we have installed the solutions. We make a long-term commitment to ensure that the solutions we provide continue to perform and meet your expectations. Again, flexibility is the key factor. Many Trane customers seek to ensure that the performance of their solutions is sustained through the use of warranties and maintenance/service agreements. Other customers require longer-term performance guarantees. Your Trane representative is equipped to discuss all of these options and assist you in making the best choice.

Stability

Since 1929, Trane has provided our customers with high-efficiency products and value-added services. We have solid financial backing within our parent company, American Standard Inc., which generates over $4.8 billion in sales annually. In addition, Trane has achieved one of the lowest associate turnover rates in the industry. As a result, our team is consistent and reliable in providing solutions that allow you to meet your immediate and future goals and we have the financial wherewithal to stand behind what we offer.

Expertise

As an industry leader, Trane has developed a wealth of knowledge and unique insight into finding solutions to building performance issues. American Standard adds even more depth of expertise in plumbing applications. This is of particular importance in today's environment of increased awareness of total resource management. Our support team of sales representatives, engineers, project managers, and service technicians are recognized as highly trained industry leaders. The professionals who work with you have a long history of working successfully as a team. They will come to you prepared to deliver value and cost-effective solutions.

Global Company, Local Presence

As a global company with nearly 100 district offices in North America, we are just a short distance away from you. Our local Trane offices are equipped to develop comprehensive solutions designed to match each customer's unique needs. Additionally, we are capable of providing a wide array of solutions ranging from the provision of HVAC equipment to the installation of comprehensive building solutions and continuing our relationship with ongoing factory-authorized service and monitoring. All local offices provide customer training in HVAC applications, building automation system operation, and equipment maintenance.

Because we are a global company, our local offices have access to a depth of resources unparalleled in the industry today. In short, Trane provides customers with the right support, in the right place, at the right time.

As mentioned above, Trane's Comprehensive Solutions typically fall into one of the following categories: Design-build Turnkey, Performance Contracting (PACT™), Central Plant Outsourcing, or Cogeneration.

Design-build Turnkey Solutions

Trane's contracting solutions begin with our design-build turnkey process. Each customer can utilize this streamlined and systematic approach to effectively shift most of the project risk from the customer to Trane. Trane reduces your risk by supplying an integrated design-build turnkey project. We can also expand this offering by including other HVAC services and support that addresses your total facility operation. We can assist in the planning of your project, provide full design and development services, project and construction management, and full commissioning services. Typical turnkey projects from Trane may include any of the following solutions:

- Mechanical systems retrofit/optimization
- Electrical systems retrofit/optimization
- Lighting systems retrofit/optimization
- Enterprise energy management systems
- On-site generation
- Water conservation
- Operating cost optimization
- Code and regulation compliance
- Energy purchase options
- Renewable technologies

Performance Contracting

Trane's solutions-based approach to performance contracting is called PACT™, or Performance Agreement for Comfort from Trane. Trane's PACT Program integrates the entire Trane offering into a customized solution for building owners, addressing facility infrastructure concerns and improving operating efficiencies. The cost savings associated with these energy and operational efficiencies reduces the capital investment required to implement the facility improvements, allowing building owners to invest this capital into activities more closely aligned with their business objectives. Trane guarantees its solution, reducing risk to the building owner. By alleviating facility concerns, Trane helps building owners focus on their core business issues.

Central Plant Services

Also known as central plant ownership or outsourcing, this is a unique solution that shifts the financial burden of the capital cost of central plant ownership to Trane. Trane, in turn, bills the customer for the commodity (e.g. chilled water or steam) on a periodic basis. The plant is owned, operated, and maintained by Trane and the commodity is "sold" to the customer on a "unit" basis (e.g. BTUH, Ton-Hour, Gallon, etc.), much like the sale of electricity, fuel and water. Trane will design, construct and operate the Central Plant and supply the commodity to the customer on a guaranteed supply basis at agreed upon rates. This allows for ease in annual budget requirements and places the risk associated with operations, maintenance and general ownership issues with Trane. In order to implement such a solution, Trane could purchase and upgrade an existing plant, construct a new plant to supply the customer with its thermal energy requirements, and design it to be "expandable" with space for additional capacity for future new construction buildings in the area.

Cogeneration

The traditional electricity system as we know it may well evolve beyond recognition as global and national pressures gain momentum to reduce emissions and a more holistic approach is taken to evaluating power generation, supply, and the provision of energy services to end users.

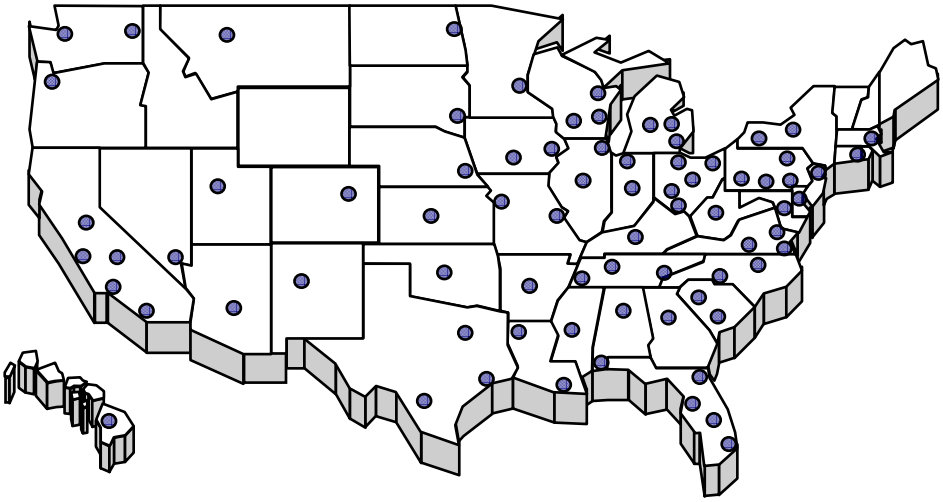
Cogeneration technology provides greater conversion efficiencies than traditional generation methods as it harnesses heat that would otherwise be wasted. This can result in up to more than a doubling of thermal efficiency or higher heat values (HHV). Also, carbon dioxide emissions can be substantially reduced. Furthermore, the heat by-product is available for use without the need for the further burning of a primary fuel. Cogeneration systems predominantly use natural gas, a fuel source which emits less than half the greenhouse gas, per unit of energy produced than the cleanest available thermal power station.

In time an increasing proportion of new power will come from a range of small embedded generators, including cogeneration.

Service Capabilities

Trane has nearly 100 major sales office locations nationwide, as well as many additional satellite locations that can provide on-site service and maintenance for heat pumps, chillers and other HVAC related equipment. Trane's service locations are found in our District Offices. Because of the close proximity of these service departments, turn-around time can be very short. Please refer below for a map of Trane service and maintenance providers. Trane can provide a full range of post-implementation services custom tailored to meet the needs of our customer.

Figure 1. Trane Service and Maintenance Locations



Additional Trane services can include, but are not limited to:

- Site Specific Training and Instruction
- Configuration and Operation of Systems and Equipment
- Operations and Maintenance Coordination with the Government
- Planned Preventive Maintenance
- Remote Monitoring
- Routine Inspection
- Routine Repair
- Emergency and/or On-call Repair

Trane can also develop a training and instruction plan to ensure that appropriate customer personnel are fully knowledgeable on the systems and equipment installed and are trained to operate and maintain those systems and equipment to the same quality standard as Trane would provide.

Trane can provide on-site training and instruction to designated customer personnel. This training will focus on the specific practices and procedures used to operate and maintain the systems and equipment installed on the site and will provide familiarization with the as-built configuration. Formal training can also be provided through Trane's extensive training programs and facilities. Formal training is available covering a wide variety of systems, equipment and techniques. Training can be provided through scheduled classroom instruction at one of Trane's state-of-the-art training facilities or custom on-site classroom training.

Additionally, Trane offers a wide variety of self-paced instructional programs ranging from printed self-study materials, video presentation, interactive CD-ROM, and on-line (Internet based) programs.

Trane can custom-tailor a program to meet the needs and desires of the customer as specified. Trane provides full and complete preventive maintenance, inspection and repair service, including 24 hours a day, 365 days a year emergency maintenance services. However, should the customer prefer to perform some or all of these services itself, Trane will work with the customer to provide the desired level of Trane service. Additionally, Trane will provide comprehensive training to designated customer personnel to best prepare them to perform those services.

With over 2,000 service employees throughout the United States, Trane offers an unparalleled ability to provide on-going maintenance and service. Each of our offices has a significant service business, trained staff, tools, parts and supplies to service any project. The Trane service capacity was developed out of the need to meet our customers' requirements for "factory trained" service technicians and also to act as the warranty agents for our products. Over the past several years, the breadth of our service offering has increased to include a significant portion of non-Trane HVAC related products and control systems. We continue to be leaders in providing technical training, not only for our employees, but also for the industry.

The average local Trane Service Company assigned to a customer facility will have the following qualifications:

- Over 200 service contracts in place
- Over a 95.5% renewal/retention rate for service contracts
- Experience in servicing most Fortune 500 companies' facilities
- Over 28.7 HVAC service technicians

Awards and Recognition

Trane has received several prestigious industry awards, proving our commitment to the betterment of our environment.

2001 Federal Energy and Water Management Award

Presented to the U.S. Dept. of State by the Federal Energy Management Program (FEMP) based on Trane's Super ESPC project at the U.S. Embassy Seoul, Korea. "The Department of State is the first to advance FEMP's Super Geothermal Heat Exchange ESPC internationally with a project at the U.S. Embassy Seoul, Korea. Geothermal heat exchangers will replace inefficient oil furnaces and window air conditioners in 157 housing units and the Ambassador's residence. The $5.1 million contract will span 19 years with total cost savings of $12 million and energy savings of 568 billion Btu. The units will provide a cleaner, healthier, environment for U.S. Embassy personnel living in these residences. This project sets an example of the best in U.S. environmental technology and alternative financing."

2001 EPA Energy Star® Building: American Center

The American Center property qualified as a participant in the U.S. EPA's Energy Star® Building program by showing significant annual savings. Trane provides an annual

performance guarantee of $500,000 in energy savings and $121,000 in operational savings, which aided American Center in qualifying for this award.

2001 Sustainable Building Industry Council
'Best Practice' Sustainability Award

This award recognizes innovation and excellence in market-ready green building & building product design. In the systems category, SBIC recognized the *Earth•Wise™ Design for Chilled Water Systems* project submitted by Trane.

2000 OSHA Voluntary Protection Program Merit Award

The Occupational Safety and Health Administration (OSHA) has recognized Trane La Crosse as a Star Voluntary Protection Program (VPP) site. The voluntary program is designed to recognize and promote effective safety and health management. To achieve Star Status, participants had to meet rigorous criteria based on management excellence in meeting the objective for the safety and protection of human life.

The 1998 Energy Star® Buildings Ally of the Year

The United States Environmental Protection Agency presented this award to Trane for promoting energy-efficient technologies that reduce pollution. Maria Tikoff Vargas, Co-Director of the EPA's Energy Star Buildings and Green Lights Program said, "Trane's partnership with the EPA serves as a remarkable example of environmental leadership."

The Green Seal of Honor

Green Seal, a privately funded, non-profit organization, has certified Trane's Earth•Wise™ CenTraVac® chillers as environmentally responsible. Equipment with the Green Seal must meet the group's rigorous environmental standards.

EPA Climate Protection Award

Presented by the U.S. Environmental Protection Agency (EPA) to Trane in October 1998, this award recognized the development and manufacture of the Trane Earth·Wise™ CenTraVac®. The chiller uses an environmentally balanced alternative refrigerant and leads the industry with superior performance. As recognized by the EPA, the performance of this chiller exceeds all other product technologies currently available in the marketplace, typically by five to twenty percent. In presenting the award, the EPA cited Trane for "...exemplary efforts and achievements in protecting the global climate."

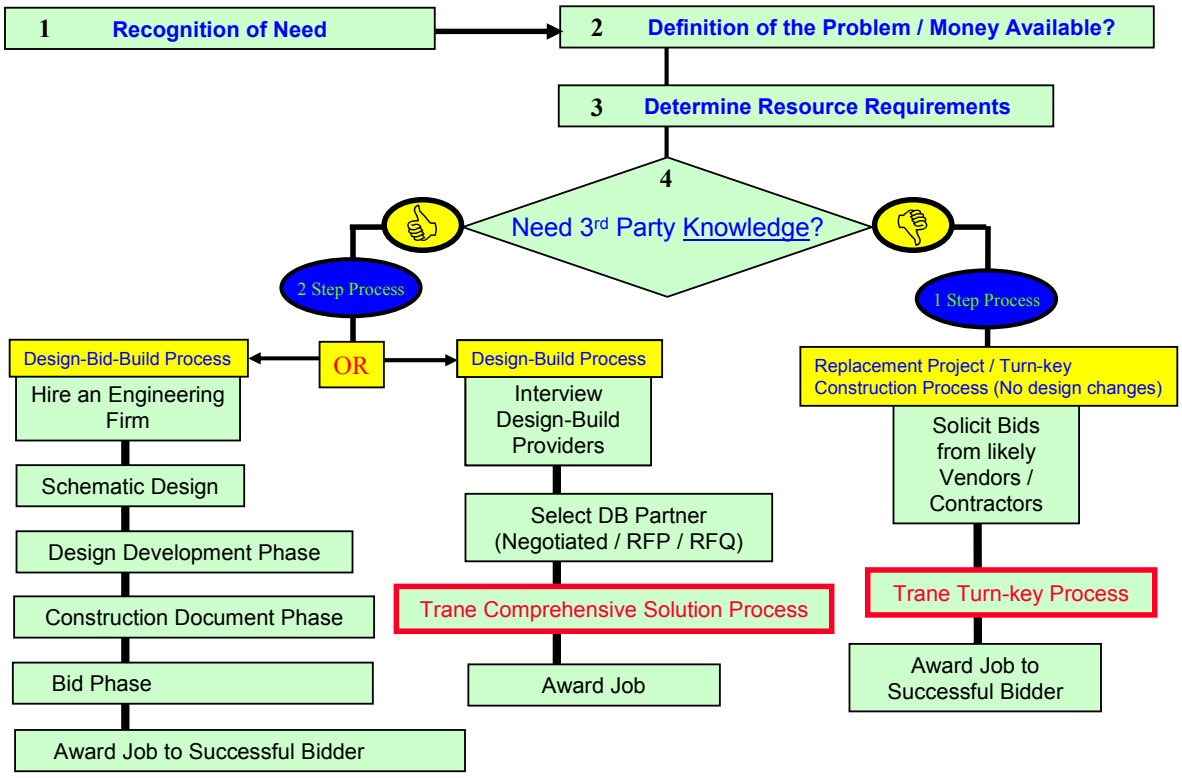
1997 Wisconsin Governor's Export Achievement Award

This award recognized Trane's commitment to increasing its activity in international exports of their products. One of the achievements cited was that nearly forty percent of the centrifugal water chillers manufactured domestically are shipped to customers outside the U.S. This was the second award received by Trane for export achievements. In September of 1996 Trane received the President's E-Star Award for excellence in exporting from the U.S. Department of Commerce.

General Approach to Developing Comprehensive Solutions

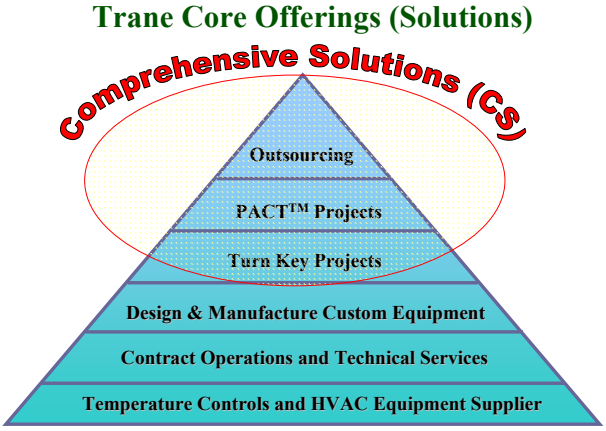
Trane Process Overview and Advantages

One of the first tasks Trane will help you accomplish is to define whether you are faced with a comprehensive solution type of project or a simple replacement project. The flow diagram below depicts a typical decision making process that a building owner traverses to determine that they are in fact dealing with a comprehensive solution scenario.

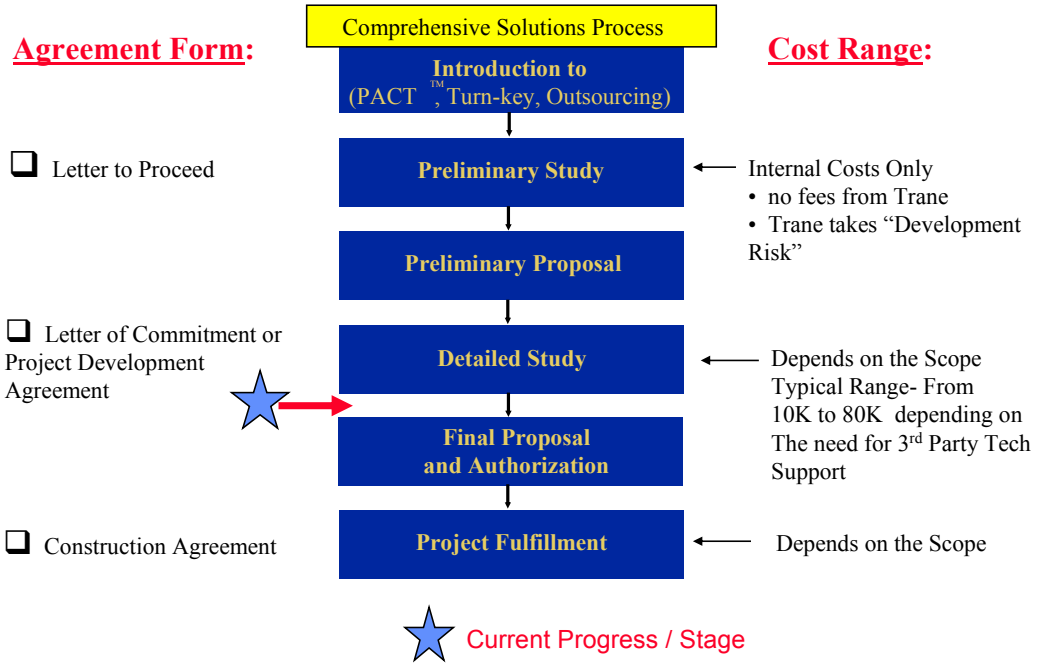


QUESTION: HOW DO WE DECIDE WHICH APPROACH TO TAKE?

Depicted on the following page is the Trane process steps in a comprehensive solution type of project. Also depicted directly below are the three main categories of comprehensive solutions Trane currently offers.

