



Giant Investments on Energy Efficiency by Carrier

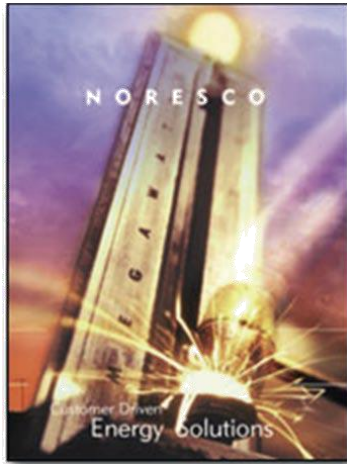
Carrier has also made significant progress in energy efficiency, which is becoming increasingly important with the efforts of both governments and companies around the world. In 2008, Carrier has shown the importance it attaches to this field by purchasing one of the biggest ESCOs in America **NORESCO** as well as LEED and companies specialized in energy efficiency consultancy such as **DOME-TECH INC.**, **ARCHITECTURAL ENERGY (AEC)** and **EMSI** (see ACST News, issue 25) which had become the leader among the Chinese and Indian markets in a short time and which has taken on very important responsibilities in the Beijing Olympics and successfully fulfilled them. Carrier also went to a UK-based restructuring in 2008 to implement some of the work it has been doing in the United States, in Europe. Currently, work is being carried out under this organization in order to present some of the power-efficient systems of UTC Power to the European market.

In addition, with the gathering of representatives from all UTC companies, UT500 Energy Team provides efficiency-increasing efforts to reduce energy consumption and environmental damage at companies' facilities. Below, we introduce NORESKO, AEC and Dome-Tech companies and their activities. >>>



NORESCO- Experienced Business Partner in Energy Services

NORESCO is a leading energy service company in the US, operating within Carrier, develops energy-saving projects with operational improvements to reduce energy and water use, provides financing, maintains customer performance and provides solutions to customers within business partnerships by taking a certain share from their savings. NORESKO's designs and integrated energy solutions are focused on efficiency, protection, infrastructure updating and system performance.



Since it has been founded, NORESKO has been providing services to major and specialized facilities, especially such as public buildings, military structures, municipal buildings and halls, university-colleges, secondary schools, health institutions, commercial-industrial markets as well as providing solutions to specific problems of specific customers.

Four Principles

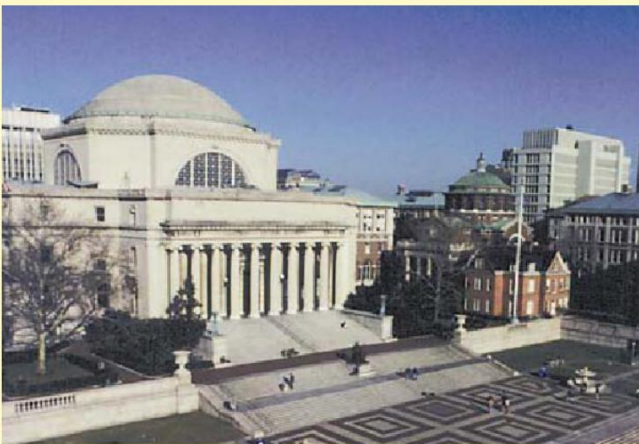
All of the activities of the leading energy service company in the USA NORESKO have been guided by four basic principles; integrity, innovation, operation and excellence in customer service. NORESKO has produced 350 megawatts of power with its established systems and has ensured its customers save over 31 billion kWh of electricity and over 71 trillion BTUs; this equates to five years of energy consumption of over 1 million homes.

NAESCO Accreditation

Since 1996, NORESKO has been recognized as a Energy Service (ESCO) and Energy Service Provider (ESP) company by the National Association of National Energy Service Companies (NAESCO). With ESCO accreditation, NORESKO's comprehensive energy efficiency projects have been approved for their technical and managerial expertise in order to provide all energy services, as well as to achieve energy savings according to recognized industry practices and to develop performance-based projects. With ESP accreditation, NORESKO is fully authorized to provide consultancy in the development and implementation of production, cogeneration or combined heat and power (CHP) projects and providing electricity or gas, and being consulted on signing contracts with energy companies.

