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Company Description

A Energy Company specializes in producing components for energy efficiency and energy generation products, with 30 employees serving clients in the central and western United States. An extensive research and development team has used technology to develop a lean system to produce the essential mechanisms necessary to decrease the amount of power required for motor operation and increase the capacity of energy generation. The information technology (IT) team has created a network for sharing information with all members of the organization to help the company become a high-performance business. Gross revenues of $45.1 million were generated for the prior fiscal year by the 30-member company at the two current locations. Sales growth for the prior three years has been 3%, 4%, and 10%, respectively.

A Energy Company is an integrated company that specializes in the design, development, and production of the highest quality components for diverse energy efficiency and energy generation customers. Our people use advanced materials and processing capabilities to supply components to create superior value for our customers. Our significant investment in technology combined with our resources for research and development have allowed us to focus on the critical needs of our customers and the energy industry.

We have an extensive history as a supplier to energy efficiency and energy generation companies. The company began four generations ago in the infancy of the powder metallurgy and particulate materials industry. Blending machining and advanced materials properties and performance, our strategic approach to technology integration with research and development has provided a competitive advantage. The revolutionary advances in material science and powder processing have led to new capabilities that harness the effectiveness of metal-based components from powders.

As a supplier of core components for energy efficiency and energy generation firms, we have worked to lessen our energy consumption and our impact on the environment. Our reduction of emissions has increased worker safety and community satisfaction. Our investment into sustainable energy generation at each of our facilities has minimized our dependence on

external energy supplies and provided us with a natural laboratory for developing and testing component parts for energy efficiency and energy generation.

A Energy Company is a minority- and female-owned business. Our core values have defined the character of A Energy Company. These five values guide how we make decisions:

- ***Integrity***: Ethical actions and open honest debate help increase responsibility and innovative thinking.
- ***High Quality People***: Expecting people to use technology to drive creative thinking develops additional hypotheses to test, which results in optimum product performance and innovative designs.
- ***Respect*****:** Diversity of thought, action, and culture ensures an interesting environment that values inclusion and acceptance.
- ***Shared Governance***: All employees act with an owner mentality and work to build a heritage for future generations through professional development and fulfillment of commitments to internal and external stakeholders.
- ***Value*****:** Improved client performance and the creation of long-term, win-win relationships increase focus on excellent performance.

Market analysis has indicated a need to expand A Energy Company into the eastern and southern regions of the United States. Regional explorations for sites and customers are being studied. Expectations are to continue the technology integration to have a one-site collocation experience in four distinct regions of the country.

Our continued efforts to explore the properties of advanced materials, exploit the power of technology integration, examine the viability of innovative designs, and exercise our experimental approach will help move our clients forward to reach their goals and serve their energy efficiency and energy generation customers. The result is a mobilization of the finest resources, skills, and technologies to increase energy efficiency and energy generation.

Company Organizational Chart

A Energy Company has locations in Fresno, California, and Chicago, Illinois. Even though business has grown 17.5% in the four years since Sabelle Arnold has taken over, the number of employees has stayed the same.

The use of technology has allowed the small firm to operate as if collocated.

Below is a list of the positions and the organizational chart as it exists for both locations.