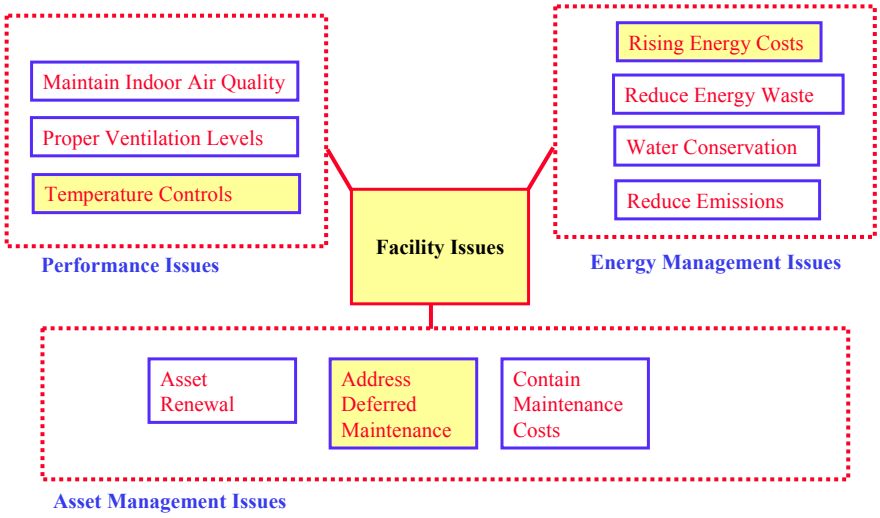


Trane Comprehensive Solutions Project Development Process



The purpose of the above process is to make sure we are investing both your time and Trane's time in a focused manner to help ascertain whether a project makes sense, or assist you in making an "informed decision" as to the best course of action regarding your particular issues. The issues Trane gets involved in go beyond energy conservation and equipment replacement projects. The following figure depicts the overall issues you likely face as a facility owner / manager and the areas that Trane can help. An example of the type of support and information we provide both the consulting engineering community and building owners can be found in APPENDIX M regarding indoor air quality.

Facility Related Issues



Making Informed Project Development Decisions

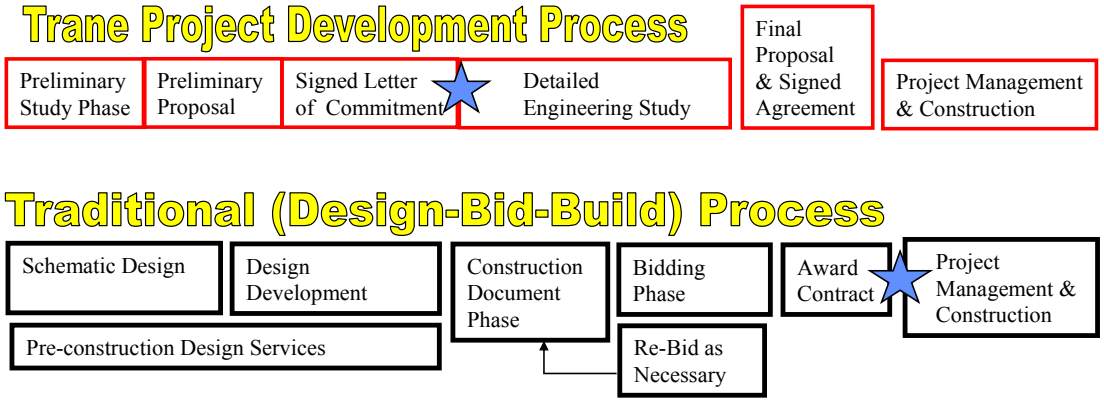
Retrofit projects are unlike new construction projects whereby the decision to construct a project has already been established. One of the key challenges of retrofit work is to try and mitigate the project development costs necessary to validate a project. Ideally, one tries to keep the project development costs to a minimum, until such time as the project costs and savings (project economics) are fully understood and investigated.

Unfortunately it is not always practical for an owner to achieve such a goal. For example, assume an owner is interested in developing an energy retrofit project and decides to hire a professional engineering firm to help develop the project. The engineering firm then creates construction bid documents and executes a bid process on behalf of the owner. Unfortunately, the economics of the project do not prove out as the expected project costs (bids) exceed the amount required to meet the owner's investment criterion, and the owner has unfortunately just invested in developing a project that will never transpire.

The Trane approach to developing comprehensive solutions is designed to align both the owner and Trane's interests in pursing a results-driven project (for the long term), consequently we aim to minimize the up front development expenditures to the extent practical. This is not to say we are minimizing the importance of professional engineering firms and their services. As a matter of practice Trane will hire qualified local professional engineering firms to execute the engineering tasks associated with a comprehensive solution project as it matures. Ordinarily however, our experience in the construction industry and the application of HVAC systems affords us the unique opportunity to quantify project costs and savings with minimal outside support. This advantage will then give you the confidence that the project is "real" before you have to start incurring unnecessary development costs.

When it comes to retrofit projects, Trane's goal is to help an owner specify the results they expect to achieve with a project, as opposed to the new construction process whereby specifications are created to ensure the owner is getting the right equipment or installation methods deployed in a project, at the right first costs. This "aligned interests" concept is highlighted below:

Comprehensive Technical Solutions Vs Traditional Process



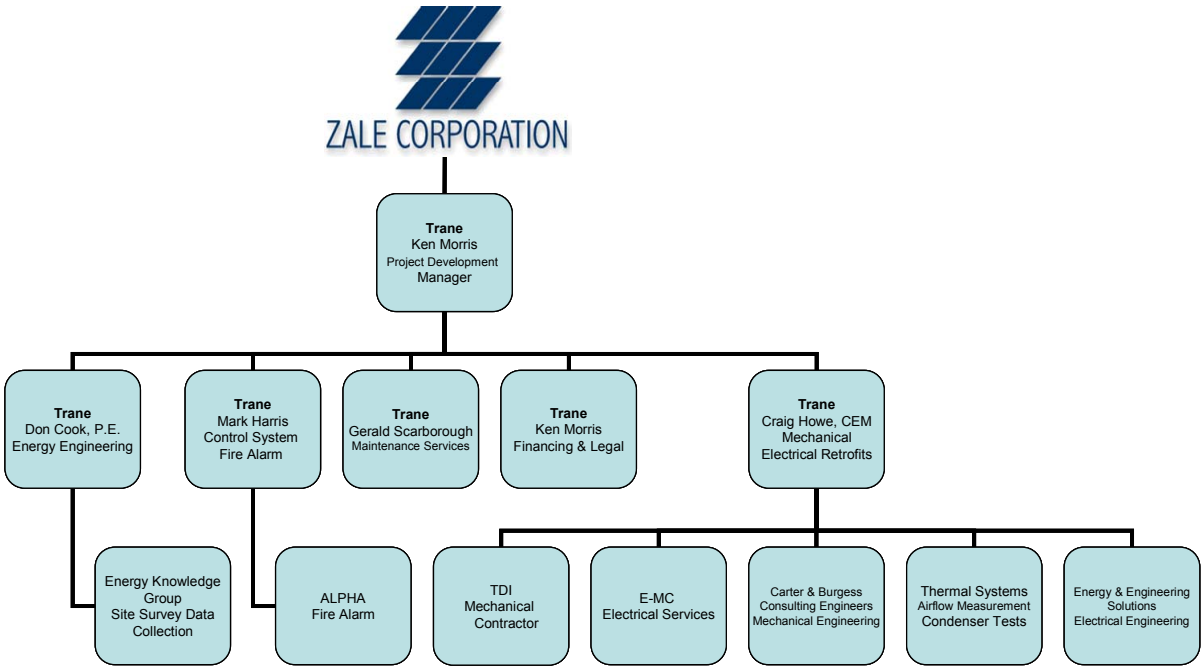
Key Benefits of the Trane Approach:

- ❑ Shared Project Development Risk (Trane and Owner)
- ❑ Long Term Interests are Aligned
- ❑ Single Point of Responsibility
  - ✓ Project Development
  - ✓ Design Engineering
  - ✓ Construction
  - ✓ Financing
  - ✓ Ongoing Services

★ Firm Project Pricing Targets Established

Project Development Team for your Project

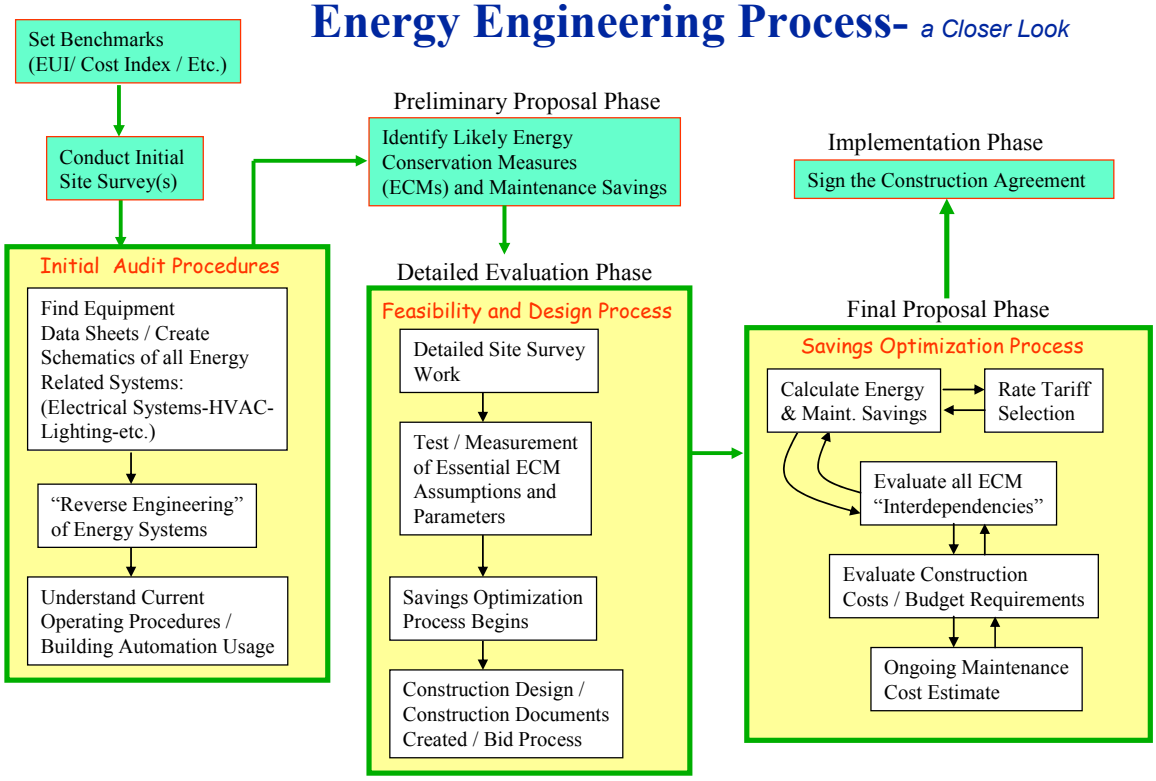
In developing the solution for the Zale Corporation Headquarters project, Trane assembled the following team of experts to assist in the detailed study effort:



Developing Energy Conservation Measures (ECMs)

The process Trane uses in terms of the energy savings discovery process is depicted on the following page. One of the key elements of the energy engineering process has to do with making sure all the energy savings measures are considered as a group, and that the **interdependencies of each of the energy savings measures are adequately considered**. For example, a chiller replacement project will save electricity based on cooling a building more efficiently, given a certain annual amount of cooling "ton-hours." A lighting retrofit will save energy in lighting and cooling costs. In other words, reducing the wattage of lighting in a building will reduce the annual "ton-hours" that a chiller needs to provide. If the chiller project and the lighting retrofit project are done concurrently, and you are not careful, you might overstate the predicted energy savings of the chiller replacement project if the reduced "ton-hours" of cooling associated with the lighting retrofit are not properly accounted for.

Trane developed TRACE 700 to accurately assess energy savings and avoid the aforementioned issue. To gain a thorough understanding of the benefits of using TRACE 700 software please refer to APPENDIX A.



TRACE 700 Model Created for your Project _____

In creating a site-specific TRACE 700 model for the Zale Corporation project we performed the following tasks, broken down into two basic phases:

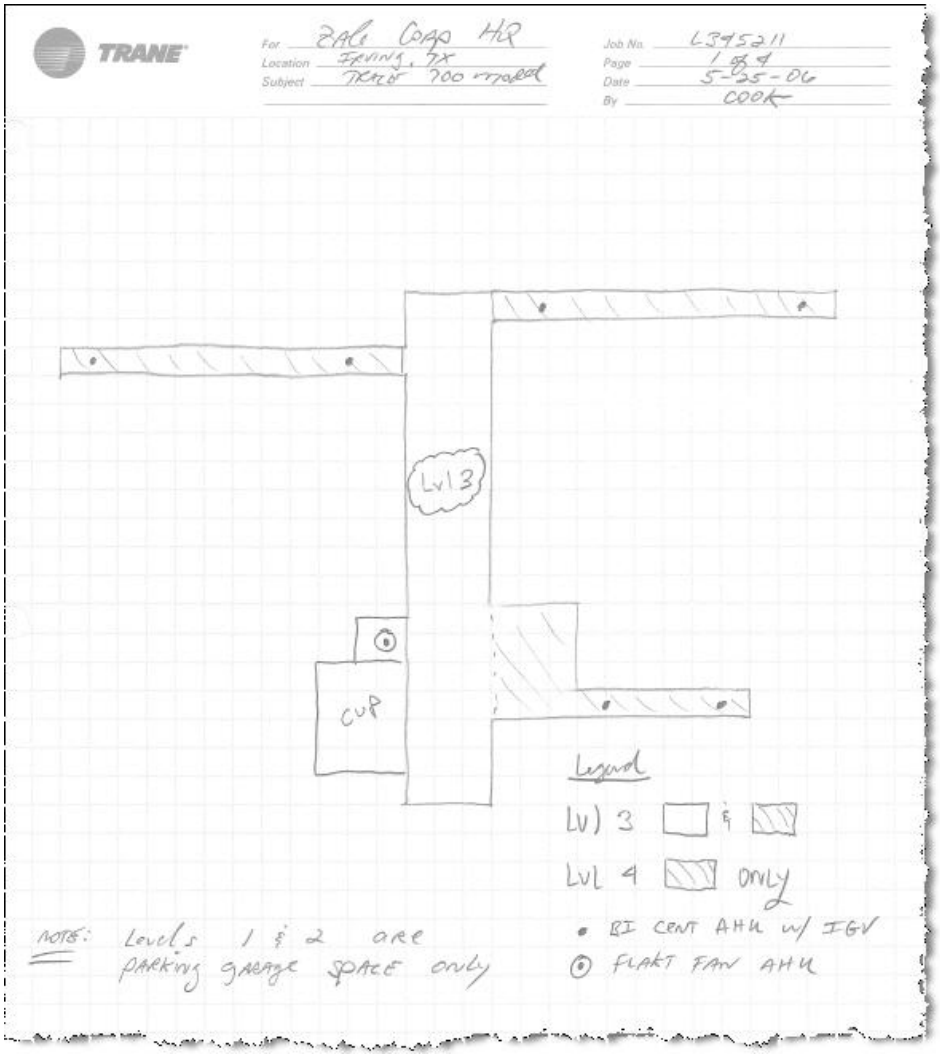
Trace Modeling Approach

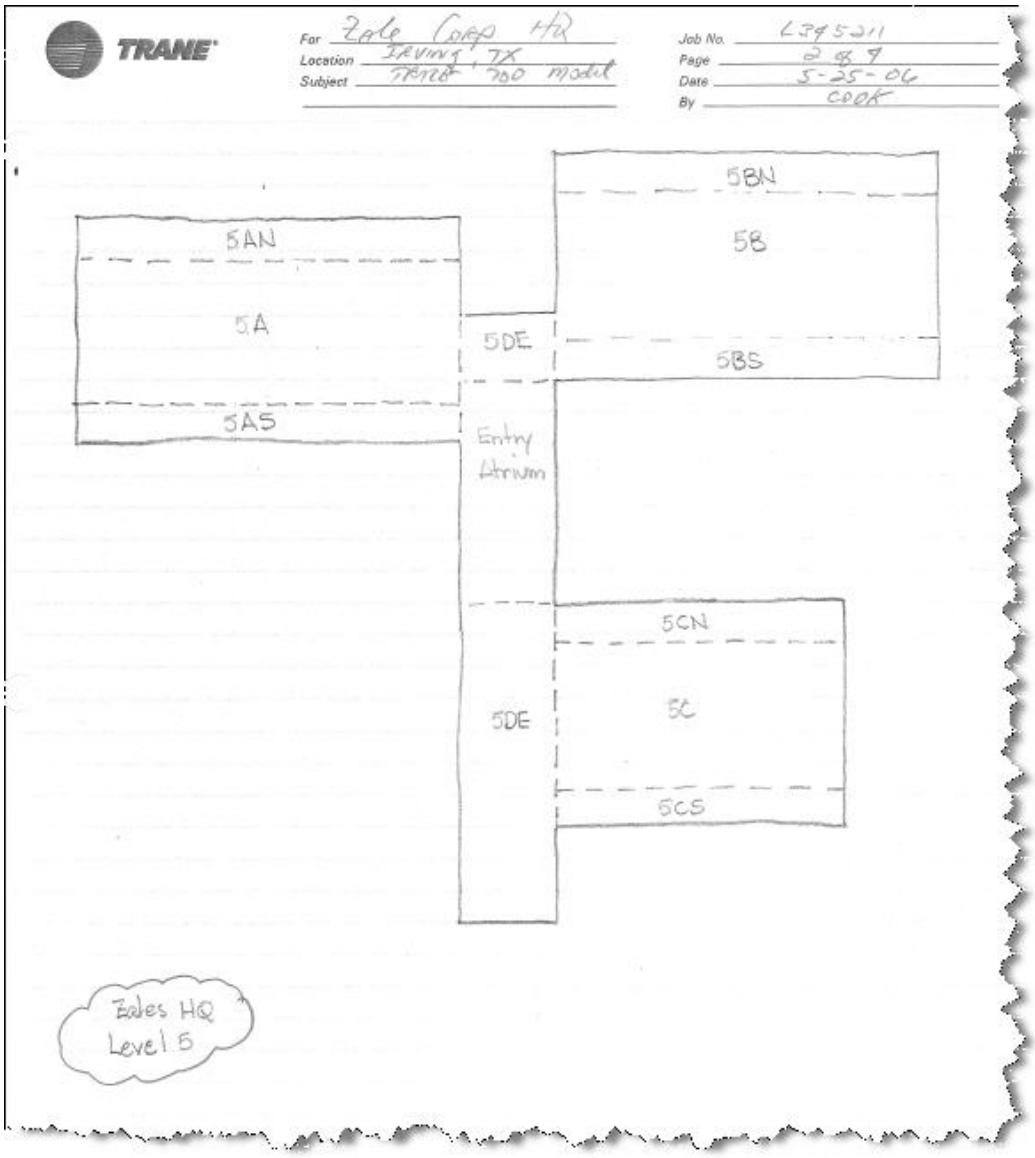
PHASE 1	Normalize past elect and gas billing histories via METRIX software	**Trace Alt-1** Calibrate Model to METRIX (Normalized) Data	**Trace Alt-2** Adjust Baseline to Account for Proper OA Ventilation Levels
PHASE 2	**Trace Alt-3** Apply the Lighting Retrofit ECM	**Trace Alt-4** Apply the Building Automation ECM	**Trace Alt-5a,b, and c** Apply the Central Plant Upgrades ECM