20 Years of Experience

Today's competitive energy market is developing new opportunities with effective and reliable features for customers. With the control of energy systems, it is possible to provide very good operational performance and reduce operating costs. In this environment, NORESKO offers an excellent partnership in energy solutions with its 20 years of experience and the prestigious projects it has implemented, and helps economic growth by improving the financial performance, quality and safety of energy systems and existing infrastructure assets in private or public education institutions as well as public buildings.



In the US, Columbia University saves 2.7 billion dollars per year on 49 buildings on the Morningside and Health Sciences campuses by NORESKO'S conservation measures.

Within the scope of the project, energy consumption of each building can be controlled separately. In the project, 49 buildings, with a total area of 8 million square meters, has been examined individually for water and electricity consumption and the measures to be taken were determined. Accordingly, cost analysis and expected savings calculations were made. Tests for electricity and water were carried out and expectations were confirmed. The project was designed and completed at the end of these studies, which did not provide any cost to the university, but required serious engineering and experience. NORESKO confirmed the project by comparing old consumption with new consumption and by extrapolating.



The USA's Hawaii State Administration has signed a \$ 33.9 million dollar ESPC (Energy Savings Performance Contracting) agreement with NORESKO in October 2009 to conserve energy in key public buildings. Within the scope of the project, savings will be made in ten public buildings within a total construction area of 10 million m2, including the State Parliament building.

The project aims to reduce the electricity consumption of 6.3 million kilowatts a year by 30% and to save \$ 3.2 million dollars annually, to reduce emissions of imported fossil fuels by 9.917 tons of carbon dioxide equivalent in Hawaii. These reductions in the emissions mean that 1,647 vehicles will be withdrawn from traffic. The duration of the project is 24 months. NORESKO has also promised a performance guarantee for 20 years as well as undertaking the maintenances of the equipment.



Leading the Sector with 1st Integrated Engineering Services and Products

One of the companies working in the field of energy efficiency within Carrier is the Architectural Energy Corp.- Energy Architecture Company; AEC for short. AEC's vision is to provide a comfortable, healthy, spacious and productive environment for those who use the building with energy efficient, innovative, appropriate technology and design in a sustainable, high performing environment. Its mission is to be the pioneer in this sector with integrated engineering solutions and energy efficient services and products.

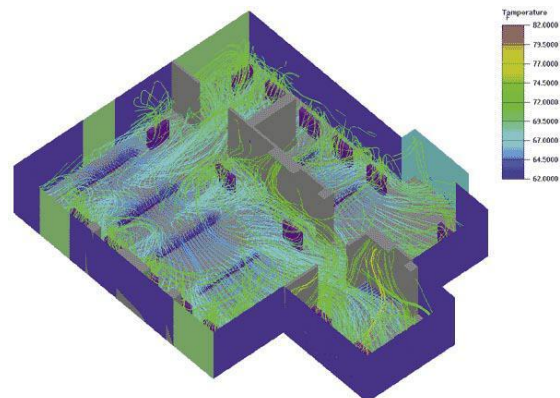
AEC is a leading B2B company focused on energy, buildings and environment. AEC offers its customers professional services during the life of the building with its comprehensive and innovative solution packages. It works as a LEED consultant on building constructions and restoration projects. AEC carries out its activities focused on improving integrated building performances in a wide range of research and development, energy and environment.

AEC has developed softwares that analyzes the energy performance of residential and commercial buildings and it provides the right system selection. With these softwares, it provides services in energy modeling, lighting design and analysis, electrical lighting, air flow modeling, life cycle calculation, LEED consultancy, education and renewable energy systems. AEC uses its own tools such as DOE-2, Radiance, Trace Pro. and CFD modeling.

DOE-2 is an energy simulation program that analyzes energy use in buildings. DOE-2 analyzes the balance between thermal comfort and cost, and evaluates all the alternatives and designs that will increase the energy efficiency of the building. Within the scope of this analysis; highly efficient cold water plants, cooling towers and controls as well as coolers, pumps, economizers, variable speed fan control, energy efficient motors, boxes, temperature and pressure controls, air distribution systems and the structure of the building are evaluated.

In order to estimate the visual comfort possibilities with the highly sensitive Radiance software, the effects of daylight are determined in the building, inner and outer light values are measured, the illumination maps and rates are prepared. In accordance with this, daylight and alternative lighting are analyzed and the most suitable lighting modeling is created.