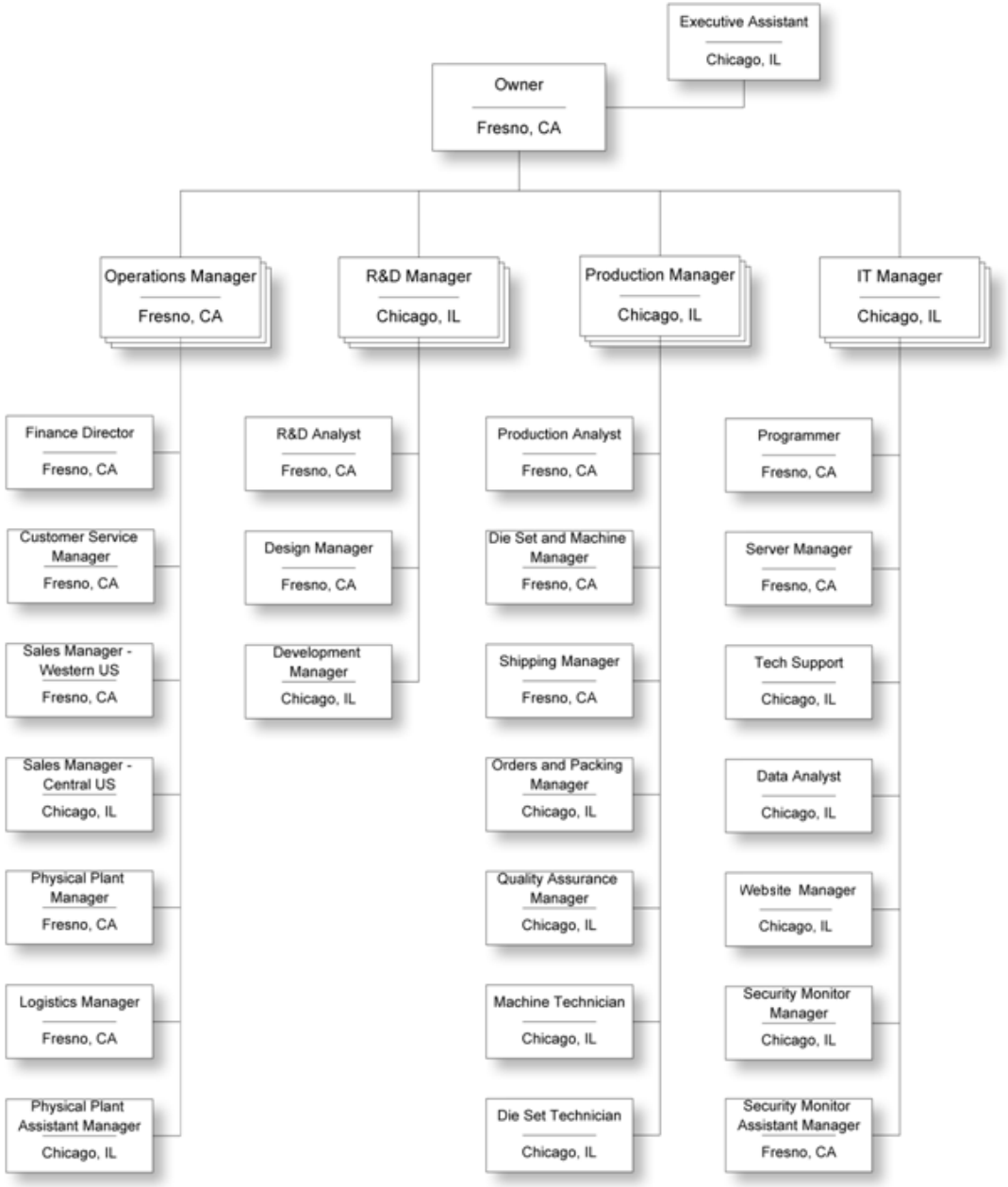
Fresno, CA Site

- Owner
- Operations Manager
- Finance Director
- Customer Service Manager
- Sales Manager for Western United States Region
- Physical Plant Manager
- Logistics Manager
- R & D Analyst
- Design Manager
- Production Analyst
- Die Set and Machine Manager
- Shipping Manager
- Programmer
- Server Manager
- Security Monitor Assistant Manager

Chicago, IL Site

- Executive Assistant
- R & D Manager
- Production Manager
- IT Manager
- Sales Manager for Central United States Region
- Orders and Packing Manager
- Quality Assurance Manager
- Machine Technician
- Die Set Technician
- Tech Support
- Data Analyst
- Website Manager
- Security Monitor
- Physical Plant Assistant Manager
- Development Manager

Company Organization Chart



Biography of Owner

Sabelle Arnold, Executive Director

Sabelle Arnold has over twenty-five years of engineering experience related to advanced powder metallurgy and particulate materials, innovative design and processing, and information technology integration. Arnold holds three master's degrees, one each in mechanical engineering, engineering science, and business administration in information technology.

Arnold is the fourth-generation of ownership of A Energy Company. She has had different responsibilities in the company including production of parts, conducting research and development, and the architecture of the current IT system. Arnold began working for A Energy Company while in high school. She returned to work with the production and research teams during her summers while seeking her degrees.

Arnold purchased the company from her father four years ago. A Energy Company has experienced a 17.5% increase in sales since Arnold took the helm. She is currently exploring the prospect of expanding the company from its current western and central United States locations into eastern and southern United States markets.

Arnold serves on the APMI (a nonprofit professional society for the advancement of powder metallurgy) International Conference Planning Board and has published several articles in the *International Journal of Powder Metallurgy* and the *Journal of Information Technology.*

A Energy Company supplies component parts to over 150 energy efficiency and energy generation firms in the western and central United States.

Feasibility Study

Executive Summary

A Energy Company has plans to expand its services to the eastern and southern United States. Increased coverage requires increased expense related to technology upgrades and possible expansion and new staff members at the new locations. The market analysis has identified a number of potential clients in these new regions. Development of relationships with these clients is necessary for the success of the expansion. Much of this relationship development is dependent upon the functionality of the company's IT infrastructure to maintain the same feeling on collocation that the company has between its Fresno, California, and Chicago, Illinois, sites.

Description of Products and Services

A Energy Company is considering expansion of its services to eastern and southern United States locations to supply component parts to the energy efficiency and energy generation companies in these new regions. Currently, A Energy supplies component parts to more than 150 firms in the western and central regions of the United States.