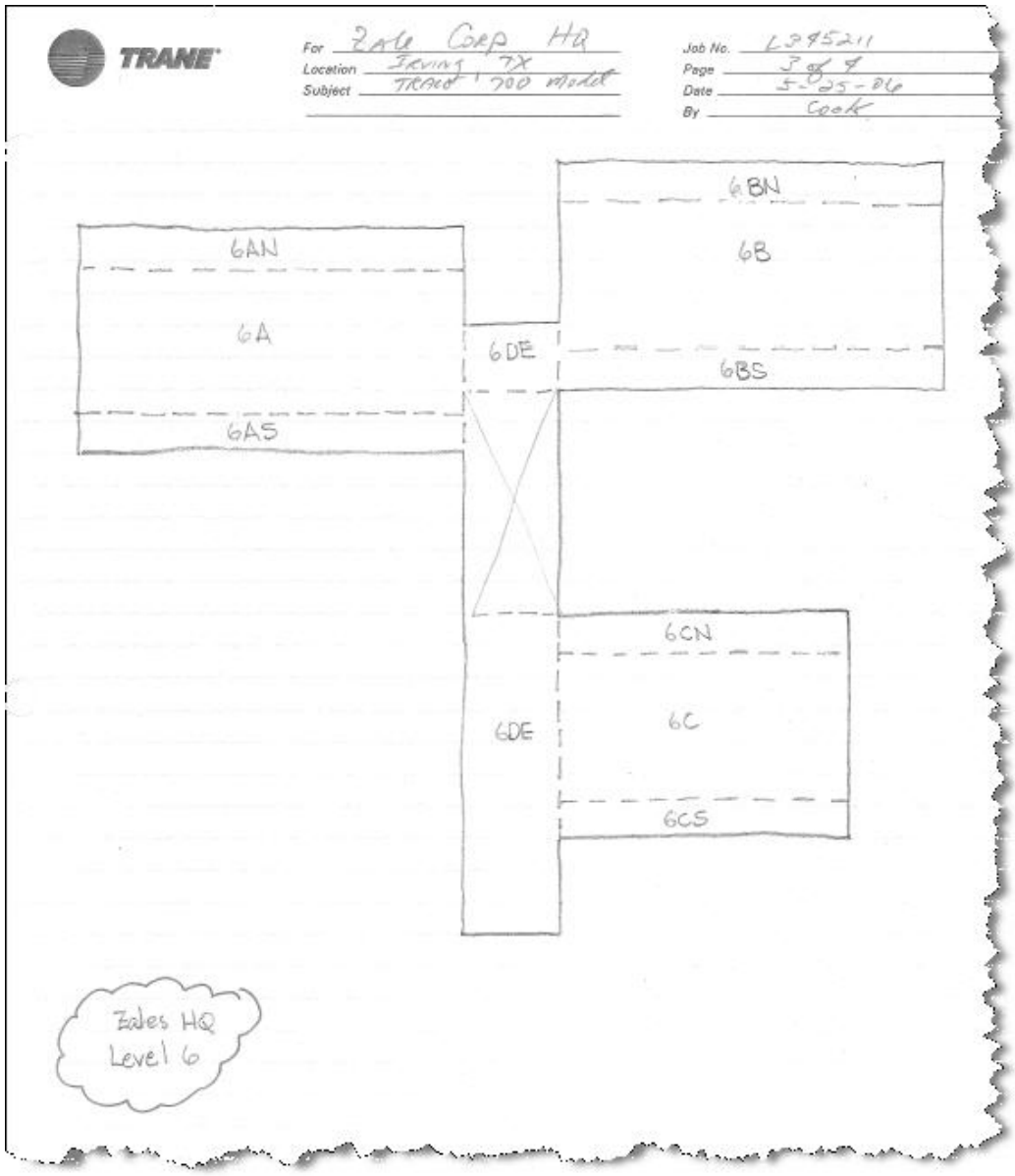
As you can see from the above figure, the first phase concentrated on developing a model of the building that accurately reflected the annual energy expenditures. The second phase of the TRACE 700 modeling effort was concerned with analyzing the savings potential of the various energy conservation measures under consideration.

To create an accurate model of the Zale Corporation Headquarters Trane performed a detailed site survey to understand the electro-mechanical infrastructure and all related energy consumption parameters, to include the architectural features of the overall building. Please refer to APPENDIX E for the results of our detailed site survey.

Once the detailed site survey was accomplished, our TRACE 700 modeling engineer used the information to develop a modeling scheme that appropriately represents the Zale Corporation Headquarters building. Please refer to the next several pages to gain an understanding as to how Trane modeling the rooms in your facility:






TRANE
For Zale Corp HQ
Location Irving TX
Subject TRANE 700 model
Job No. L345211
Page 3 of 4
Date 5-25-06
By Cook
6BN
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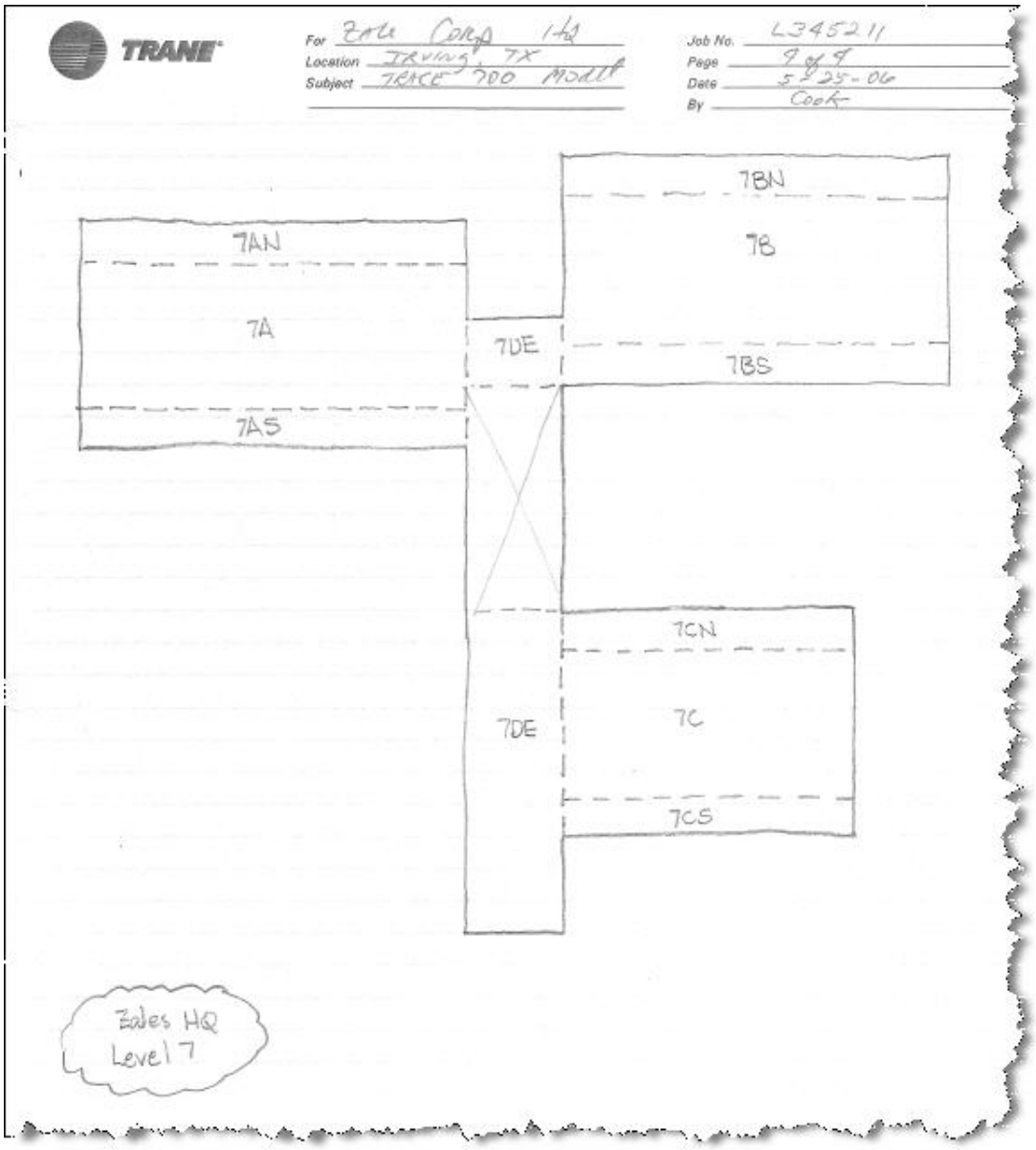
6CS
Zales HQ
Level 6



The following pages at the end of this section reflect the "entered values" that were put into the TRACE 700 model. The attached information contains a substantial amount of information regarding Trane's understanding of the rooms throughout the Zale Corporation Headquarters facility. The attached pages reflect the calibrated model with an adjustment to account for proper outside air ventilation levels.

Energy Usage Analysis

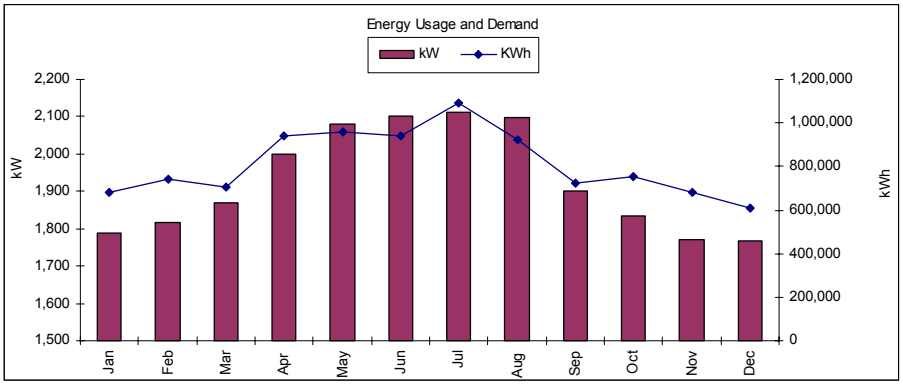
Energy Consumption Patterns and Baseline

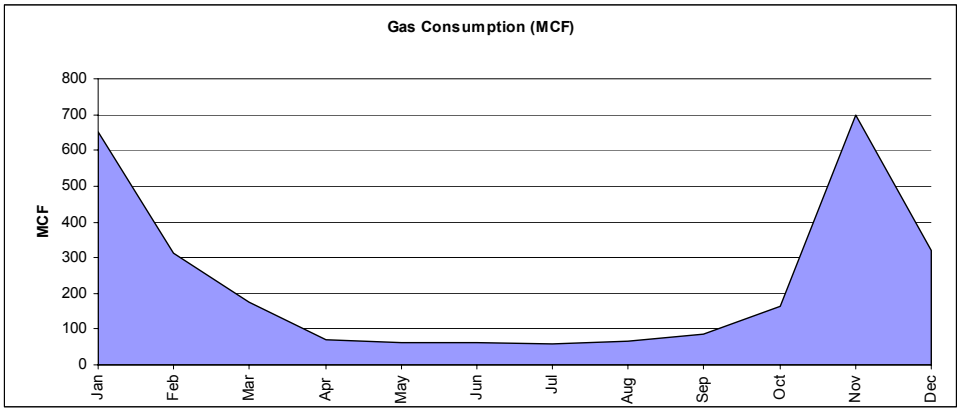
The following analysis depicts the annual energy usage profile at the Zale Corporation Headquarters building. The data below represents the "baseline" energy data that will be used to calculate future energy savings. (The data below reflects the combined data from both electric points of delivery at the site)

Baseline Energy Consumption Information

	Electric Data			Natural Gas Data	
Month	KWh	kW	Cost	MCF	Cost
Jan	678,665	1,787	74,711	650	$5,791
Feb	740,241	1,816	80,777	312	$2,776
Mar	706,414	1,871	77,825	177	$1,581
Apr	943,304	1,998	101,248	68	$610
May	961,197	2,081	103,408	61	$546
Jun	943,474	2,103	101,825	63	$562
Jul	1,089,777	2,111	115,912	57	$510
Aug	925,126	2,098	100,036	65	$580
Sep	725,608	1,900	79,822	86	$767
Oct	756,486	1,834	82,437	165	$1,472
Nov	682,515	1,772	75,001	698	$6,215
Dec	610,362	1,767	68,050	318	$2,835
	9,763,168 (kWh)		**$1,061,052**	**2721** (MCF)	**$24,245**

Total Spend: (Electric and Gas)	**$1,085,298**
Facility SF (Conditioned SF)	**390,000**
Cost per SF	**$2.78**
Average monthly kW	**1928**
Average monthly kWh	**813,597**
Electrical "load factor"	**0.53**
Energy Cost per MMBTU- electric only	**$29.45**
Average monthly MCF of Natural Gas	**227**
Current EUI (BTUs per SF per Year)	**92,392**
EUI Target	**75,500**
Approximate Energy Savings based on EUI Target	**$193,996**
Energy Savings Percentage Target Goal	**18%**
Historical Cost per kWh (Average)	**0.1087**





The above baseline energy data was derived by analyzing the historical billing information. The historical consumption patterns were entered into Metrix Software, which is an industry standard linear regression tool used by energy services providers to normalize energy consumption patterns against a variety of variables, the most pertinent usually being weather. The normalized baseline was then adjusted to account for a future increase in outside air ventilation. (Trane discovered during the detailed site survey that an insufficient amount of ventilation was being brought into portions of the building, while too much ventilation was being brought into others) Trace 700 was used to determine the effects of the ventilation changes. The table below reflects the changes that were made to the historical consumption to derive the baseline energy data.

Energy Baseline Development: Overview

	Electrical Consumption						Gas Consumption		
	2005 Actual		Metrix Normalized		Metrix with Base Adjustment (Ventilation)		2005 Actual	Metrix Normalized	Metrix with Base Adjustment (Ventilation)
	kWh	kW	kWh	kW	kWh	kW	CCF	CCF	CCF
Jan	615,414	1,736	675,214	1,786	678,665	1,787	6,950	5,934	6,500
Feb	651,462	1,804	737,228	1,812	740,241	1,816	6,390	2,560	3,116
Mar	703,227	1,803	706,042	1,869	706,414	1,871	3,070	1,434	1,774
Apr	708,052	1,768	940,884	1,987	943,304	1,998	1,330	653	684
Mar	933,422	2,005	955,365	2,070	961,197	2,081	650	611	612
Jun	942,745	1,987	930,830	2,077	943,474	2,103	580	631	631
Jul	946,431	2,007	1,071,910	2,086	1,089,777	2,111	560	572	572
Aug	1,058,387	2,143	906,952	2,056	925,126	2,098	540	651	651
Sep	912,212	2,142	719,061	1,879	725,608	1,900	570	861	861
Oct	748,458	1,963	757,392	1,833	756,486	1,834	620	1,546	1,653
Nov	783,943	1,842	683,439	1,774	682,515	1,772	1,420	6,755	6,975
Dec	684,002	1,799	608,118	1,770	610,362	1,767	6,100	2,647	3,182
	9,687,755	22,999	9,692,434	22,999	9,763,168	23,138	28,780	24,855	27,211

Analyzing the above energy consumption baseline information in terms of annual British Thermal Units per Square Foot per Year (BTUs per SF per Yr) in comparison to other energy efficient office buildings in the region leads one to conclude that the Zale Corporation building could reduce the BTUs per SF per Yr level to a value of 75,500 BTUs per SF per Yr and be conservative. The approximate energy savings resulting from a reduction to that level are approximately **$ 194,000 per year**. The Zale Corporation building is currently in excess of the average commercial office building in the region, according to the data listed below from the Energy Information Administration.

Regional Energy Profiles

U.S. Census Regions and Divisions

Release date: June 14, 2000

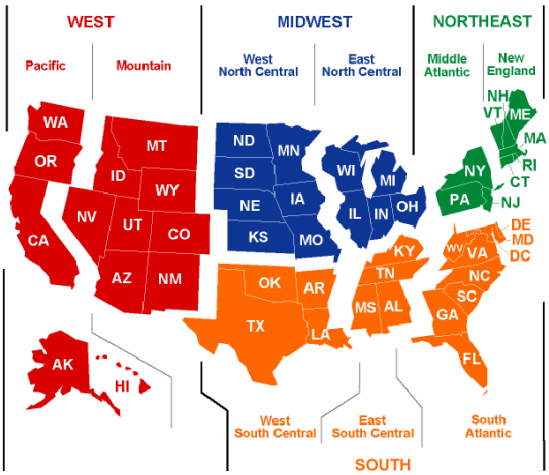
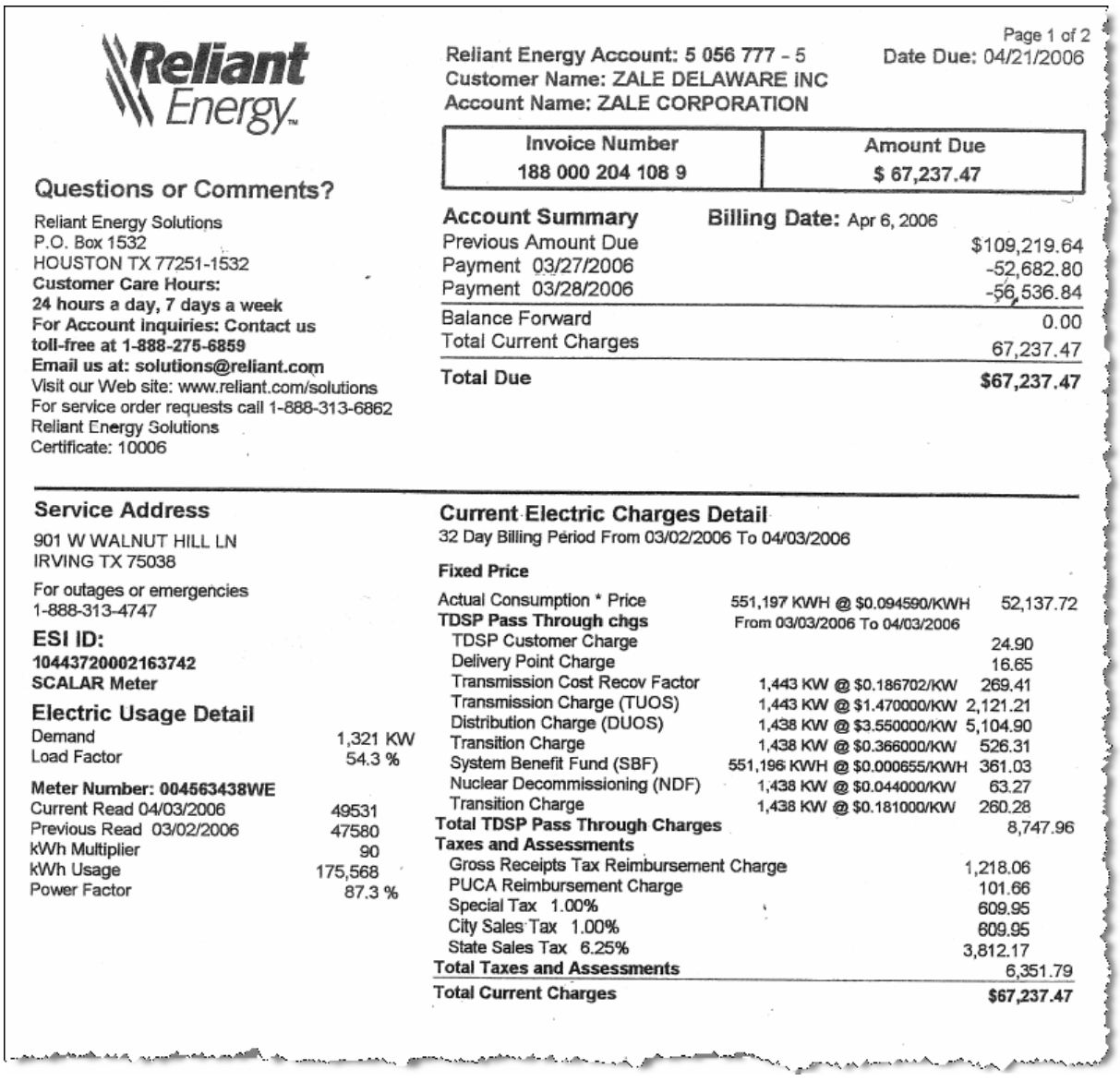


Table C3DIV. Consumption and Gross Energy Intensity for Sum of Major Fuels by Census Division, 1999

	All Buildings			Sum of Major Fuel Consumption			
	Number of Buildings (thousand)	Floorspace (million square feet)	Floorspace per Building (thousand square feet)	Total (trillion Btu)	per Building (million Btu)	per Square Foot (thousand Btu)	per Worker (million Btu)
WEST SOUTH CENTRAL	618	7,264	11.8	573	927	78.9	62.1
Building Floorspace (Square Feet)							
1,001 to 5,000	360	1,015	2.8	129	359	127.3	88.8
5,001 to 10,000	139	983	7.1	52	372	52.8	32.8
10,001 to 25,000	69	1,145	16.6	68	988	59.6	57.0
25,001 to 50,000	25	912	36.0	68	2,673	74.2	87.8
50,001 to 100,000	16	1,116	68.8	78	4,824	70.1	50.1
100,001 to 200,000	6	735	131.6	69	12,308	93.5	80.6
200,001 to 500,000	2	670	298.5	45	20,076	67.2	69.6
Over 500,000	1	687	949.8	Q	88,279	92.9	55.1
Principal Building Activity							
Education	48	913	19.2	59	1,240	64.5	40.0
Food Sales	Q	135	Q	30	1,197	219.4	208.7
Food Service	61	207	3.4	69	1,130	335.1	156.0
Health Care	21	367	17.6	59	2,817	159.9	90.5
Lodging	12	303	24.5	33	2,697	110.2	215.4
Mercantile	95	1,135	11.9	68	716	60.2	58.5
Office	75	1,155	15.5	105	1,401	90.7	38.8
Public Assembly	38	541	14.3	37	969	67.7	39.2
Public Order and Safety	Q	Q	Q	Q	Q	Q	Q
Religious Worship	49	487	10.0	15	305	30.5	67.2
Service	89	433	4.9	45	502	103.2	147.9
Warehouse and Storage	50	1,085	21.5	33	662	30.8	62.5
Other	Q	Q	Q	Q	Q	Q	Q
Vacant	Q	Q	Q	Q	Q	Q	Q
Year Constructed							
1919 or Before	32	159	5.0	Q	Q	Q	30.4
1920 to 1945	51	765	14.9	27	527	35.4	27.8
1946 to 1959	102	1,146	11.2	62	604	53.7	72.0
1960 to 1969	76	1,065	14.0	98	1,286	91.6	56.1
1970 to 1979	156	1,464	9.4	128	823	87.7	68.7
1980 to 1989	136	1,557	11.4	139	1,023	89.4	60.5
1990 to 1999	65	1,107	17.0	114	1,761	103.3	85.8

Unit Costs of Energy

The next important step in the process is to determine what the unit costs of energy are so we can input those values into our TRACE 700 model. The following three figures represent sample utility bills for the Zale Corporation Headquarters building. The first two represent the two electric "points of delivery" for the site, and the other figure is a sample natural gas bill. For detailed information regarding the electrical costs please refer to APPENDIX K for the "TDSP" charges and APPENDIX L for the energy commodity portion "Actual Consumption Price" of the bill.



Reliant Energy

Page 1 of 2

Reliant Energy Account: 5 056 777 - 5
Customer Name: ZALE DELAWARE INC
Account Name: ZALE CORPORATION

Date Due: 04/21/2006

Invoice Number	Amount Due
188 000 204 108 9	$ 67,237.47

Questions or Comments?

Reliant Energy Solutions
P.O. Box 1532
HOUSTON TX 77251-1532
Customer Care Hours:
24 hours a day, 7 days a week
For Account inquiries: Contact us toll-free at 1-888-275-6859
Email us at: solutions@reliant.com
Visit our Web site: www.reliant.com/solutions
For service order requests call 1-888-313-6862
Reliant Energy Solutions
Certificate: 10006

Account Summary **Billing Date:** Apr 6, 2006

Previous Amount Due	$109,219.64
Payment 03/27/2006	-52,682.80
Payment 03/28/2006	-56,536.84
Balance Forward	0.00
Total Current Charges	67,237.47
Total Due	**$67,237.47**

Service Address

901 W WALNUT HILL LN
IRVING TX 75038

For outages or emergencies
1-888-313-4747

ESI ID:
10443720002163742
SCALAR Meter

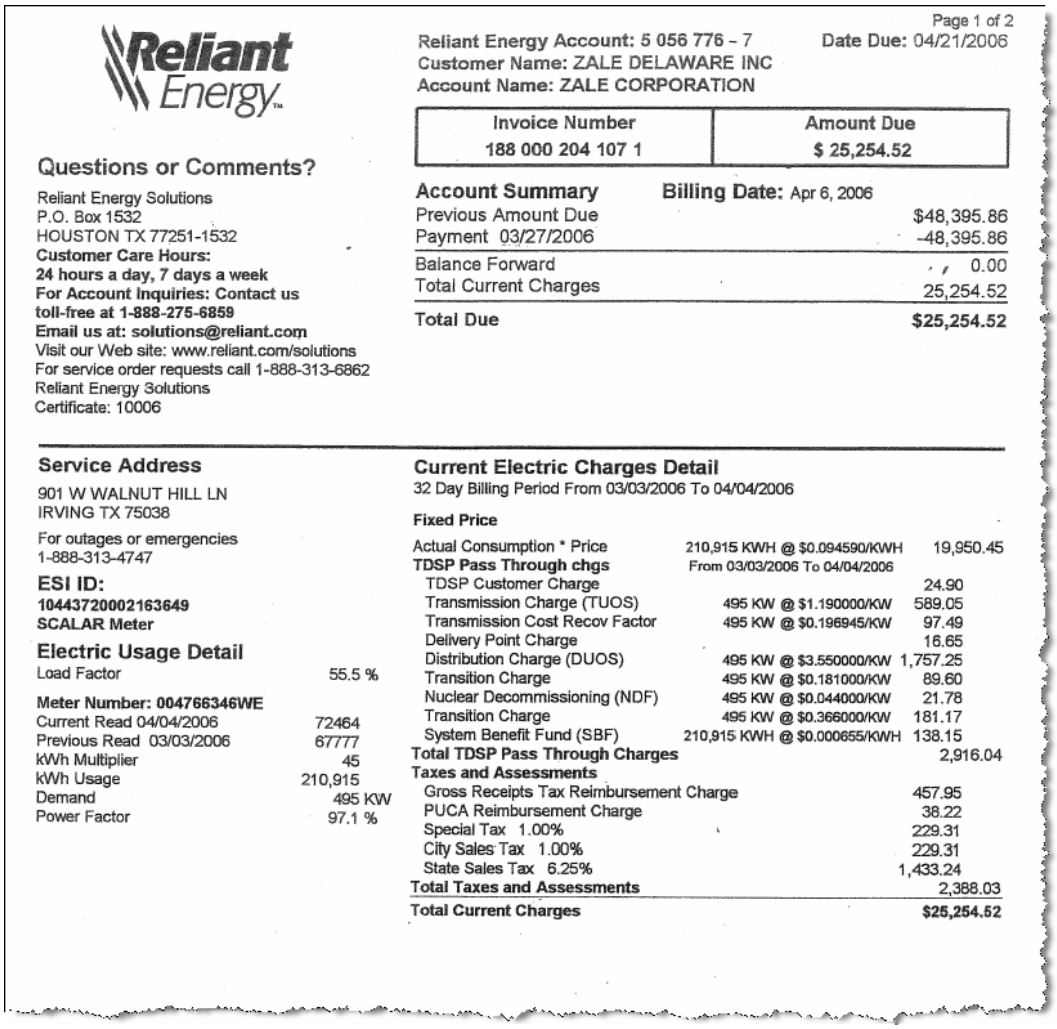
Electric Usage Detail

Demand	1,321 KW
Load Factor	54.3 %
Meter Number: 004563438WE	
Current Read 04/03/2006	49531
Previous Read 03/02/2006	47580
kWh Multiplier	90
kWh Usage	175,568
Power Factor	87.3 %

Current Electric Charges Detail
32 Day Billing Period From 03/02/2006 To 04/03/2006

Fixed Price

Actual Consumption * Price	551,197 KWH @ $0.094590/KWH	52,137.72
TDSP Pass Through chgs	From 03/03/2006 To 04/03/2006	
TDSP Customer Charge		24.90
Delivery Point Charge		16.65
Transmission Cost Recov Factor	1,443 KW @ $0.186702/KW	269.41
Transmission Charge (TUOS)	1,443 KW @ $1.470000/KW	2,121.21
Distribution Charge (DUOS)	1,438 KW @ $3.550000/KW	5,104.90
Transition Charge	1,438 KW @ $0.366000/KW	526.31
System Benefit Fund (SBF)	551,196 KWH @ $0.000655/KWH	361.03
Nuclear Decommissioning (NDF)	1,438 KW @ $0.044000/KW	63.27
Transition Charge	1,438 KW @ $0.181000/KW	260.28
Total TDSP Pass Through Charges		8,747.96
Taxes and Assessments		
Gross Receipts Tax Reimbursement Charge		1,218.06
PUCA Reimbursement Charge		101.66
Special Tax 1.00%		609.95
City Sales Tax 1.00%		609.95
State Sales Tax 6.25%		3,812.17
Total Taxes and Assessments		6,351.79
Total Current Charges		**$67,237.47**



Page 1 of 2

Reliant Energy

Reliant Energy Account: 5 056 776 - 7 Date Due: 04/21/2006
Customer Name: ZALE DELAWARE INC
Account Name: ZALE CORPORATION

Invoice Number	Amount Due
188 000 204 107 1	$ 25,254.52

Questions or Comments?

Reliant Energy Solutions
P.O. Box 1532
HOUSTON TX 77251-1532
Customer Care Hours:
24 hours a day, 7 days a week
For Account Inquiries: Contact us toll-free at 1-888-275-6859
Email us at: solutions@reliant.com
Visit our Web site: www.reliant.com/solutions
For service order requests call 1-888-313-6862
Reliant Energy Solutions
Certificate: 10006

Account Summary **Billing Date:** Apr 6, 2006

Previous Amount Due	$48,395.86
Payment 03/27/2006	-48,395.86
Balance Forward	0.00
Total Current Charges	25,254.52
Total Due	**$25,254.52**

Service Address

901 W WALNUT HILL LN
IRVING TX 75038

For outages or emergencies
1-888-313-4747

ESI ID:
10443720002163649
SCALAR Meter

Electric Usage Detail

Load Factor	55.5 %
Meter Number: 004766346WE	
Current Read 04/04/2006	72464
Previous Read 03/03/2006	67777
kWh Multiplier	45
kWh Usage	210,915
Demand	495 KW
Power Factor	97.1 %

Current Electric Charges Detail
32 Day Billing Period From 03/03/2006 To 04/04/2006

Fixed Price

Actual Consumption * Price	210,915 KWH @ $0.094590/KWH	19,950.45
TDSP Pass Through chgs	From 03/03/2006 To 04/04/2006	
TDSP Customer Charge		24.90
Transmission Charge (TUOS)	495 KW @ $1.190000/KW	589.05
Transmission Cost Recov Factor	495 KW @ $0.196945/KW	97.49
Delivery Point Charge		16.65
Distribution Charge (DUOS)	495 KW @ $3.550000/KW	1,757.25
Transition Charge	495 KW @ $0.181000/KW	89.60
Nuclear Decommissioning (NDF)	495 KW @ $0.044000/KW	21.78
Transition Charge	495 KW @ $0.366000/KW	181.17
System Benefit Fund (SBF)	210,915 KWH @ $0.000655/KWH	138.15
Total TDSP Pass Through Charges		2,916.04
Taxes and Assessments		
Gross Receipts Tax Reimbursement Charge		457.95
PUCA Reimbursement Charge		38.22
Special Tax 1.00%		229.31
City Sales Tax 1.00%		229.31
State Sales Tax 6.25%		1,433.24
Total Taxes and Assessments		2,388.03
Total Current Charges		**$25,254.52**

Average costs associated with the TDSP portion of the bill:

Transmission, Distribution Service Provider (TDSP) Cost Analysis:

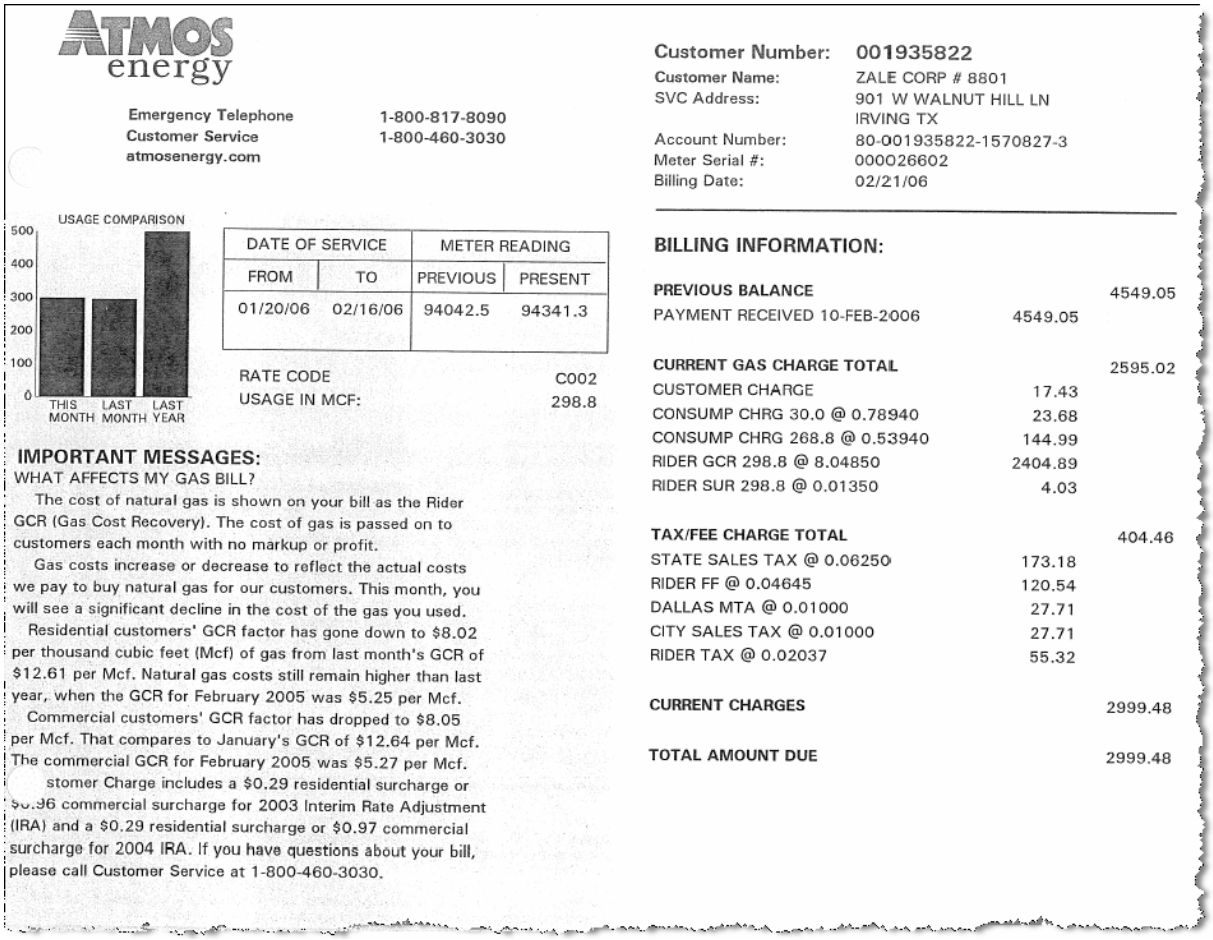
Large Point of Delivery with IDR meter:

03/03/05	04/04/05	05/03/05	06/05/05	07/05/05	08/03/05	09/05/05	10/04/05	11/02/05	12/04/05	01/04/06
$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000
$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000
$ 0.185000	$ 0.185000	$ 0.185000	$ 0.185000	$ 0.185000	$ 0.185000	$ 0.181000	$ 0.181000	$ 0.181000	$ 0.181000	$ 0.181000
$ 0.163000	$ 0.163000	$ 0.163000	$ 0.366000	$ 0.366000	$ 0.366000	$ 0.366000	$ 0.366000	$ 0.366000	$ 0.366000	$ 0.366000
$ 1.470000	$ 1.470000	$ 1.470000	$ 1.470000	$ 1.470000	$ 1.470000	$ 1.470000	$ 1.470000	$ 1.470000	$ 1.470000	$ 1.470000
$ 0.232808	$ 0.232808	$ 0.232808	$ 0.232808	$ 0.232808	$ 0.232808	$ 0.218221	$ 0.218221	$ 0.218221	$ 0.218221	$ 0.218221
$ 5.645	**$ 5.645**	**$ 5.645**	**$ 5.848**	**$ 5.848**	**$ 5.848**	**$ 5.829**	**$ 5.829**	**$ 5.829**	**$ 5.829**	**$ 5.829**

Smaller Point of Delivery without IDR meter:

03/04/05	04/04/05	05/04/05	06/06/05	07/06/05	08/04/05	09/06/05	10/05/06	11/03/05	12/05/05	01/05/06
$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000	$ 3.550000
$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000	$ 0.044000
$ 0.185000	$ 0.185000	$ 0.185000	$ 0.185000	$ 0.185000	$ 0.185000	$ 0.181000	$ 0.181000	$ 0.181000	$ 0.181000	$ 0.181000
$ 0.163000	$ 0.163000	$ 0.163000	$ 0.366000	$ 0.366000	$ 0.366000	$ 0.366000	$ 0.366000	$ 0.366000	$ 0.366000	$ 0.366000
$ 1.190000	$ 1.190000	$ 1.190000	$ 1.190000	$ 1.190000	$ 1.190000	$ 1.190000	$ 1.190000	$ 1.190000	$ 1.190000	$ 1.190000
$ 0.218670	$ 0.218670	$ 0.218670	$ 0.218670	$ 0.218670	$ 0.218670	$ 0.195061	$ 0.195061	$ 0.195061	$ 0.195061	$ 0.195061
$ 5.351	**$ 5.351**	**$ 5.351**	**$ 5.554**	**$ 5.554**	**$ 5.554**	**$ 5.526**	**$ 5.526**	**$ 5.526**	**$ 5.526**	**$ 5.526**

$5.63	Average Value in $ per kW
$5.35	Minimum Value in $ per kW



ATMOS energy

Emergency Telephone 1-800-817-8090
Customer Service 1-800-460-3030
atmosenergy.com

Customer Number: 001935822
Customer Name: ZALE CORP # 8801
SVC Address: 901 W WALNUT HILL LN
IRVING TX
Account Number: 80-001935822-1570827-3
Meter Serial #: 000026602
Billing Date: 02/21/06

USAGE COMPARISON
500
400
300
200
100
0
THIS MONTH LAST MONTH LAST YEAR

DATE OF SERVICE		METER READING	
FROM	TO	PREVIOUS	PRESENT
01/20/06	02/16/06	94042.5	94341.3

RATE CODE C002
USAGE IN MCF: 298.8

IMPORTANT MESSAGES:
WHAT AFFECTS MY GAS BILL?
The cost of natural gas is shown on your bill as the Rider GCR (Gas Cost Recovery). The cost of gas is passed on to customers each month with no markup or profit.
Gas costs increase or decrease to reflect the actual costs we pay to buy natural gas for our customers. This month, you will see a significant decline in the cost of the gas you used.
Residential customers' GCR factor has gone down to $8.02 per thousand cubic feet (Mcf) of gas from last month's GCR of $12.61 per Mcf. Natural gas costs still remain higher than last year, when the GCR for February 2005 was $5.25 per Mcf.
Commercial customers' GCR factor has dropped to $8.05 per Mcf. That compares to January's GCR of $12.64 per Mcf. The commercial GCR for February 2005 was $5.27 per Mcf.
stomer Charge includes a $0.29 residential surcharge or $0.96 commercial surcharge for 2003 Interim Rate Adjustment (IRA) and a $0.29 residential surcharge or $0.97 commercial surcharge for 2004 IRA. If you have questions about your bill, please call Customer Service at 1-800-460-3030.