A Energy Company has grown 17.5% in sales since four years ago, which was the beginning of the tenure of the current owner. Each year, the sales staff continues to have record years. Much of this success is a team effort. The information from the sales calls is shared with the research and development team to design new and innovative parts to increase the competitiveness of the clients. Excellent service from suppliers for the appropriate tools and dies to make the parts is related to the technology integration. The quality of the technology employed is as effective as being collocated.

Technology Considerations

To facilitate the expansion, the level of technology with the new locations must continue the experience of collocation via the network. The limited number of staff, 30 members, has production resulting in over $45 million in sales this past year. The high level of productivity is due to the ability to work as a team in both physical locations while having a home office in only one location.

Expectations of the technology system will be to have security monitoring for each location capable of being viewed at each of the other locations, the server capacity would have to double, and the number of communications would change in proportion to the increased number of staff. The types of connections and the capacities of the switches and routers may have to change due to dependence upon the technology design and upgrades in technology. The website would increase in its capacity to handle the additional connections necessary for the new clients.

Product/Service Marketplace

The current markets for A Energy Company's products are companies that require energy efficiency to maintain a competitive edge with their motors, turbines, and transformers. Some of these products

include hand tools that are battery operated; increased motor operation efficiency increases the amount of time the tool can be operated. This creates a competitive advantage for the company making the tool because the end-user can use the tool longer between recharging and can experience increased productivity. For those companies that have turbines and transformers for energy generation, the improved parts increase the amount of energy being generated for the same volume of fuel. The increased efficiency results in more power being produced with less input. The results are lower energy costs, increased profitability for the company, increased disposable income for the end-user, increased economic gains, and less pollution.

The parts are made with innovative metal powders and particulate materials. The strong research and development leads to high value added parts. There are currently few competitors for this innovative technique due to the variability in change of part size from the tool mold to the finished product. Strength and position analysis require complex analysis skills. Parts that are less complex have a large number of firms that can make the parts at a competitive price.

Marketing Strategy

A key component to the success of A Energy Company is the relationship the company has had with its clients over four generations of family ownership. The sales team members have a close partnership with the clients. New sales team members will have to establish similar relationships with firms in the new regions. The intimate knowledge of the requirements of the motors is proprietary information.

Some firms try to reverse engineer the parts that are used within the motors. This has not been successful because the part is designed with the functionality of the motor in mind. The sales staff has to have an understanding of the capabilities of the parts and gain insight into the workings of the clients' motors. Together, they communicate the new design requirements for the increased efficiency to the design team to design and develop the part.

Organization and Staffing

A Energy Company is staffed in a very lean manner at this time. Each member has a great amount of corporate knowledge that would be lost if that member were to leave the company. The salary for each of the positions is above market price to retain skills and knowledge in the company. With the expansion there would be an increase in staff. It is a desire of the firm to have two new locations so as to be considered local to the companies with whom A Energy Company would do business.

Schedule

Upon approval of this project, a detailed schedule will be created by the assigned project team to include all tasks and deliverables.

The expected time frame for the expansion would be over the next year. The two sites have been identified.

Financial Projections

Financial data is available for the development. This would be available at the time it is determined that the project is feasible and that the costs for the development of two new sites and the increased IT infrastructure necessary for the expansion are realistic.

Findings

Technology:

- The current network must change to accommodate the increased locations and upgrades in technology.

Marketing:

- New relationships must be built to have the same level of effectiveness as the company has with its current clients.

Organizational:

- Additional staff is needed to support similar positions that exist in the current IT infrastructure.

Financial:

- The additional staff must be in balance for position support, increased production, and increased costs.
- Calculations need to be made to determine the expense of the network expansion, increased staff, and new locations.

Financial Statement

	(all numbers in $000)				
REVENUE		PY-3	PY-2	PY-1	Prior Year
Gross sales		$38,354	$39,401	$40,977	$45,075
	Less cost of goods sold	26,848	27,581	28,684	31,553
Net Sales		$11,506	$11,820	$12,293	$13,522
COST OF SALES					
Beginning inventory		$350	$360	$420	$435
	Plus goods purchased / manufactured	120	165	185	190
Total Goods Available		$470	$525	$605	$625
	Less ending inventory	360	420	435	440
Total Cost of Goods Sold		$110	$105	$170	$185
Gross Profit (Loss)		$11,396	$11,715	$12,123	$13,337
OPERATING EXPENSES					
Selling					
	Salaries & wages	$169	$176	$183	$190
	Commissions	17	18	18	19
	Advertising	10	12	14	20
	Depreciation	146	157	167	167
	Other	52	63	63	73
Total Selling Expenses		$394	$426	$445	$469

(Continued on next page)

General/Administrative				
Salaries & wages	$2,282	$2,373	$2,468	$2,567
Employee benefits	980	1,020	1,060	1,103
Payroll taxes	735	765	795	827
Insurance	63	63	73	73
Rent	8	8	9	9
Utilities	196	204	212	220
Depreciation & amortization	30	40	40	50
Office supplies	2	2	2	2
Travel & entertainment	3	3	3	4
Postage	1	1	1	2
Equipment maintenance & rental	10	10	10	11
Interest	0	1	1	2
Furniture & equipment	3	4	4	5
Total General/Administrative Expenses	$4,313	$4,494	$4,678	$4,875
Total Operating Expenses	$4,707	$4,920	$5,123	$5,344
Net Income Before Taxes	$6,689	$6,795	$7,000	$7,993
Taxes on income	635	646	665	759
Net Income After Taxes	$6,054	$6,149	$6,335	$7,234
Extraordinary gain or loss	$0	$0	$0	$0
Income tax on extraordinary gain	0	0	0	0
NET INCOME (LOSS)	$6,054	$6,149	$6,335	$7,234

General Company Budget

General Company Budget for This Year

This general budget does not include the cost of goods sold.

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Totals	% of Total
Indirect Materials and Supplies	$8,204	$8,204	$8,204	$8,204	$32,816	0.318%
General/Administration Labor	$549,120	$549,120	$549,120	$549,120	$2,196,480	21.344%
Employee Benefits	$286,728	$286,728	$286,728	$286,728	$1,146,912	11.145%
IT Team Labor	$167,700	$167,700	$167,700	$167,700	$670,800	6.518%
Utilities Costs	$57,200	$57,200	$57,200	$57,200	$228,800	2.223%
Technology	$1,200,000	$1,200,000	$1,200,000	$1,200,000	$4,800,000	46.643%
Taxes	$215,046	$215,046	$215,046	$215,046	$860,184	8.359%
Insurance	$18,980	$18,980	$18,980	$18,980	$75,920	0.738%
Depreciation, Machinery	$60,000	$60,000	$60,000	$60,000	$240,000	2.332%
Space Cost	$4,000	$4,000	$4,000	$4,000	$16,000	0.156%
Repairs and Maintenance	$5,000	$6,000	$6,000	$6,000	$23,000	0.224%
Other						
Other						
Totals	**$2,571,978**	**$2,572,978**	**$2,572,978**	**$2,572,978**	**$10,290,912**	**100.0%**

Budget for IT This Year

This budget for IT does not include the full cost of IT labor and benefits. Production requires 90% of the IT labor and is included in the general budget.

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Totals	% of Total
Indirect Materials and Supplies	$5,800	$5,900	$6,000	$7,000	$24,700	0.4%
Indirect Labor	$54,912	$54,912	$54,912	$54,912	$219,648	3.6%
Employee Benefits	$28,673	$28,673	$28,673	$28,673	$114,692	1.9%
IT Team Labor	$16,770	$16,770	$16,770	$16,770	$67,080	1.1%
Utilities Costs	$55,000	$55,000	$55,000	$55,000	$220,000	3.7%
Technology	$1,200,000	$1,200,000	$1,200,000	$1,200,000	$4,800,000	79.8%
Taxes	$40,000	$40,000	$40,000	$40,000	$160,000	2.7%
Insurance	$50,000	$50,000	$50,000	$50,000	$200,000	3.3%
Depreciation, Machinery	$48,000	$48,000	$48,000	$48,000	$192,000	3.2%
Space Cost	$2,000	$2,000	$2,000	$3,000	$9,000	0.1%
Repairs and Maintenance	$2,000	$3,000	$3,000	$3,000	$11,000	0.2%
Other						
Other						
Totals	**$1,503,155**	**$1,504,255**	**$1,504,355**	**$1,506,355**	**$6,018,120**	**100.0%**

Biographies for the IT Department

Cameron Kern, IT Manager

Cameron Kern has over 12 years experience working in all levels of IT management. Kern graduated with a master's degree in information security and assurance before joining the staff of A Energy Company five years ago. Kern has experience as a network administrator and was responsible for upgrading the telephone system on a regional level of a 40-member firm with three office locations.

In the role of IT Manager, Kern oversees all the help desk activities; provides expert support when necessary for systems troubleshooting and disaster recovery; builds and maintains vendor relationships; manages the company's telephone system; supervises training program development; and leads the planning and implementation of all additions, deletions, and modifications to the IT infrastructure .

> *Cameron Kern consistently acknowledges and appreciates the contributions by each of the IT team members. Cameron motivates the IT team to work together in the most efficient manner.*—Sabelle Arnold, executive director

Sidney Jeffrey, Data Analyst

Sidney Jeffrey joined the staff of A Energy Company after graduating with a bachelor's degree in statistics and mathematics. Jeffrey possesses strong analytical and problem solving skills and is a certified database architect.