BILLING INFORMATION:

PREVIOUS BALANCE		4549.05
PAYMENT RECEIVED 10-FEB-2006	4549.05	
CURRENT GAS CHARGE TOTAL		2595.02
CUSTOMER CHARGE	17.43	
CONSUMP CHRG 30.0 @ 0.78940	23.68	
CONSUMP CHRG 268.8 @ 0.53940	144.99	
RIDER GCR 298.8 @ 8.04850	2404.89	
RIDER SUR 298.8 @ 0.01350	4.03	
TAX/FEE CHARGE TOTAL		404.46
STATE SALES TAX @ 0.06250	173.18	
RIDER FF @ 0.04645	120.54	
DALLAS MTA @ 0.01000	27.71	
CITY SALES TAX @ 0.01000	27.71	
RIDER TAX @ 0.02037	55.32	
CURRENT CHARGES		2999.48
TOTAL AMOUNT DUE		2999.48

Unit Costs of Energy used in the TRACE 700 Model

Based on the above information, and a historical analysis of previous energy bills, Trane developed the following unit costs to be used to calculate electric and natural gas costs and savings in the TRACE 700 model:

The Base Utility Rates are those utility rates used in the Utility BaselineAnalysis that are used to calculate the energy savings and are the rates set forth below. The Base Utility Rates used to calculate energy savings will be used as the floor price for the Guarantee Term and shall be the lowest rate used. In calculating any energy savings, Trane will use the greater of the then current applicable utility rate unit cost or the Base Utility Rates as described herein. The Base Utility Rates used to calculate energy increases will be used as the ceiling price for the Guarantee Term and shall be the highest rate used. In calculating any reduction in energy savings, Trane will use the lesser of the then current applicable utility rate unit cost or the Base Utility Rates as described herein.

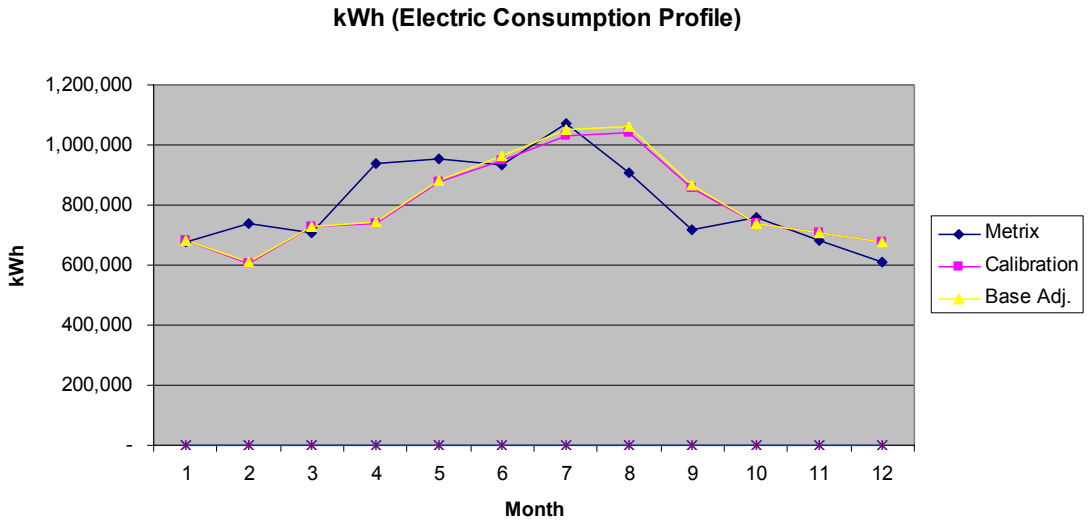
The following are the Base Utility Rates:

$ per kWh: **$0.096**
$ per kW per month: **$ 5.35**
$ per Therm (100,000 British Thermal Units): **$0.891**

Energy Distribution Profile

Where the Energy is Being Consumed

The energy distribution profile is determined early in the preliminary survey stage of the Trane development process in order to make sure we are focused on the appropriate energy infrastructure components to optimize. In order to accurately determine how the energy is being distributed in your building Trane must first create a TRACE 700 model that is calibrated to the aforementioned energy baseline. The figure below depicts the relationship between the baseline energy consumption for electrical consumption (Metrix) versus the TRACE 700 model. The Zale Corporation TRACE 700 model is within 6% of the baseline electrical consumption.



The following figure depicts the energy distribution calculated by the TRACE 700 model of your facility.

ENERGY DISTRIBUTION PROFILE:

Energy System	Elect Cons. (kWh)	Gas Cons. (kBtu)	Water Cons. (1000 gals)	% of Total Building Energy	Total Building Energy (kBtu/yr)
Primary heating					
Primary heating	39,542	4,186,513		11.4 %	4,321,471
Other Htg Accessories	11,847			0.1 %	40,433
Heating Subtotal	**51,389**	**4,186,513**		**11.5** %	**4,361,904**
Primary cooling					
Cooling Compressor	1,026,307			9.3 %	3,502,785
Tower/Cond Fans	275,519		6,509	2.5 %	940,345
Condenser Pump	227,131			2.1 %	775,197
Other Clg Accessories	467			0.0 %	1,594
Cooling Subtotal....	**1,529,423**		**6,509**	**13.8** %	**5,219,921**
Auxiliary					
Supply Fans	**710,415**			**6.4** %	2,424,646
Pumps	**403,430**			**3.6** %	1,376,906
Stand-alone Base Utilities	3,286,040	664,884		31.4 %	11,880,139
Aux Subtotal....	4,399,885	664,884		41.5 %	15,681,692
Lighting					
Lighting	2,716,664			**24.5** %	9,271,975
Receptacle					
Receptacles	966,358			8.7 %	3,298,178
Totals:	**9,663,718**	**4,851,397**	**6,509**	**100.0** %	**37,833,667**

59.89 Percent of the above energy that the Trane project will have an impact on.

Energy Conservation Measures

Trane's goal in the Detailed Study was to further research ways to help you reduce your annual costs of operation. The time spent during the Detailed Study allowed us to further validate opportunities presented in the Preliminary Proposal, as well as to identify other possible improvements that provide long term financial and facility benefits. Generally speaking, Trane followed the proceeding process during the study:

- Trane team members analyzed three years of actual utility data and used it to model building energy consumption and analyze trends in utility consumption. We also checked your utility billing for accuracy per the established rate schedule. Consideration was given to any information available from existing energy management systems and/or related studies performed on the facility.

- Trane verified hours of operation for your motors, lighting, air systems, chillers, heating, and other systems. In addition, we verified seasonal start up and shut down dates of the equipment as well as existing efficiencies and loading of motors. We established load curves of your existing systems with variable capacity.

- Our team verified existing quantities, wattages, and types of lighting. We examined ballasts to see if they might contain PCBs. We measured your lighting and actual electrical consumption for existing fixtures. Then we verified building hours of occupancy and special event schedules.

- Trane team members determined equipment operation and maintenance and examined systems with known problems to see if they could be repaired. We also surveyed any energy management system and pneumatic control systems in detail to determine if maintenance and modifications were required.

- Our team interviewed the staff and occupants to establish any outstanding physical facility and building environment concerns.

Once we collected the survey data, we began our detailed analysis. Utilizing the TRACE 700 Software program, we calculated building loads and modeled utility consumption at your building. We modeled various ECM strategies to calculate the impact on building loads and utility consumption.

In order to gain an understanding of the type of energy and operational cost saving strategies we were considering for your facility, please refer to the following pages to see our "checklist." Additionally, some of the more common energy conservation measures are described in APPENDIX B.

Energy Savings and Operational Condition Assessment *Checklist*

CENTRAL HEATING PLANT
- ☐ Convert Electric Boiler to Gas Fired Boiler
- ☐ Convert Steam Boiler to HW System & Steam Generator
- ☐ Hot Water Reset
- ☐ Purchase Transportation Gas
- ☐ Purchase Interruptible Gas Service
- ☐ Sequence Multiple Boilers
- ☐ Lead/Lag Boiler Control
- ☐ Install Low Load Boiler
- ☐ Utilize District Steam or Cogeneration Waste Steam

BOILERS
- ☐ Provide Hot Water Reset to Reduce overheating
- ☐ Reduce Steam Pressure
- ☐ Steam Pressure Reset
- ☐ Adjust Firing Rate to Building Load
- ☐ Preheat Combustion Air
- ☐ Duct Combustion Air
- ☐ Properly Size Combustion Chamber
- ☐ Interlock Combustion Air Intake with Burner Controls
- ☐ Repair Air Leaks in Combustion Chamber
- ☐ Adjust Burner Excess Air Settings
- ☐ Install Oxygen Trim
- ☐ Provide Dual Fuel Burners
- ☐ Install Oil Atomizing Burners
- ☐ Chemical Additives for Fuel Oil
- ☐ Reduce Stack Temperature (Stack Temp > 45O°F)
- ☐ Stack Heat Recovery (Stack Temp > 3OO°F)
- ☐ Seal Leaks in Natural Draft Stacks
- ☐ Install Stack Automatic Draft Dampers
- ☐ More Frequent Blowdown
- ☐ Prevent Burner Short Cycling
- ☐ Remove Soot from Combustion Surfaces
- ☐ Remove Scale from Wetted Surfaces
- ☐ Clean Air Filters

HOT WATER HEATING SYSTEMS
- ☐ Trim Pump Impeller
- ☐ Reduce Pump Motor Size
- ☐ Install Variable Speed Drive
- ☐ Provide Smaller Pump for Low Load Conditions
- ☐ Replace High Resistance Elements with Low
- ☐ Rebalance System to Minimize Overheating
- ☐ Reset Hot Water Temp to Minimize Overheating
- ☐ Repair Control Valves
- ☐ Repair Cavitated Pumps
- ☐ Minimize System Pressure
- ☐ Provide Air Control

CHILLED WATER PLANT
- ☐ Absorption vs. Centrifugal
- ☐ Replace Chillers w/Higher Efficient
- ☐ Sequence Multiple Chillers
- ☐ Install Time Clocks
- ☐ Install Low Load Chiller

CHILLERS
- ☐ Chilled Water Reset
- ☐ Conversion to Variable Flow System
- ☐ Provide Isolation Valves
- ☐ Install a Variable Frequency Drive
- ☐ Clean condenser/Evaporator Tubes
- ☐ Seal Refrigerant Leaks
- ☐ Seal oil Leaks
- ☐ Restore Refrigerant Levels
- ☐ Minimize Oil Migration
- ☐ Listen for Unusual Noises
- ☐ Pipe Chillers in Series (Add Bypass)
- ☐ Heat Pump Conversion
- ☐ Repair Compressor (Code Kit)

COOLING TOWERS
- ☐ Condenser Water Reset
- ☐ Discharge Building Air to Towers
- ☐ Install Closed Loop Free Cooling System
- ☐ Install Refrigeration Migration Free Cooling System
- ☐ Install Plate Heat Exchanger Free Cooling System
- ☐ Install Strainer Cycle Free Cooling System
- ☐ Repair Cooling Tower Fill and Drift Eliminators
- ☐ Unclog Spray Nozzles or Water Distribution Basins
- ☐ Reduce Pump Head by Lowering Water Discharge Height
- ☐ Improve Chemical Water Treatment
- ☐ Replace Air-Cooled Condensers w/ Water-Cooled
- ☐ Install Venturi Stack (Reduce Static Pressure, Reduce Recirculation)
- ☐ Install Variable Speed or Two Speed Cooling Tower Fan Motors
- ☐ Install Variable Pitch Blade Cooling Tower Fan

DUAL DUCT LOW VELOCITY SYS
- ☐ Hot/Cold Duct Temperature Reset
- ☐ Install Splitters to Funnel Return Air to Hot Deck

DUAL DUCT HIGH VELOCITY SYS
- ☐ Replace High Pressure Mixing Boxes with Low Pressure
- ☐ Minimize Hot/Cold Duct Damper Leakage
- ☐ Convert to VAV

VARIABLE AIR VOLUME SYSTEMS
- ☐ Install Inlet Vanes for Centrifugal Fan
- ☐ Install Variable Pitch Blade Fan for Vane Axial Fan
- ☐ Install Variable Speed Drive
- ☐ Control Fan Speed for Constant Static Duct Pressure
- ☐ Provide Supply Air Reset
- ☐ Provide Hot Water and Chilled Water Reset
- ☐ Delay Reheat Until Airflow is at a Minimum

INDUCTION SYSTEMS
- ☐ Reduce Primary Air Volume and Pressure
- ☐ Lower Primary Air Reheat Schedule
- ☐ Lower Secondary Hot Water Temperature
- ☐ Reduce Secondary Water Flow Rate
- ☐ Raise Primary Air Cooling Temp - Lower Secondary Water Temp
- ☐ Reduce Secondary Water Temperature
- ☐ Eliminate Primary Heating Air - Raise Secondary Hot Water Temp

RETURN AIR AND EXHAUST DUCT
- ☐ Match Exhaust Fan Volume with VAV Supply Fan
- ☐ Provide Toilet Exhaust Unoccupied Control
- ☐ Install Heat Recovery Makeup Air Units

FAN COIL AND UNIT VENTILATORS
- ☐ Convert 4-Pipe System to 2-Pipe
- ☐ Install Time Clocks
- ☐ Eliminate Fan During Unoccupied
- ☐ Minimize Outdoor Air Usage

WATER-TO-AIR HEAT PUMPS
- ☐ Install One Larger Unit Rather than Multiple Smaller Units
- ☐ See Condenser, Compressor, Fan, Pump, Piping, & Ductwork Measures

AIR-TO-AIR HEAT PUMPS
- ☐ Direct Building Exhaust to Inlet of Heat Pump
- ☐ Install Time Clocks
- ☐ Replace Compressors with EER less than 9 for cooling

BUILDING ENVELOPE

- ☐ Replace Window Glazing
- ☐ Clean Coils and Change Filters
- ☐ Reduce Air Volume
- ☐ Apply Window Film
- ☐ Rehang Misaligned Windows
- ☐ Repair Operable Window Seals/Latches
- ☐ Apply Window and Door caulking and Weather Stripping
- ☐ Install Revolving Doors
- ☐ Build Vestibules
- ☐ Install Air Curtains for Larger Entries
- ☐ Install Automatic Door Closers
- ☐ Post a Sign ("Keep Door Closed")
- ☐ Insulate Walls, Roof, Floor, Soffit, Slab Edge etc.
- ☐ Provide a Vapor Barrier for Walls, Roof
- ☐ Minimize Stack Effect
- ☐ Caulk Pipe Penetrations
- ☐ Seal Ceiling to Roof Gap
- ☐ Solar Radiation Reduction
- ☐ Apply Reflective Coating to Roof to Reduce Heat Gain

UTILITY SERVICE

- ☐ Convert Electric to Gas
- ☐ Purchase Transportation Gas
- ☐ Purchase Interruptible Gas Service (Dual Fuel Burners Required)
- ☐ Reduce Consumption (KWH) / De-energize Equipment with Time Clocks
- ☐ Reduce Peak (KW) Loads
- ☐ Correct Power Factor
- ☐ Investigate Utility Rebates / State Grant Programs
- ☐ Install Separate Meters and Monitor Efficiency

HEAT RECOVERY

- ☐ Install Heat Wheels
- ☐ Install Heat Pipes
- ☐ Utilize a Fixed Plate Heat Exchanger
- ☐ Utilize a Run-around Coil
- ☐ Install a Thermosiphon
- ☐ Recover Heat from Industrial Heat Producing Systems and Processes
- ☐ Recover Heat from Fume Removal Systems
- ☐ Recover Heat from Process HVAC Systems
- ☐ Recover Steam or Heat from Condensate
- ☐ Generate Heat Through Waste Incineration

LIGHTING

- ☐ Provide Unoccupied Time Clock
- ☐ Increase Light Delivered to the Task
- ☐ Reduce Light Levels Beyond Tasks
- ☐ Relamp with More Efficient Light Source
- ☐ Reposition Light Source Locations
- ☐ Install High Efficiency Ballasts
- ☐ Take Advantage of Day Light
- ☐ Delamp and Install Reflectors
- ☐ Increase Reflectance by Painting Surfaces White
- ☐ Lower Fixture Mounting Height
- ☐ Provide Uniform Lighting
- ☐ Install Dimmer Switches
- ☐ Install Task Lighting
- ☐ Install Motion Detectors

ADDITIONAL Energy Conservation Items

- ☐ Cogeneration
- ☐ Boiler Replacement
- ☐ Chiller Replacement
- ☐ Install a Facilities Management System
- ☐ Install an Alternative Energy System
- ☐ Install an Off-Peak Ice Storage System
- ☐ Generate Battery Reserves Off-Peak
- ☐ Industrial Process Control and Heat Recovery
- ☐ Clean Room Temperature and Humidity Control
- ☐ Computer Room Temperature and Humidity Control
- ☐ Pool Covers and Pool Heat Recovery
- ☐ Upgrade Elevators/Escalators
- ☐ Claim Avoided Maintenance
- ☐ Provide Predictive Maintenance

Other Measures

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
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- ☐ _____

SHOULD WE CONSIDER

- ☐ Primary power transformer efficiencies
- ☐ Two speed motors on Constant Volume Units
- ☐ Power Factor Correction
- ☐ Condenser coil condition on DX units
- ☐ Evaporator coil condition on DX units
- ☐ Water coil condition on hydronic systems
- ☐ Evaporator Pre-coolers on DX condensers
- ☐ The general condition of the dampers
- ☐ The current performance of the existing control systems
- ☐ Fan bearing condition
- ☐ Belts too tight
- ☐ Motor Amps <= Nameplate Amps
- ☐ Condition of fan blades
- ☐ Air & Water balance
- ☐ Are the air strainers and filters being maintained
- ☐ Are the expansion tanks properly charged
- ☐ Are the auto air vents working properly
- ☐ Pump seals leaking
- ☐ Pump alignment
- ☐ Power termination's to tight
- ☐ Pipe insulation & vapor barrier condition
- ☐ Gas burners tuned properly
- ☐ Vibration analysis
- ☐ Oil Test
- ☐ Eddy current test
- ☐ Power & Gas meters on the FMS

Prior to discussing the energy conservation measures that Trane identified as being viable, we need to discuss some of the performance / code requirement issues that were identified during the on-site evaluation.