Jeffrey is an integral part of the IT team and provides vital information to the organization. Jeffrey contributes to the success of the company by gathering and collecting data from a variety of sources, analyzing the data, preparing data reports, auditing data reports for accuracy, and presenting the reports to the management team.

Sidney Jeffrey has excellent knowledge of current market trends and happenings. This knowledge is helpful in making decisions for the future of the firm. As a key member of our team, we look to Sidney to bring data to support or refute our ideas. — Sabelle Arnold, executive director

Taylor Muelles, Programmer

Taylor Muelles has more than 20 years of experience as a computer programmer and holds certifications in the major computer programming languages, including C++, Java, and XML in addition to a bachelor's degree in information technology with an emphasis in software. Muelles is responsible for identifying the goals of the programs and prepares flow charts to show the management team diagrammatically how information flows through the network.

Muelles contributes to the company by developing faster and more robust applications for the production equipment to communicate with the servers and systems to gather data and provide real-time production statistics to the production team.

Taylor Muelles has developed a system for production status reporting that provides real-time feedback to the production team to know if the machinery is operating at peak efficiency. Our use of energy inputs has been reduced to show significant savings due to the data measured within Taylor's programs.—Sabelle Arnold, executive director

Bailey Wynne, Security Monitor - Manager

In addition to monitoring the sites to prevent theft, vandalism, fire, or other situations that could harm the staff at either site, Bailey Wynne maintains the security of the employees and guests by developing and presenting employee safety training programs. Wynne is a certified emergency medical technician and safety specialist.

Wynne developed the company's disaster response policy and holds certifications from the American Society for Industrial Security. Wynne is currently enrolled in a bachelor's degree program in information technology with an emphasis in security.

> *Bailey Wynne has taken the initiative to apply the skills from the bachelor's degree program to develop methods for increasing the efficiency of the high-definition digital monitoring system and for analysis of the accounting data that is collected and analyzed. Bailey's creative thinking and intuition have helped ensure more than three years free of safety incidents for the employees.*—Sabelle Arnold, executive director

Sawyer Molinas, Security Monitor - Assistant Manager

Sawyer Molinas monitors the sites to prevent environmental hazards that could harm the staff. Molinas holds a bachelor's degree in health informatics. Molinas has applied these skills to develop database systems to prevent theft, vandalism, oxidation, or other situations that could harm the material inputs into the production of the energy components supplied by A Energy Company to energy efficiency and energy generation firms or that could cause environmental hazards for the staff.

Molinas has been a member of A Energy Company's staff for more than ten years. Molinas has implemented advanced security monitoring and has recommended modifications to improve the security monitoring and attack detection systems.

> *Sawyer Molinas balances the people side of security monitoring with the information technology aspect. Controlling the environmental conditions requires information about the conditions. Sawyer worked with the physical plant staff to develop security monitoring systems that prevent loss due to environmental conditions in addition to theft or vandalism. Ultimately, the air quality is better for the workers and for the community due to Sawyer's security systems designs.*—Sabelle Arnold, executive director

Rory Tysoh, Server Manager

Rory Tysoh has more than 15 years of experience in network and server management. Tysoh holds a bachelor's degree in information technology with an emphasis in networks administration and a master's degree in information security and assurance. Tysoh manages, installs, and administers all the server hardware and software; manages system backups and offsite data storage; and communicates with vendors and the IT team about the performance and security of the server hardware and software.

Tysoh has experimented with sustainable IT and is working to create ways for the servers to have more energy efficiency and less use of power. Tysoh serves on a panel with other IT professionals to explore better energy efficiency for servers.

> *Rory Tysoh has been innovative in network and server management to reduce the energy requirements for the operation of the main servers and back-up servers at each of our sites. This approach is excellent for the health of our company and provides information that we can give to our clients to increase the value of energy efficiency.*—Sabelle Arnold, executive director

Parker Fisch, Tech Support

Parker Fisch has more than seven years of experience providing technical assistance and training. Fisch holds a technical school certificate. Fisch's primary responsibilities are to provide support and technical issue resolution via email, phone, or other electronic medium.

Fisch has developed a number of web-based training programs to answer the frequently asked questions for A Energy Company clients and staff. In partnership with the IT team, Fisch is working to develop configurations for connecting to the application servers that would improve the ease of reaching the servers and using the applications.

> *Parker Fisch provides excellent customer service to our clients and staff by answering their technical questions and resolving their technical issues in a timely manner. Client satisfaction has improved due to Parker's efforts*

to help the clients use the web-based order system.—Sabelle Arnold, executive director

Charlie Vargi, Website Manager

Charlie Vargi is responsible for leading and coordinating the website's development, feasibility, accessibility, and site features. With more than 18 years of experience developing websites, Vargi ensures the business requirements are met by applying new technology, media, interactive techniques, and e-commerce in a usable and attractive web presence.

Vargi holds a bachelor's degree in information technology with an emphasis in software and an MBA in information technology management. Vargi's responsibilities include analyzing the website traffic to further improve the development of the website.

Charlie Vargi mixes the creativity of an artist with the skills of an IT manager to create an eye-catching website that is as functional as it is pleasing to see. Charlie's web design communicates the culture and the brand of A Energy Company in a clear manner.—Sabelle Arnold, executive director

IT Infrastructure

Documentation and Diagram

The IT infrastructure of A Energy Company incorporates functionality that enables employees to integrate technology into their design, development, and production of component parts for energy efficiency and energy generation firms in the western and central United States.

Introduction

A Energy Company's IT network infrastructure supports two similar-sized offices and production sites in the western and central United States. The locations in Fresno, CA, and Chicago, IL, feature equal networks and have security monitoring systems for those monitoring the local site to also monitor the other site.

The interconnectivity between the two locations has permitted the employees to have the same benefits as if they were collocated. Just after becoming the company owner, Ms. Arnold designed the current IT infrastructure plan. She updated the systems to handle an anticipated 20% growth of the server and system use and storage.

The current infrastructure provides numerous redundancies to maintain usability in the event of a crisis. To assist in times of storms or other interruptions in power, each location is equipped with the following power supplies and Uninterruptible Power Supply (UPS) provisions:

- 4,000 AMP, 480-volt electrical system with independent transformers
- 1-megawatt redundant UPS power with 2,400 AMP, 48-volt, positive ground DC power plant and distribution
- 1-megawatt paralyzing UPS system with redundant master and emergency busses
- 2-megawatt diesel generator system

Network Overview

The two company sites have equal configurations of the network to provide support for the other site should there be any problems. Each site can operate independently with their own Internet connection and servers. Each site is backed up daily, and in some cases more frequently, at an offsite location to ensure minimal data loss in the event of a disaster or other crisis.

Each site has multiple routes for information and intrasite network traffic is kept to a minimum by having routers that control the flow of information and ensure the information does not continue on an internal loop. A single Internet service provider that is a tier-one carrier provides capacity and backup to both of the sites.

Within the sites and when traveling, a virtual private network is used for tunneling through the firewalls on each site and for secure connections when not in the office. Wireless connections are available at each site in addition to hardwired connections. Each wireless connection uses WPA encryption and MAC address filtering for security.

Servers in the IT Infrastructure

Each site is equipped with a series of servers to provide storage and serve programs. Each server is located in a cabinet. Restricted access to the servers has been implemented. The IT director and at least three members of the IT staff have been trained and have key access to the server cabinets.

The application server distributes applications to the employees' laptops and workstations to limit the need to install software on each computer. This implementation saved hours of imaging computers and installing software. Limited licenses have been purchased for analysis software and software that is more technical. Licensing expenses have been reduced through analysis of how often software was accessed and the number of users necessary for operation. The application server allows for application storage on a laptop in the event that a worker needs to access an application while not connected to the Internet.

The backup server initiates daily backups of all computers in the network and all servers and websites. Internal and external storage devices are used to minimize data loss.

The database servers index the data stored on the document servers and are SQL searchable. Access to the database server requires an SSL connection to protect sensitive data. The database server also includes the tracking system for the electronic key card system, which tracks entry into the building and movement from the office area to the research and development area or the production area.

The document access servers provide secure access to all documents. The file structure for the document storage was created from input from all the employees at the time of the development. Permission levels for access to documents in the file structure are assigned by the user and by the level of storage in the file structure. For example, some documents contain proprietary information on processes and procedures for part design and development. These documents are stored in a portion of the file structure that is accessible only through a secure connection and password and SecurID authentication tokens.

The e-mail server has a large storage capacity for e-mail storage to maintain record of communications. The system uses Simple Mail Transfer Protocol (SMTP) for sending e-mail and Internet Message Access Protocol (IMAP) for receiving email. The e-mail server also provides calendaring and groupware platforms to share events, tasks, and contacts with the other users on the system and interface with desktop and mobile devices.

The File Transfer Protocol (FTP) servers support 128-bit SSL encryption. The graphical user interface is user friendly and allows for full administration. The server performance and online sessions are

monitored through a web-based interface for access and administration from within the offices and while offsite.

The production server monitors each machine in the production cycle to record data for all raw material inputs into the machine; the amount of energy necessary for production; the number of parts produced; and specific information about the size, weight, and quality of the parts produced. This data is analyzed daily through a programmed set of analyses. Trends that cause the parts to vary from the Six Sigma level criteria for meeting the clients' specifications send alerts to the machine for immediate attention by the production staff. Production information is displayed at each machine for quick reference and evaluation of actual versus expected performance in production and quality.