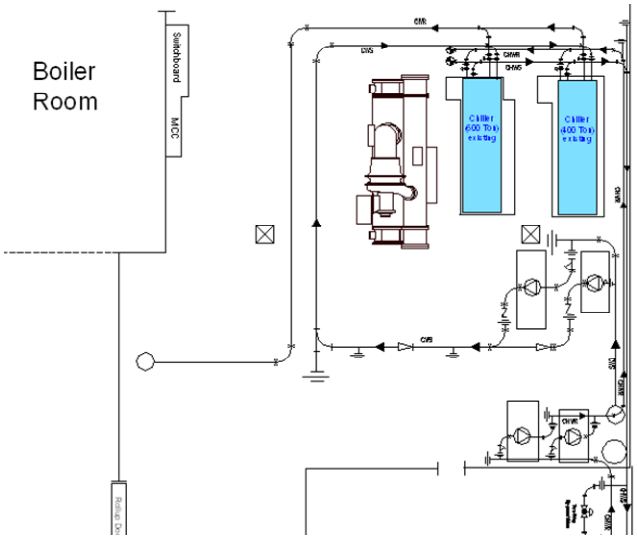
Specifically, we were informed that the existing condenser water system, emanating from the cooling tower, was causing problems with the existing condenser water pumps. Trane evaluated the situation with our development team and recommends lowering the suction header leading to the condenser water pumps by approximately 3.5 feet. Trane performed tests related to this issue and is confident this will resolve the current issue.

Another issue we determined relevant to this detailed study was the need to be compliant with ASHRAE 15 guidelines, with respect to the proper handling of new refrigerants, once a new chiller is installed. The attached information on the following pages was provided by our project development partner with respect to the mechanical design considerations.

The existing motor control center serving the existing pumps and cooling tower fans has reached the end of its service life. Trane evaluated the option to upgrade this switchgear, but in order to preserve capital investment dollars, we recommend upgrading all the connected motors with variable frequency drives to alleviate any further concerns with the existing motor starters, as they will no longer be used. The strategy has the additional benefit of improving the power factor related to the attached motors.

The final issue we explored was related to the ability to avoid having a loss in cooling services when the new chillers are installed. As you can see from the drawing below, Trane intends on installing the first of the new chillers adjacent to the existing 600 ton machine, such that we can continue to provide chilled water from the existing chillers until such time as we are ready to remove them.

Sequence of Construction (Chiller Plant)



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May 12, 2006

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Re: Zale Corporation World Headquarters, Chiller Replacement

This report provides information pertaining to the chiller replacement at the Zale Corporation World Headquarters in Irving, Texas. Three issues are addressed: (1) An ASHRAE 15-2001 Safety Standard for Refrigeration Systems analysis is provided to address all issues within the mechanical that are currently noncompliant. (2) In addition to replacing the chillers, the chilled water pumps will also be replaced for which pump selections are provided. (3) The building engineers have noted problems with the condenser water pumps. Although conclusive data has not been attained, probable causes and solutions are provided.

I. ASHRAE 15-2001

The following analysis is in reference to the ASHRAE 15-2001 requirements for the central plant at the Zale Corporation World Headquarters building. The requirements from ASHRAE 15-2001 are shown below followed by a compliance assessment. Not all requirements are listed below, only those that are not currently complied with and must be addressed during the chiller replacement project.

1. Requirement: 8.11.2 and 8.12b – *Machinery room shall have tight fitting doors or doors opening outward. Doors communicating with the building shall be approved, self-closing, tight fitting fire doors.*

    a. **Assessment: The existing doors to the mechanical room do not comply. A few have automatic closures. All of the doors are metal frame without seals. Therefore, surface mounted seals and automatic door bottom seals must be added to the doors and closures added/repaired as necessary. Five doors require seals, three doors require closures. The mechanical room has one roll-up door that is not easily sealed or controlled. It is recommended to replace the roll-up door with a pair of double doors. The new doors shall have seals and automatic closures.**

2. Requirement: 8.11.8 – *Access to the machinery room shall be restricted to authorized personnel. Doors shall be clearly marked or permanent signs shall be posted at each entrance to indicate this restriction.*

a. **Assessment: The entry doors to the mechanical room must have signs added indicating "Authorized Personnel Only".**

3. Requirement: 8.12d – *The machinery room shall have a door that opens directly to the outside air or through a vestibule equipped with self-closing, tight-fitting doors.*

   a. **Assessment: This will be complied with once the doors to the loading dock are corrected as noted in item #1.**

4. Requirement: 8.12f – *All pipes piercing the interior walls, ceiling, or floor of the mechanical room shall be tightly sealed to the walls, ceiling, or floor through which they pass.*

   a. **Assessment: Most of the penetrations comply with the requirement. However, a few penetrations through the wall to the air compressor room do not comply. All penetrations shall be sealed gas tight with a UL listed sealant. All existing sealed penetrations shall be verified for accordance.**

5. Requirement: 8.12i – *Remote control of the mechanical equipment in the mechanical room shall be provided immediately outside the machinery room door solely for the purpose of shutting down the equipment in an emergency. Ventilation fans shall be on a separate electrical circuit and have a control switch immediately outside the mechanical room door.*

   a. **Assessment: The current configuration does not comply. A glass breakage type EPO (emergency power off) switch shall be located outside the mechanical room, adjacent to the main entry door and shall be clearly labeled. Additionally, a switch for the main exhaust fan shall be provided in the same location and be clearly labeled.**

6. Requirement: 8.11.2.1 – *The mechanical room shall contain a detector, located in an area where refrigerant from a leak will concentrate, that actuates and alarm and mechanical ventilation at a value not greater than the corresponding TLV-TWA (or toxicity measure consistent therewith). The alarm shall annunciate visual and audible alarms inside the refrigerating machinery room and outside each entrance to the room. The alarms required in this section shall be of the manual reset type with the reset located inside the refrigerating machinery room. Alarms set at other levels (such as IDLH) and automatic reset alarms are permitted in addition to those required by this section. The meaning of each alarm shall be clearly marked by signage near the annunciators.*

   a. **Assessment: The current configuration does not comply. A refrigerant detection system shall be installed in the mechanical room (e.g. Trane TruSense). Annunciators and signage shall be installed on the outside of the mechanical room, above the entryway doors. Additionally, annunciators shall be installed throughout the mechanical room such that at least one annunciator is visible from any location in the mechanical room. Alarms shall be direct acting (not through the DDC system) and shall be manually reset from within the mechanical room.**

7. Requirement: 8.11.4 – *Mechanical ventilation shall be by one or more power-driven fans capable of exhausting air from the machinery room at least in the amount given in formula 8.11.5. To obtain a reduced airflow for normal ventilation, multiple fans or multi-speed fans shall be used. Provision shall be made for the inlet air to replace that being exhausted. Openings for inlet air shall be positioned to avoid recirculation. Air supply and exhaust ducts to the machinery room shall serve no other area. The discharge of the air shall be to the outdoors in such a manner as not to cause a nuisance or danger.*

   a. **Assessment: Currently, the mechanical room consists of one exhaust fan rated for 19,000-cfm @ 0.25"S.P. Per ASHRAE 15, the following flow rates are required:**

      i. **1,611-cfm when occupied.**

      ii. **19,000-cfm to maintain the space a maximum of 18°F above ambient or a maximum of 122°F.**

      iii. **5,100-cfm for removal of refrigerant gas.**

   Therefore, the current exhaust fan is in compliance. However, the control of the fan is not compliant. The fan should be normally controlled by a thermostat to operate the fan when the space temperature reaches 85°F (adjustable). Additionally, the manual override switch shall be provided as required in item #5. An energy saving option exists to provide a variable frequency drive to control the motor to provide the flow rate required for the condition that needs to be met. The VFD would be controlled by the DDC controls system that is already included in this project, provided by Trane.

8. Requirement: 9.7.8 – *Pressure-relief devices and fusible plugs on any system . . . containing more than 6.6-lb of a Group A2, B1, or B2 refrigerant . . . shall discharge to the atmosphere at a location not less than 15-ft above the adjoining ground level and not less than 20-ft from any window, ventilation opening, or exit into any building. The discharge shall be terminated in a manner that will prevent the discharged refrigerant from being sprayed directly on personnel in the vicinity and foreign material or debris from entering the discharge piping. Discharge piping connected to the discharge side of a fusible plug or rupture member shall have provisions to prevent plugging the pipe in the event the fusible plug or rupture member fails.*

   a. **Assessment: The current refrigerant relief line is not in compliance. The sizing will have to be verified/resized for the new chillers. Currently, the line discharges below grade into an areaway. Per ASHRAE 15, the line must discharge 15-ft above grade. Therefore, the current routing will have to be revised to route the line up, above grade, and terminate a minimum of 15-ft above grade.**

One additional task Trane was asked to analyze had to do with the proper sizing of the new chillers. Fortunately the TRACE 700 Software handles this task extremely well. In addition to the TRACE report (depicted below) Trane review existing service records to see how the runtime if each machine looked. As you will see from the information below, the existing 600 ton and 400 ton configuration appears to be a good design.

SYSTEM LOAD PROFILES- (E)

By Trane

Percent Design Load	---- Cooling Load ---- Cap. (Tons)	Hours (%)	Hours (%)	Hours	Hours	---- Heating Load ---- Cap. (Btuh)	Hours (%)	Hours	---- Cooling Airflow ---- Cap. (Cfm)	Hours (%)	Hours
0 - 5	51.9	23	23	1,494	1,494	-517,181.1	56	2,460	18,742.9	0	0
5 - 10	103.8	14	37	890	2,384	-1,034,362.1	17	767	37,485.8	0	0
10 - 15	155.8	9	46	604	2,988	-1,551,543.5	11	468	56,228.7	49	4,252
15 - 20	207.7	7	53	458	3,446	-2,068,724.3	5	233	74,971.6	11	932
20 - 25	259.6	8	61	523	3,969	-2,585,905.5	4	176	93,714.5	5	430
25 - 30	311.5	5	66	308	4,277	-3,103,087.0	2	108	112,457.4	6	541
30 - 35	363.4	4	70	257	4,534	-3,620,267.3	1	27	131,200.3	3	286
35 - 40	415.3	3	73	185	4,719	-4,137,448.5	1	27	149,943.2	3	281
40 - 45	467.3	3	76	222	4,941	-4,654,629.5	1	65	168,686.1	2	193
45 - 50	519.2	2	78	145	5,086	-5,171,811.0	1	37	187,429.0	2	149
50 - 55	571.1	1	79	89	5,175	-5,688,992.0	0	9	206,172.0	2	169
55 - 60	623.0	3	82	211	5,386	-6,206,174.0	0	13	224,914.9	2	177
60 - 65	674.9	3	85	210	5,596	-6,723,354.0	0	8	243,657.7	0	40
65 - 70	726.9	2	87	142	5,738	-7,240,534.5	0	3	262,400.6	1	123
70 - 75	778.8	2	89	151	5,889	-7,757,716.5	0	0	281,143.6	1	105
75 - 80	830.7	4	93	260	6,149	-8,274,897.0	0	0	299,886.4	1	126
80 - 85	882.6	2	95	137	6,286	-8,792,077.0	0	0	318,629.3	2	197
85 - 90	934.5	2	97	129	6,415	-9,309,259.0	0	0	337,372.3	2	198
90 - 95	986.4	0	97	27	6,442	-9,826,439.0	0	0	356,115.2	4	341
95 - 100	1,038.4	0	97	0	6,442	-10,343,622.0	0	0	374,858.0	3	220
Hours Off	0.0	0		2,318		0.0	0	4,359	0.0	0	0

Historical Runtime on Chillers

Machine	600 Ton	400 Ton
Startup Date	2/10/1984	2/10/1984
Inspection Date	11/14/2002	6/6/2002
Years	18.50	18.07
Hours of Runtime Total	38,436	43098
Average Hours per Year	2,077	2,385

Machine	600 Ton	400 Ton
Startup Date	2/10/1984	2/10/1984
Inspection Date	12/30/2004	9/17/2003
Years	20.60	19.33
Hours of Runtime Total	43,514	45231
Average Hours per Year	2,112	2,339

Machine	600 Ton	400 Ton
Startup Date	2/10/1984	2/10/1984
Inspection Date	5/18/2005	5/19/2005
Years	20.98	20.98
Hours of Total Runtime	43,539	49199
Average Hours per Year	2,075	2,345

Trane also observed during the Detailed Study that some of the ventilation dampers were fully closed. The figure below depicts typical ventilation requirements, based on ASHRAE 62 guidelines, but the key point to remember is that proper ventilation levels are required to sustain a healthy work environment. Additional information regarding this guideline can be located in APPENDIX M. This issue led us to hire a testing firm to measure the amount of ventilation and supply air being delivered by the existing air handlers. The results are also depicted below:

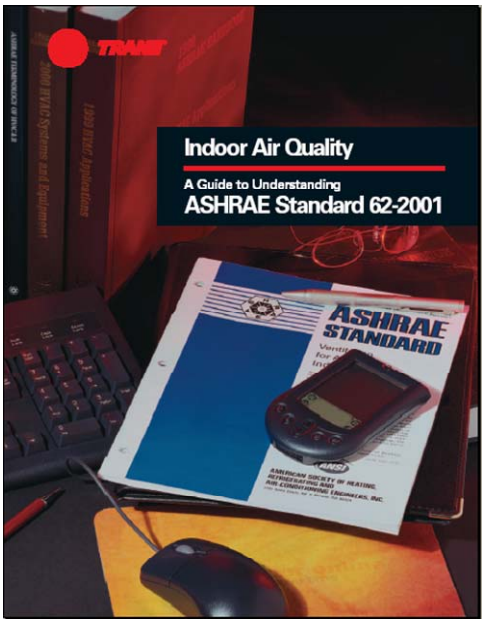

Figure 6: Excerpt from Table 2 of ASHRAE Standard 62-2001

Application	Estimated Maximum Occupancy (people/1000 ft²)	Outdoor Air Requirements cfm/person	cfm/ft²
Offices			
Office space	7	20	
Reception areas	60	15	
Telecommunication centers and data entry areas	60	20	
Conference rooms	20	20	
Public Spaces			
Corridors and utilities			0.05
Public restrooms		50	
Locker and dressing rooms			0.5
Smoking lounge	70	60	
Elevators			1.0

Sample Calculation:

1800 people x 20 CFM = 36,000 CFM

Outside Air Measurements

AHU A West-
Supply Air- 33326 CFM
Return Air- 33090 CFM
O/A- 236 CFM (leakage thru O/A damper)
Exhaust Air- 1985 CFM (leakage thru exhaust damper)

AHU A East-
Supply Air- 30182 CFM
Return Air- 27610 CFM
O/A- 2573 CFM (leakage thru O/A damper)
Exhaust Air- 1657 CFM (leakage thru exhaust damper)

AHU B West-
Supply Air- 26409 CFM
Return Air- 23514 CFM
O/A- 2895 CFM (leakage thru O/A damper)
Exhaust Air- 879 CFM (leakage thru exhaust damper)

AHU B East-
Supply Air- 22715 CFM
Return Air- 22078 CFM
O/A- 638 CFM (leakage thru O/A damper)
Exhaust Air- 1256 CFM (leakage thru exhaust damper)

AHU C West-
Supply Air- 21482 CFM
Return Air- 21174 CFM
O/A- 308 CFM (leakage thru O/A damper)
Exhaust Air- 854 CFM (leakage thru exhaust damper)

AHU C East-
Supply Air- 26881 CFM
Return Air- 10002 CFM
O/A- 3864 CFM (leakage thru wall damper)
Exhaust Air- 16881CFM (leakage thru fully open M/A damper)

AHU D-
Supply Air- 29938 CFM
Return Air- 29068 CFM
O/A- 870 CFM (leakage thru O/A damper)

Kitchen exhaust- 8482 CFM (no make up air)
Deli exhaust- 1778 CFM (no make up air)
Dishwasher exhaust- 932 CFM (no make up air)

Ventilation Range: From 34,896 CFM to 46,088 CFM

Now that we have discussed the relevant design considerations above, we shall highlight the energy conservation measures selected for the Zale Corporation project. The follow list of energy conservation measures have been collectively evaluated via TRACE 700 to provide the following energy savings benefits:

Building ECM	Calculation Method	Savings (Dollars $)	Safety Factor	Guaranteed Savings	% Total Util. Cost	kWh Saved	kW Saved	Therms Saved
Lighting	Trace 700	$ 99,811	18%	$80,768	7.4%	785,315	1,928	(3,955)
DDC	Trace 700	$ 63,523	18%	$52,086	4.8%	382,383	239	13,564
Chillers and CPMgr	Trace 700	$ 74,492	20%	$59,594	5.5%	532,374	1,255	-
Total Savings		**$237,827**		**$192,448**	17.7%	1,700,071	3,421	9,609

Specifically, Trane recommends that Zale Corporation install following energy conservation strategies, in addition to the upgrades / required items outlined above:

(Please refer to APPENDIX B for further explanation as to the individual strategies)

AIR DISRIBUTION IMPROVEMENTS

- Conversion of existing variable air volume boxes to direct digital controls.

CHILLER PLANT IMPROVEMENTS

- Installation of new Centrifugal chillers (400 ton and 600 ton) equipped with power factor capacitors, and advanced controls capable of enabling variable flow through both the evaporator and condenser
- Optimize the existing variable frequency drive controlled cooling tower fans
- Convert the chilled water distribution system to a variable flow primary system (Please refer to the APPENDIX C for information regarding this design approach)
- Incorporate Trane proprietary "Chiller Plant Manager" software into the sequence of operation of all the cooling associated equipment, to include the chillers, pumps, and cooling tower fans.