The web servers house the dynamic website for A Energy Company and any communications or orders for components that are placed through the secure portion of the site. The server permits large file support for files greater than 2 GB on a 32 bit OS and has bandwidth throttling to manage any attacks and to efficiently serve the more than 150 clients. The current load limit is set to 500 concurrent client connections.

Security of the IT Infrastructure and Facilities

Server security and functionality is of the highest priority for the IT team. In addition to protecting the systems from attacks, unauthorized server access, password cracking, or network eavesdropping, the IT team is supported by an intrusion detection service that analyzes data for critical threats or cyber attacks and provides a response. The distinct internal and external networks allow for access of all the internal resources for the company in a secure manner that reduces the opportunity for those external to the organization to access the proprietary information of the company. Redundant access points permit rerouting of service through the alternate path in case of any issues with the primary path. Duplicity of the database and web servers is created at the other site in case of any disaster or crisis at the primary site. Redundant power is supplied through UPS systems and generators.

Physical location security is of high priority for the IT team. The alarm system communicates with an offsite alarm monitoring service. Each employee has an electronic card to swipe upon entering the building and moving through the areas of the building. The card swipes for entry into the building, the production area, and the research and development area are analyzed to monitor and respond to any unauthorized access to the areas. A high resolution, motion sensitive, digital surveillance system sends images of the external doors of the building, the internal doors between areas, and the parking area to the personnel responsible for monitoring the locations and to a recording system. Onsite personnel at each location monitor the images for their site and the other location to help increase workplace safety and maintain proprietary secrets.

Personnel computer security includes location tracking for laptops in case of loss or theft, virus protection, and VPN access. Each laptop computer and work station requires a user ID and password that must be updated every 90 days, be a minimum of 8 characters in length, and include at least three of the four following criteria: capital letter, lowercase letter, symbol, or number.

Physical Attributes for the Facilities

Each site has a computer-monitored and computer-controlled heating, ventilation, and air conditioning control system with closed-loop chillers and humidity and temperature control. The data center

analyzes the environment of each thermostat location by taking a sample of the temperature and humidity every ten minutes and automatically adjusts the system based upon the trend determined in the analysis.

Fire detection and suppression systems provide early warning smoke detection monitoring onsite and offsite. Emergency lighting and power supplies are managed by the IT team. Lighting levels are adjusted to provide a consistent amount of lumens to the office space and are dependent upon the amount of light entering naturally through the windows and skylights.

Other Systems in the IT Infrastructure

A main set of systems and a secondary set of systems are located behind firewalls to serve the administrative and e-services functions for A Energy Company. These systems are used to manage the operations of the company by increasing efficiency in receiving and sending payments, billing for orders, managing performance, communicating, and computing. Logistics management is part of the general computing functionality. Following is a list of systems and e-services in addition to the servers and security systems:

Administrative systems

- Finance
- Human resources
- Management data warehouse
- Research and development
- Production