ELECTRICAL IMPROVEMENTS

- Installation (from the factory) of power factor correction capacitors with the new chillers. The electrical point of delivery serving the chiller plant is in need of improving power factor. The thought is that we will be able to improve the overall power factor of this particular point of delivery via these capacitors, coupled with

the installation of VFDs on the pumps, and air handlers, such that we will be able to alleviate the need to install power factor correction capacitors at the main switchboard.

- Installation of variable frequency drives on the chilled water pumps, the condenser water pumps, and the 7 main air handlers.

ENVIRONMENTAL CONTROL (BUILDING AUTOMATION SYSTEM) IMPROVEMENTS

- Chiller Plant Optimization (see the detailed explanation in APPENDIX B)
- Cooling Tower Optimization
- Direct Digital Controls
- Lowering of Static Pressure Control Points to an Optimal Level
- Enthalpy Control of mixed air dampers
- Night Setback
- Night Purge
- Occupied-Unoccupied (time of day) Control
- Optimal Start/Stop & Ventilation Delay
- Demand Controlled Ventilation with the use of CO2 sensors
- Supply air reset

LIGHTING UPGRADES

- Conversion of existing Fluorescent Fixture to State-of-the-art-technology
- Conversion of Select Incandescent Fixtures

The full details regarding the lighting systems to be upgraded are highlighted below:

LIGHTING RETROFIT SUMMARY

Line	Existing Fixture CODE	Existing Fixture Description	Upgrade Fixture CODE	Upgrade Fixture Description	Quantity
1	22PB2U	2X2 TROFFER WITH PARABOLIC LENS AND 2-4' UBEND T12 LAMPS	2F017WERH OP	2-2' T8 LAMPS WITH STANDARD POWER OPTANIUM BALLAST AND WHITE REFLECTOR	2
2	24PB3L T8	2X4 TROFFER WITH PARABOLIC LENS AND 3-4' T8 LAMPS	2F032WERH OP	2-4' T8 32 WATT LAMPS WITH STANDARD POWER OPTANIUM BALLAST AND WHITE REFLECTOR	4
3	24TP3L T8	2X4 TROFFER WITH PRISMATIC LENS AND 3-4' T8 LAMPS	2F032WERH OP	2-4' T8 32 WATT LAMPS WITH STANDARD POWER OPTANIUM BALLAST AND WHITE REFLECTOR	8
4	2S1L	2' STRIP FIXTURE WITH 1-2' T12 LAMP	1F017BBLW OP	1-2' T8 LAMP WITH LOW POWER OPTANIUM BALLAST	1
5	4W1L	4' WRAP FIXTURE WITH 1-4' T12 LAMP	1F032BBLW OP	1-4' T8 32 WATT LAMP WITH LOW POWER OPTANIUM BALLAST	26
			8' 2F032CKHL OP	2-4' 32 WATT T8 LAMP WITH HIGH POWER BALLAST AND WHITE CONVERSION KIT	40
6	4W2L	4' WRAP FIXTURE WITH 2-4' T12 LAMPS	2F032BBLW OP	2-4' T8 32 WATT LAMPS WITH LOW POWER OPTANIUM BALLAST	4
7	8S2L	8' STRIP FIXTURE WITH 2-8' T12 LAMPS	8' 2F032CKRH OP	2-4' T8 32 WATT LAMPS WITH STANDARD POWER OPTANIUM BALLAST AND 8' WHITE CONVERSION KIT	8
8	FL-120	120 WATT FLOOD LAMP	GLPIG20	20 WATT FLUORESCENT GLOBE LAMP	24
9	FL-65	65 WATT FLOOD LAMP	GLPIG20	20 WATT FLUORESCENT GLOBE LAMP	9
10	MH-100	100 WATT METAL HALIDE	HWPIG42 51K	42 WATT COMPACT FLUORESCENT LAMP FLUORESCENT DIRECT WIRE	52
11	MH-175	175 WATT METAL HALIDE FIXTURE	HWPIG42 51K	42 WATT COMPACT FLUORESCENT LAMP FLUORESCENT DIRECT WIRE	5
12	MH-400	400 WATT METAL HALIDE FIXTURE	PULSE350	320 WATT "PULSE START" METAL HALIDE	45
13	R2L	RED 2 LAMP EXIT SIGN	NFRLED	NEW LED EXIT SIGN WITH BATTERY BACKUP	111
14	WP MH-400	400 WATT METAL HALIDE FIXTURE	NFWP2X42	NEW WALL PACK WITH 2-42 WATT COMPACT FLUORESCENT LAMP	18
15	YM MH-1000	1000 WATT METAL HALIDE	PULSE750	750 WATT "PULSE START" METAL HALIDE	2

NOTE: Continued on next Page.

LIGHTING RETROFIT SUMMARY (Continued)

Line	Existing Fixture CODE	Existing Fixture Description	Upgrade Fixture CODE	Upgrade Fixture Description	Quantity
16	14TP2L T8	1X4 TROFFER WITH PRISMATIC LENS AND 2-4' T8 LAMPS	1F032WERH2 OP	1-4' 32 WATT T8 LAMP WITH LOW POWER OPTANIUM BALLAST AND WHITE CONVERSION KIT	298
17	14PB2L T8	1X4 TROFFER WITH PARABOLIC LENS AND 2-4' T8 LAMPS	1F032WERH2 OP	1-4' 32 WATT T8 LAMP WITH LOW POWER OPTANIUM BALLAST AND WHITE CONVERSION KIT	4090
18	4Z2L T8	4' "Z" STRIP FIXTURE WITH 2-4' T8 LAMPS	1F032CKLW OP	1-4' 32 WATT T8 LAMP WITH LOW POWER OPTANIUM BALLAST AND WHITE CONVERSION KIT	66
19	2W2L	2' WRAP FIXTURE WITH 2-2' T12 LAMP	1F017BBLW OP	1-2' T8 LAMP WITH LOW POWER OPTANIUM BALLAST	6
20	IA1-52	52 WATT INCANDESCENT LAMP	PIG18	13 WATT COMPACT FLUORESCENT LAMP	17
21	IA1-100 DIM	100 WATT DIMMABLE INCANDESCENT	HAL45PIR	45 WATT INFRARED HALOGEN	15
22	14PB2L T8 DIM	1X4 TROFFER WITH PARABOLIC LENS AND 2-4' T8 LAMPS DIMMABLE	1F032WELW DIM	1-4' 32 WATT T8 LAMP WITH LOW POWER OPTANIUM BALLAST AND WHITE CONVERSION KIT DIMMABLE	4
23	R2L (25)	2-25 WATT LAMPS RED EXIT SIGN	NFRLED	NEW LED EXIT SIGN WITH BATTERY BACKUP	55
24	8S4F32	8' STRIP FIXTURE WITH 4-4' T8 LAMPS	8' 2F032CKHL OP	2-4' 32 WATT T8 LAMP WITH HIGH POWER BALLAST AND WHITE CONVERSION KIT	266
25	HAL-50	50 WATT HALOGEN LAMP	PIG9	9 WATT COMPACT FLUORESCENT LAMP	39
26	24TP4L T8	2X4 TROFFER WITH PRISMATIC LENS AND 4-4' T8 LAMPS	2F032WERH OP	2-4' T8 32 WATT LAMPS WITH STANDARD POWER OPTANIUM BALLAST AND WHITE REFLECTOR	317
27	3W1L T8	3' WRAP FIXTURE WITH 1-3' T8 LAMP	1F025BBLW OP	1-3' T8 LAMP WITH LOW POWER OPTANIUM BALLAST	4
28	24PB4L T8	2X4 TROFFER WITH PARABOLIC LENS AND 4-4' T8 LAMPS	2F032WERH OP	2-4' T8 32 WATT LAMPS WITH STANDARD POWER OPTANIUM BALLAST AND WHITE REFLECTOR	18
29	22PB3F54	2X2 TROFFER WITH PARABOLIC LENS AND 3-2' BIAX T5 LAMPS	2F017WERH OP	2-2' T8 LAMPS WITH STANDARD POWER OPTANIUM BALLAST AND WHITE REFLECTOR	33
30	R2L	2 LAMP RED EXIT SIGN	NFRLED	NEW LED EXIT SIGN WITH BATTERY BACKUP	15
31	4IH3L	4' INDUSTRIAL HOOD FIXTURE WITH 3-4' T12 LAMPS	2F032CKLW OP	2-4' 32 WATT T8 LAMP WITH LOW POWER OPTANIUM BALLAST AND WHITE CONVERSION KIT	2
32	IA1-65	65 WATT INCANDESCENT LAMP	PIG18	13 WATT COMPACT FLUORESCENT LAMP	14

NOTE: Last line item listed above

The balance of this section contains a report from TRACE 700 depicting an overview of the energy savings calculations for the project.

Financial Analysis and the Project Scoping Tool

Prior to evaluating energy conservation measures, Trane will work jointly with an owner to uncover the current cost of operations, as it relates to the building systems we are likely to impact with a comprehensive solution type of project. The table below highlights the cost of operation savings (non-energy related savings) potential that Zale Corporation and Trane discovered during the Detailed Study.

Operational Savings Summary (By Project Retrofit Category)	
Chiller Plant Upgrades (Chillers, Pumps, DDC,VFDs) and Flakt Fan Upgrades	$110,738
Full Building DDC (less VAV boxes) to include VFDs on AHUs	$16,983
Lighting Retrofit & Lighting Controls	$29,421
VAV Box Upgrades to DDC control	$72,918
Fire Alarm System Upgrades	$48,000
Total:	$278,060

Once the above operational savings are fully understood and the energy conservation measures begin to surface, Trane will work with you to develop what we call a Project Scoping tool spreadsheet. The purpose of the tool is to help the project team remain focused on a financially viable project. The figure below represents the Project Scoping tool developed for the Zale Corporation project. (Final Version)

PROJECT SCOPING TOOL: Zale Corporation- Trane Solution (Excluding Tax) Date: June-06

Line	Scope of Work	A: Estimated Energy Savings	B: Maintenance & Repair Cost Avoidance [Levelized]	C: Total Estimated Savings (A+B)	D: Downpayment (Positive Number)
	Proposal Options				
1	Chiller Plant Upgrades (Chillers, Pumps, DDC,VFDs) and Flakt Fan Upgrades		110,738		0
2	Full Building DDC (less VAV boxes) to include VFDs on AHUs		16,983		0
3	Lighting Retrofit & Lighting Controls		29,421		0
4	VAV Box Upgrades to DDC control		72,918		0
5	Fire Alarm System Upgrades (Including Fire Suppression & Dry and Wet Pipe Systems)		48,000		0
	Total:	192,419	278,060	470,479	0

Financial Analysis

Trane Project Budget (Baseline Scope)	1,567,789	Energy Savings (A)	192,419	Annual Electric Costs:	$903,000
Budget Deviation (% of Budget)	119%	Maintenance Savings Ongoing (B)	278,060	Annual Gas Costs:	$30,000
Actual Investment	1,865,838	Less Annual M&V Costs	(12,000)	Total Utility Costs:	$933,000
Less Capital Replacement / Downpayment (D)	0	Less Trane Maintenance Support Services:	(114,054)	Percent Energy Savings:	20.6%
Financed Amount	1,865,838	Total Savings	344,425		
Interest Rate	6.25%	minus Lease Payment	(251,396)	Annual Maintenance Costs:	$600,000
Leasing Period in Months	120	Simplified Annual Cash Flow	$93,029	Percent Maintenance Savings:	46.3%
PMT per Year	($251,396)				

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KEY INPUTS:	
Hurdle Rate	15%
Lease Rate	6.25%
Depreciation	20
Tax Rate	38%
Inflation Rate	3%

FINANCING APPROACH	NPV (10 Years)
CAPITAL PURCHASE	($499,541)
CAPITAL LEASE 10 YEAR	$235,892
CAPITAL LEASE 7 YEAR	$88,992
CAPITAL LEASE 5 YEAR	($27,954)

Discounted cash flow (DCF) spreadsheets are also integrated into the project scoping tool model to provide the NPV analysis feedback. The following DCF represents the capital lease (10 years) scenario for the Zale Corporation project, based on the scope of work indicated above.

10 Year Capital Lease Analysis:

DESCRIPTION	START-UP/ CONSTRUCTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
ANNUAL ENERGY SAVINGS	$0	$192,419	$198,192	$204,137	$210,261	$216,569	$223,066	$229,758	$236,651	$243,751	$251,063	$2,205,868
OPERATIONAL SAVINGS		$278,060	$286,402	$294,994	$303,844	$312,959	$322,348	$332,018	$341,979	$352,238	$362,805	$3,187,646
MEASUREMENT AND VERIFICATION SERVICES		($12,000)	($12,360)	($12,731)	($13,113)	($13,506)	($13,911)	($14,329)	($14,758)	($15,201)	($15,657)	($137,567)
CONTRACT SERVICES		($114,054)	($117,476)	($121,000)	($124,630)	($128,369)	($132,220)	($136,186)	($140,272)	($144,480)	($148,815)	($1,307,501)
INTEREST @ 6.3%		($116,615)	($107,871)	($98,580)	($88,709)	($78,221)	($67,078)	($55,237)	($42,657)	($29,291)	($15,089)	($699,349)
DEPRECIATION 20		($93,292)	($93,292)	($93,292)	($93,292)	($93,292)	($93,292)	($93,292)	($93,292)	($93,292)	($93,292)	($932,919)
NET INCOME BEFORE TAXES	$0	$134,518	$153,595	$173,528	$194,361	$216,140	$238,914	$262,732	$287,650	$313,724	$341,015	$2,316,178
TAXES	$0	($51,117)	($58,366)	($65,941)	($73,857)	($82,133)	($90,787)	($99,838)	($109,307)	($119,215)	($129,586)	($880,148)
AFTER TAX SAVINGS	$0	$83,401	$95,229	$107,587	$120,504	$134,007	$148,126	$162,894	$178,343	$194,509	$211,429	$1,436,031
NON-TAXABLE OR NON-CASH COMPONENTS												
OWNER'S CAPITAL CONTRIBUTION	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PRINCIPAL COMPONENT OF PAYMENT		($139,904)	($148,648)	($157,938)	($167,809)	($178,298)	($189,441)	($201,281)	($213,861)	($227,228)	($241,429)	($1,865,838)
DEPRECIATION		$93,292	$93,292	$93,292	$93,292	$93,292	$93,292	$93,292	$93,292	$93,292	$93,292	$932,919
ANNUAL CASH FLOW	$0	$36,789	$39,873	$42,941	$45,986	$49,001	$51,977	$54,905	$57,774	$60,573	$63,292	$503,112
TOTAL FINANCIAL IMPACT	$0	$36,789	$39,873	$42,941	$45,986	$49,001	$51,977	$54,905	$57,774	$60,573	$63,292	$503,112
CUMULATIVE CASH FLOW	$0	$36,789	$76,662	$119,603	$165,590	$214,591	$266,568	$321,473	$379,246	$439,820	$503,112	$503,112

10-YEAR CASH FLOW		$503,112
NPV OF CF @	15.00%	$235,892
FINANCED CAPITAL AMOUNT		$1,865,838
ANNUAL LEASE PAYMENT AMOUNT		($256,519)
INFLATION ON ENERGY AND SERVICES		3%
TAX RATE ASSUMED		38%

Finally, Trane was asked to specifically evaluate what the economics of a phased-in project would look like. The results indicate that Zale Corporation can save almost $ 400,000 in NPV by doing all the projects at once. The results are depicted below.

Project Phasing Analysis Tool

Date: 22-Jun-06

Description of Investment	Project Investment Profile: Present Yr	Year 1	Year2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Chiller Plant Upgrades (Chillers, Pumps, DDC,VFDs) and Flakt Fan Upgrades	($790,000)										
Full Building DDC (less VAV boxes) to include VFDs on AHUs		($453,600)									
Lighting Retrofit & Lighting Controls			($466,011)								
VAV Box Upgrades to DDC control- included above in Full DDC											
arm System Upgrades (Including Fire Suppression & Dry and Wet Pipe Systems)	($331,574)										
Detailed Study	($35,000)										
Annual Investment Total:	($1,156,574)	($453,600)	($466,011)	$0	$0	$0	$0	$0	$0		$0
ANNUAL ENERGY SAVINGS	60,000	52,419	80,000	-	-	-	-	-	-	-	-
OPERATIONAL SAVINGS	158,738	89,901	29,421	-	-	-	-	-	-	-	-
MEASUREMENT AND VERIFICATION SERVICES	-	-	-	-	-	-	-	-	-	-	-
CONTRACT SERVICES	(112,519)	(69,913)	-	-	-	-	-	-	-	-	-

	NPV (10 Years)	Cash Flow (10 Years)
Trane Solution:	($499,541)	$936,708
Phased-In Solution:	($891,504)	$123,730

	NPV (10 Years)	Incremental Cash Flow
Savings with Trane Solution:	$391,964	$812,978
Hurdle Rate:	15%	

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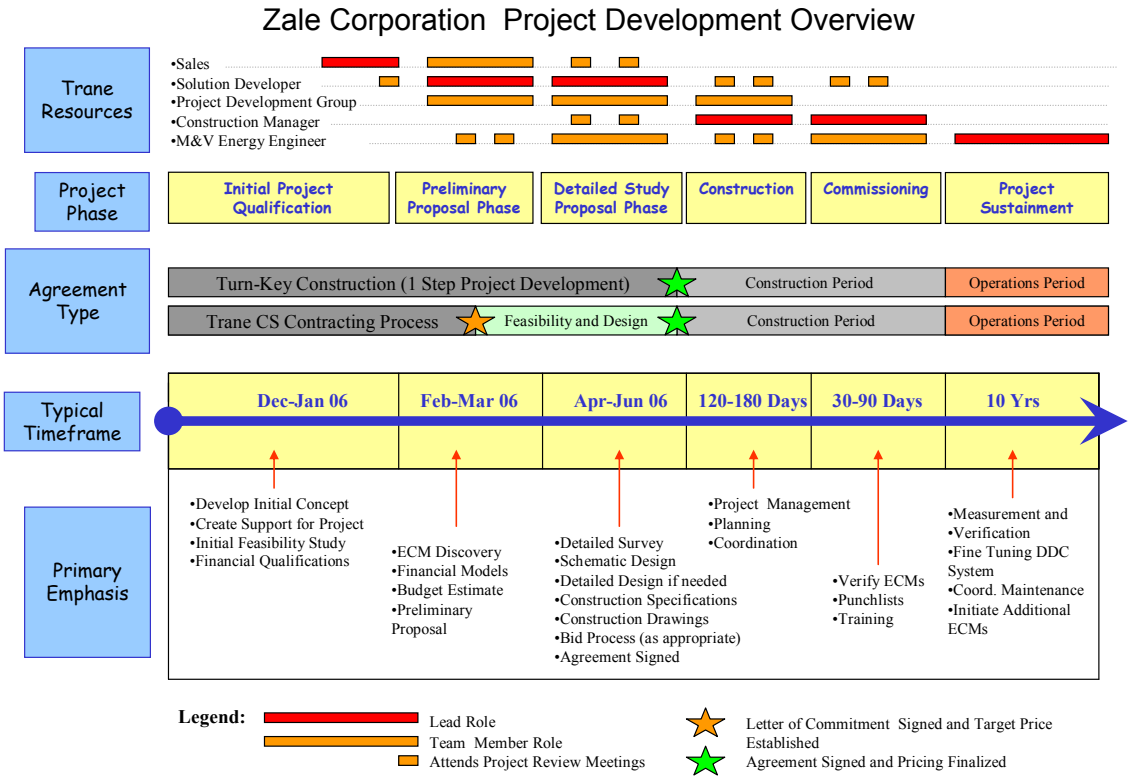
NOTES:
1. Based on a Capital Purchase Comparison.
2. Project Investment does not include applicable taxes.

Implementation Schedule

The schedule depicted below represents our progression thus far in the Trane Comprehensive Solutions project development process and our forecast as to the remaining tasks, and the associated Trane resources to be involved.



Construction Experience

As an industry leader, Trane has developed a wealth of knowledge and unique insight into finding solutions to building performance issues. Our support team of sales representatives, project managers, and service agents are well recognized and highly trained. The professionals who work with you have a long history of working successfully as a team. They will come to your building prepared to deliver value and cost-effective solutions.

As a manufacturer of comfort equipment *and* controls, a Trane solution can offer many advantages to your operation. A Trane Integrated Comfort system combines Trane heating, ventilating and air conditioning equipment with factory-installed unit controls together with a Trane building automation system. The benefits of a Trane Integrated Comfort system include:

- Higher efficiency because the components are optimized for system performance
- More reliable performance because the equipment is designed to work together
- Lower installation costs because the HVAC equipment has turnkey factory mounted and tested controllers
- Accelerated occupancy because factory commissioning makes installation and startup faster
- Less system downtime with in-depth diagnostics to identify problems before they become serious

Committed to Safety

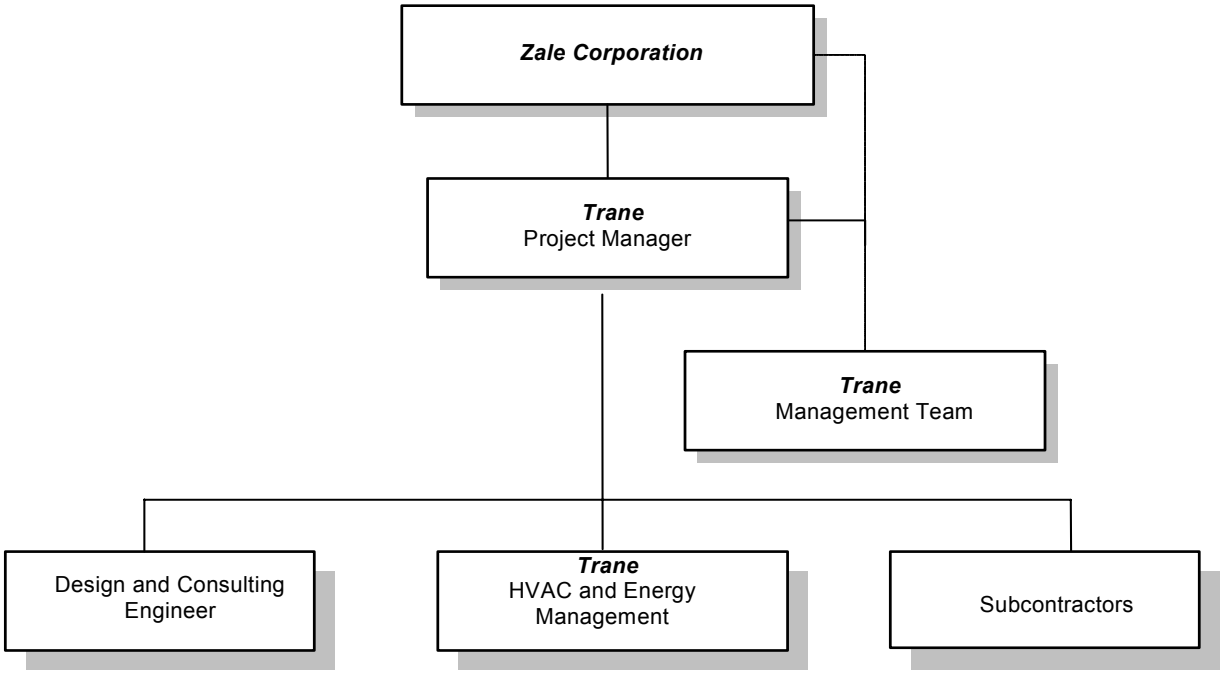
The American Standard companies, including Trane, are committed to integrating safety and health into all business activities and processes. It is the policy of Trane to provide a safe work place and to require that our subcontractors maintain a safe job site. The Trane team assigned to your project will conduct their work in a safe manner consistent with good construction safety practices, in addition to all project specific written requirements. Trane requires full compliance with all federal, state, and local laws, statutes, ordinances, rules, and regulations of government authorities, agencies and any other authorities having jurisdiction over the performance of the work. The Trane Construction Safety Manual details our position and process to promote safety at your project. In addition to Trane employees, all subcontractors are required to ensure that they and their employees, subcontractors, suppliers, vendors, and visitors, while on the job site and in the performance of work, comply with the provisions in this manual. Non-compliance with safety requirements shall be treated the same as non-compliance with any contract item.

The following figure depicts the typical resources deployed by Trane in performing the execution phase of a comprehensive solution type project:

CAPABILITIES & ISSUES	TRANE	Mechanical Contractor	Utility or Energy Services Company	Control Company / VAR	Other HVAC OEM
Products / Systems					
Refrigeration Equipment (Chillers)	☑	Broker / Dealer	Broker	Broker	☑
Rooftop HVAC	☑	Broker / Dealer	Broker	Broker	☑
Air Handling Equipment	☑	Broker / Dealer	Broker	Broker	☑
Temperature Controls	☑	Broker / Dealer	Broker	☑	?
Building Automation Systems	☑	Broker / Dealer	Broker	☑	?
Factory Mounted Controls	☑	Broker / Dealer	Broker	Coordination Required	?
Custom Built Equipment	☑	Broker / Dealer	Broker	?	?
Services					
Chiller Maintenance	☑	?	Subcontract	?	?
Rooftop HVAC Maintenance	☑	?	Subcontract	?	?
Control System / BAS Maintenance	☑	?	?	☑ (Controls)	?
Training	☑	?	Subcontract	☑ (Controls/ HVAC ?)	?
Water Treatment	☑	?	Subcontract	?	?
Parts Supplier / Support	☑	Broker / Dealer	Subcontract	☑ (Controls)	?
Rental Equipment / Emergency HVAC	☑	?	Subcontract	Subcontract	?
Design-Build Contracting	☑	?	☑	☑	?
HVAC & DDC System Application Support	☑	?	?	☑ (Controls)	?
Professional Services	☑	?	?	☑	?
Facility Management / Outsourcing	☑	?	?	☑	?
Risk Management					
Design Engineering	Subcontract	?	?	Subcontract	Subcontract
Project Management	☑	☑	?	☑	?
Construction Management / Supervision	☑	☑	?	☑	?
Mechanical Installation	Subcontract	☑	Subcontract	Subcontract	Subcontract
Electrical Installation	Subcontract	?	Subcontract	Subcontract	Subcontract
Financing Support	☑	?	?	☑	?
Performance Guarantees	☑	?	?	☑	?
Miscellaneous					
Long Term Relationship with Customer	☑	?	?	☑ (Controls)	☑
Access to Technical Support on Products	☑	?	?	☑ (Controls)	☑
Quality of Local Reputation is High	☑	?	?	?	?
Does what they say they do	☑	?	?	?	?
Employee Turnover is Low	☑	?	?	?	?

Project Management Approach

To execute the project, we will assemble an entire team of highly skilled professionals to effectively execute each detail of the project. As the schematic below suggests, the team is structured to provide you with a **single point of contact** for ongoing project communication: the Trane project manager. This approach maximizes the efficient flow of accurate information and minimizes potential confusion.



The Trane team of experienced professionals is committed to focus on the particular needs of your particular project. Our mission is to position you to successfully accomplish your business objectives. Working together, we bring the outstanding service and expertise that are synonymous with the Trane brand.

Project and Construction Management

Trane has a multitude of experienced Project Managers ready to manage projects through construction. Our Project Managers bring years of managerial, technical, and sales experience in the construction, chillers, and controls marketplace. Project Managers serve as the primary point of contact between Trane and a customer, with responsibility for the successful implementation and completion of projects. They are fully accountable to Trane and the customer for project success and customer satisfaction. Project Managers are granted full authority to carry out their duties, including the authority to expend funds and other resources and to commit the company within the scope of the contract. The position of Project Manager is a full-time assignment and, if for any reason

Trane needs to replace a Project Manager, a person of equal or higher qualifications will be assigned.

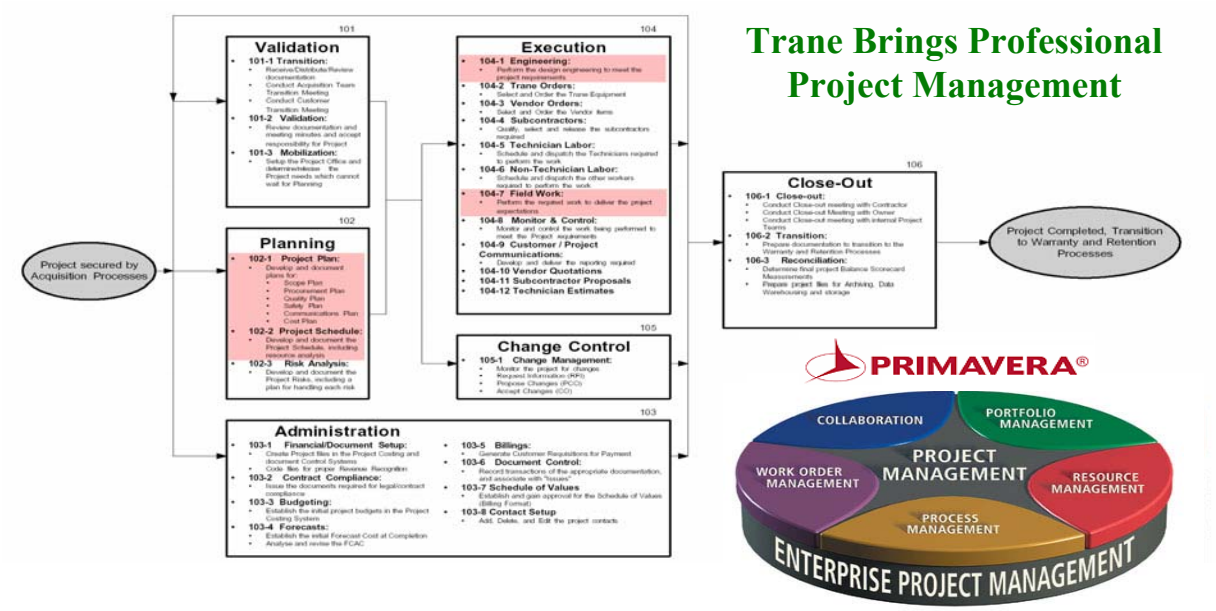
The Project Manager, supported by Trane project staff, will carry out responsibilities such as, but not limited to, the following:

- Technical Audits
- Project Development of Projects
- Construction Management
- Management and Administration of Subcontracts and Subcontractors
- Personnel (Human Resources) and General Administration
- Quality Assurance / Safety Standards, Practices, Inspections, and Audits
- Financial Management
- Standards, Practices, and Processes Development and Compliance
- Training
- Engineering Management and Technology Oversight

The Trane Project Management Process and Organization

Trane will apply a time-tested, proven management system and process to the management of any projects. We use Trane's highly successful project management process. The process utilizes a stepwise approach to work in partnership with the customer to reiteratively define and refine the customer's needs and requirements, to implement the custom designed solution best suited to the customer, and to support the customer through a tailored post-implementation support program throughout the project life cycle. The process begins prior to project execution with validation of customer expectations and finishes with a methodical close-out of each aspect of the project. The six sub-processes are as follows:

- Validation: Verification of project and contract requirements
- Administration: The systematic control of project documentation and communication
- Planning: Development of a detailed execution plan and control of project resources
- Execution: Installation and checkout of the proposed scope of work
- Close-Out: Continuous focus on customer acceptance of completed improvements
- Change Management: The systematic handling of all potential changes and
  Deviations



Trane Project Management Support Software

Our project and construction management process is enabled by a set of tools we refer to as the Trane desktop suite of software. These tools were carefully selected to enable each sub-process using a "best practices" approach. When the "best practices" were insufficient, we developed our own software package to fill the gap. As a result, the Trane Desktop is a comprehensive, integrated project management tool set that includes: The Trane Estimator®, Primavera Project Planner®, Primavera Expedition®, Primavera SureTrak®, People Soft Financial Spreadsheet©, and the Microsoft Office® suite of software. These tools are provided to the Project Managers to facilitate the management, coordination, and control of projects.

The Trane Estimator software package allows the development of a detailed estimate on any project regardless of size, scope, or complexity. When a project is started, The Trane Estimator transfers the appropriate information to the scheduling tool (P3), the control tool (Expedition), and the financial system (People Soft), thus ensuring the integrity and initial set up of the project.

Primavera's document control software, Expedition®, allows systematic control and consistency of project documentation and communication. All correspondence received and sent on the project is logged into Expedition to ensure that a complete, accurate, and up-to-date record of all transactions and communications (informational, financial, directive, or other) is kept throughout the project. Through such careful document control, we are able to minimize confusion, pinpoint stall points, and generally maximize efficiencies in dealing with non-Trane entities on a project. We also use the software's capabilities to monitor our own response and turnaround times. Through this careful scrutiny of our own processes and how they impact the other contractors on the project, we are able to increase the satisfaction our customers have in dealing with the Trane.

Primavera Project Planner (P3) and SureTrak by Primavera are used to schedule and plan all of the activities that Trane performs on a project. The Project Manager coordinates this plan with the overall project plan and the other contractors' plans to make sure conflicts are avoided. Plans from different software packages are easily merged into the overall Trane project plan. Copies of the plan and schedule are provided to the customer and to our teammates and subcontractors for their use and feedback.

Financial information on a project is easily accessed by the Project Manager through PeopleSoft, our business and financial system software. PeopleSoft tracks committed and actual project costs to date along with payable and receivable information. This information is critical not only to the Project Manager, but to all members of the team. Systematic control of the financial aspects of the project helps to motivate every team member and subcontractor to perform as expected, when expected.

Local District (Project) Office

At the local Trane district office, the Project Manager will be the primary point of contact and interface with the customer. He/she will be responsible for ensuring the project's success and the client's satisfaction throughout the life cycle of the project. The Project Manager will plan, direct, oversee, and monitor all activities performed by Trane, Trane teammates, and subcontractors.

The Project Manager will be supported by the assignment of a Project Administrator based on the scope of the project. Project management for a specific project will be based out of the district office and will be staffed by experienced engineers and safety and quality personnel as necessary to meet the needs of the customer's staff and the project. The Trane Project Manager will work with the customer's Facilities and Maintenance staff to ensure the project is installed according to proper procedures and work schedules.

Operations and Maintenance Manuals

Shortly after completion of the project, Trane will provide at least one (1) preliminary copy of as-built drawings and Operation and Maintenance Manuals. Depending on the project's scope, upon approval Trane can submit additional copies of the following (as required):

- As-builts and/or Installation Drawings
- Equipment Submittals
- Service and Maintenance Procedure(s)/Manual(s)
- User and Technical Manual(s)

We firmly believe that the more knowledgeable your personnel are in system concepts and equipment, the more fully utilized these systems will be, and the maximum level of savings will be obtained.

Financing Solutions

American Standard Approach to Financing

Trane is the air conditioning division of American Standard Inc. American Standard is a publicly traded Fortune 500 company. We are listed on the NYSE as ASD. American Standard is listed by both Moody's and Standard and Poor's as investment grade. Trane's approach to financing is to provide a process that is as transparent and seamless as possible to our customers.

Trane does not finance any of our projects internally. We rely upon third party lenders to provide the financing to our customers. Since Trane does is not a party to the financing we are able to help our customers secure cost effective financing from the marketplace without any hidden markups or fees. Trane views the financing contract as a separate instrument from the construction/performance guarantee contract.

On a daily basis, we deal with all the large, reputable providers of financing to the marketplace. We are aware of costs, issues and requirements for securing financing for our customers. We work with our customers and their chosen lender to facilitate financing that is done in a transparent, economical and timely fashion. It is our desire to work with our customers throughout the financing process to facilitate financing that is tailored to the needs of the particular project. We have successfully used this process for the benefit of our customers for over 18 years.

Mechanics of the Financing Arrangement

A typical project financing is facilitated with an equipment lease provided by a third party lender. Very early in the project planning stages, our customers select their desired lender either because of existing relationships, a financial request for proposal (RFP) process, or from various lenders Trane may recommend. Since Trane does not enter into exclusive agreements with third party lenders our position is neutral. The chosen lender will then perform a due diligence review of the customer's credit and provide an indicative rate and term for providing the financing. Every effort is made to match the term to the contract length in order to maximize the projects economics. After the lender has completed the credit review, the lender will provide the customer with a set of financing documents. If these are to be negotiated, the customer and the lender arrive at a mutually satisfactory document. Trane will provide any technical information necessary to facilitate and expedite this process where necessary. Following the conclusion of the financing document negotiations, most lenders will issue a commitment to the customer to provide the financing at a specified term and rate for a period of time, called the lock period. The rate is usually fixed for this lock period and indexed if the lock expires. Upon completion of the Trane project contract negotiations, the financing documents should be ready for execution. As a rule, the funds are deposited by the lender into a customer owned escrow account. All interest earned by the escrow account accrues to the customer. Funds are then disbursed to Trane as it invoices the customer/escrow account for progress payments. This payment schedule is part of the Trane project contract. At the completion of construction, and its acceptance by the customer, the escrow account is closed.

Title to the equipment is usually transferred to the customer at the beginning of the lease period. It is customary for the third party lender to maintain a security interest in the equipment. The customer is generally required by the third party lender to provide insurance on the equipment financed for the benefit of the lender. Trane will provide any performance guarantees negotiated in the Trane project contract to the customer. Trane does not take credit risk.

Tax Exempt Financing (If Applicable)

The most common vehicle for tax exempt financing for a not for profit (501.C3) university is called a conduit lease. Using a conduit agency, which may be a municipal government or higher education facilities agency, a not for profit university may "borrow" the tax exempt status of the municipal government. The municipal government takes no credit risk for the loan. The university borrows the funds necessary for the project from a lender who through the conduit process leases the project to the municipality who in turn subleases the project to the university. The process usually requires the coordination of attorneys for the municipality, the university and the lender. There are several IRS required hearings that must be held. As a rule the process of putting a municipal lease together takes anywhere from three to six months, depending upon scheduling. Trane has worked with many municipal lenders to facilitate conduit leases for not for profit universities. All of these lenders are skilled at making the process as smooth as possible. Some of the lenders are CitiCorp, Key Bank, Bank of America, and GE Public Finance.