E-services

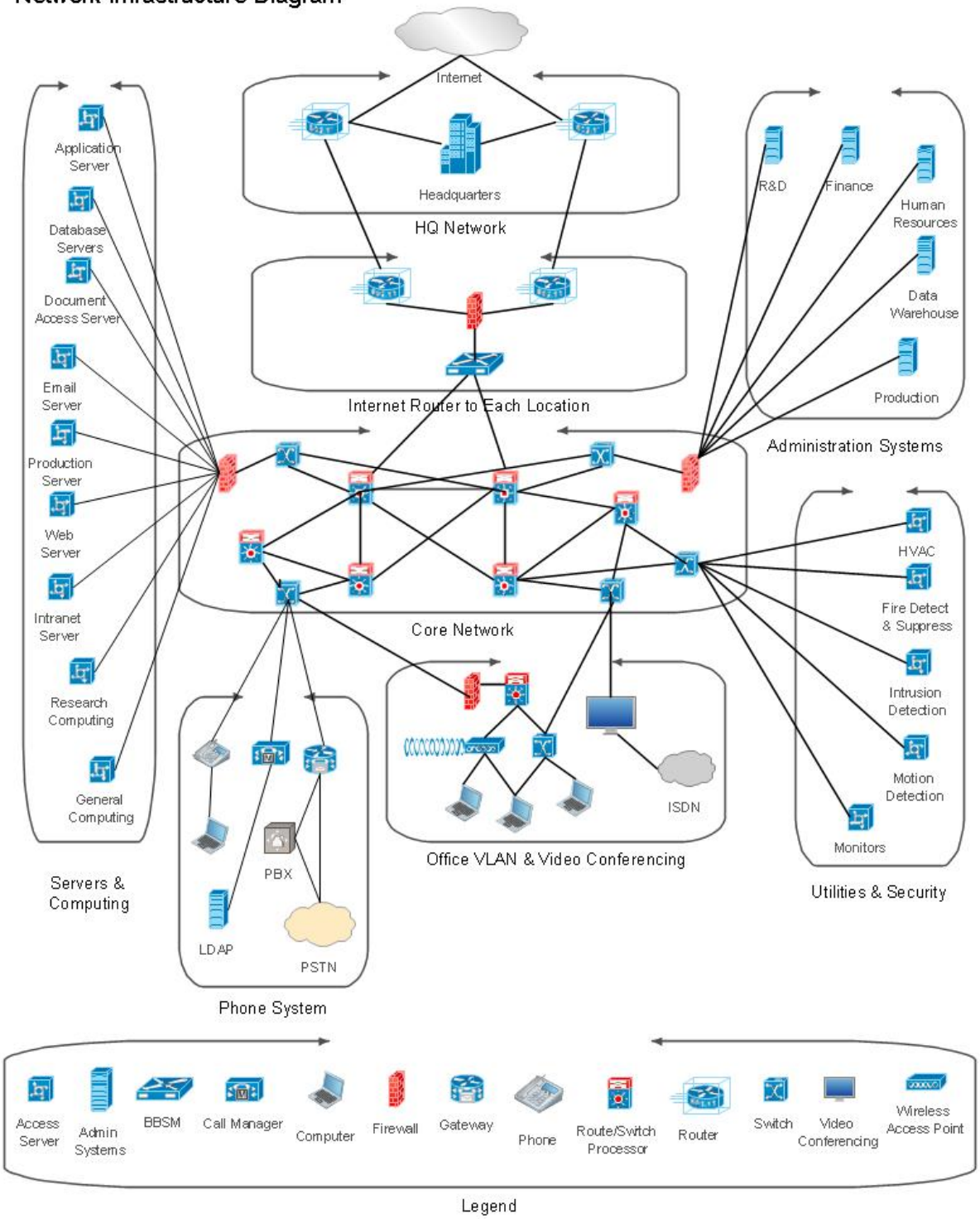
- General computing
- Research computing
- LDAP - interfaces with e-mail, directory, and phone system
- DNS services
- Intranet

The integration of these administrative systems and e-services has resulted in significant cost savings related to personnel time for monitoring and analyzing data.

Network Infrastructure Diagram

The A Energy Company network is composed of a headquarters network, an Internet router network, the core network, the servers and computing systems, the administrative systems, systems to monitor the utilities and securities, the office virtual local area network and video conferencing, and the phone system. The office VLAN is composed of wireless and hardwired connections. The video conferencing communicates with employees using VPN and external stakeholders using their video conferencing units.

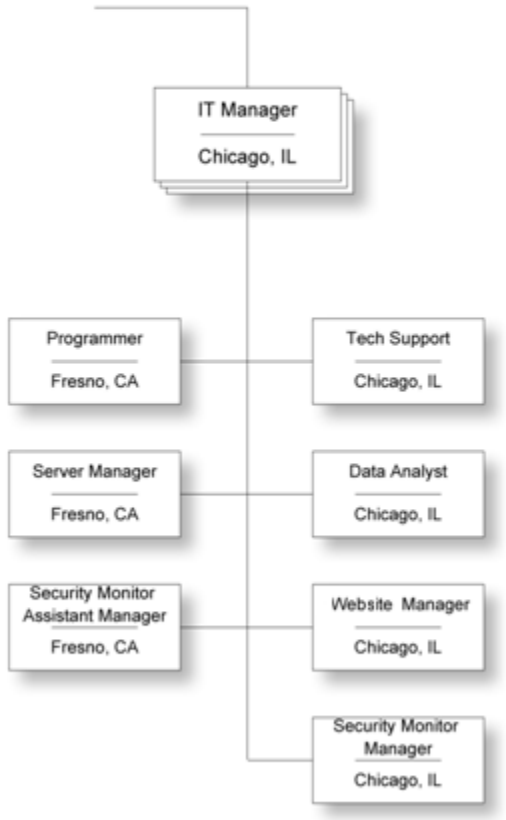
Network Infrastructure Diagram



IT Organizational Chart

The IT team has staff with home offices at each of A Energy Company's locations. Three staff members have offices in Fresno, California; five staff members have offices in Chicago, Illinois.

IT Staff



Memorandum

To: Management Team

From: Sabelle Arnold

Date: 7/18/XXXX

Re: Direction of new technology shown at conference

Last week I attended the ACM conference and there was a keynote speaker on the second day who presented several new technological innovations. As we are considering expanding our business with the addition of two new locations, we should consider the implementation of these new technologies into our network.

You can see the new technologies being advertised on the Internet. They are not a secret! There will be a teleconference meeting on Thursday afternoon at 3:00 (Chicago time) to discuss the possibilities—to see if they will help us meet our goals. Everyone should come with at least one new technology that they think will improve our network.

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