TracePro is a comprehensive, versatile software tool for modeling light propagation by following rays. Simulations are prepared for multiple solar angles throughout the year so that the design can be improved. CFD models the air flow inside the building according to the sun, wind, pressure, temperature, humidity, building materials, thermal and physical properties; so architects and designers can develop designs that will provide the highest energy efficiency.



Air flow chart for CFD modeling in the Virginia Museum



The Sheraton Chicago Hotel (SCH) has a seating area of 111,000 square meters. Apart from the hotel section, SCH is the largest conference center in the heart of Chicago. The hotel has 1,209 rooms and suites, conference and meeting rooms, an exhibition hall, a business center, health club, shops, offices and restaurants. The hotel's energy and resource use expenditures rose from USD 2.4 million to USD 3.8 in a year due to the hotel's structure. At this stage, AEC conducted a detailed energy case study on request, with short-term diagnostic monitoring, energy modeling, analysis of energy conservation measures, and determined that operating costs could be greatly reduced.

This study demonstrates that with the DOE-2 energy simulation model development program, a total of 1.2 million USD savings can be made per year through a series of measures and improvements. The investment required for this could return in 1.6 years. In this context, the operation of the air side economizer, the supply air temperature control and the heating element were corrected. The centralized DDC system, which optimizes the control systems' strategies, has been renewed. DDC controls of the hotel rooms are connected to the network. A strategy of resetting the channel static pressure was applied to control the VFD feed and return air fans. The electric heating elements were replaced with a steam-waterboard and old water coolers were replaced with high-efficient new ones. In addition, the project was completed successfully with the measures taken.



Dome-Tech, Inc.

A Global Brand in Energy Engineering and Consultancy

Dome-Tech is Carrier's company that provides professional consulting services for world-class energy engineering and sustainable, lifelong high-efficiency buildings.

Extensive services include consulting / energy modeling in existing buildings or commissioning in new buildings, turnkey project implementation, energy supply consultancy and energy efficiency tests. Dome-Tech offers its customers a range of services with expert consulting, engineering solutions and guarantees these services throughout the life of the building. In this context, it provides services such as energy cost reduction, energy consumption management, carbon emission reduction, sustainable solutions and LEED consultancy.

In the Field Performance Tests and EB-Commissioning Program, performance testing, fault finding, testing and balancing, measurement and verification, commissioning in old and new buildings are carried out.

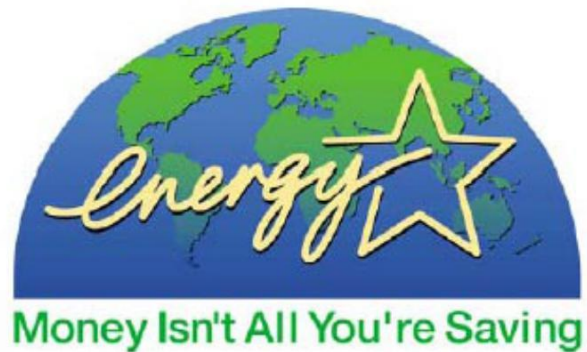
Using the real-world experience, Dome-Tech can create impressive results with cost-effective solutions.

With Dome-Tech's patented ENFORMA program, the performance of the air conditioning system is continuously monitored, analyzed automatically and shows to the user what to do for efficient operations.

The technical and operational needs of each organization are different in different industrial areas where Dome-Tech serves.

Dome-Tech understands these differences with its 20 years of experience and provides services according to needs. Dome-Tech's areas of interest include pharmaceutical industry, healthcare industry, data centers and industrial production facilities that require very precise and reliable designs and applications, and municipal and public projects and complex projects that require complex design and applications.

With its practical and effective solutions, Dome-Tech has created a bright reference list from around the world among the Energy Star class.



An Example Project for Restoring Old Buildings in New York Manhattan 100 Park Avenue

One of the exemplary applications in Dome-Tech's new energy-efficient buildings is the project for SL Green management under the new Flex-Tech Program of the New York State Energy Research and Development Center (NYSERDA). The project was implemented on the buildings at 100 Park Avenue in Manhattan. The study identified 241 problems.

Of the problems, 112 were related to re-commissioning / renovation and 129 were related to pneumatic system. The cost for the solution of these problems was 300.000 USD and the return of the project was 6.8 years.

The aim of the project was to eliminate the causes that negatively affect energy efficiency in buildings with maintenance problems, to define energy saving opportunities (ECO), and was to economically analyze every problem for budgeting and priority.

The problems are classified as optimization of air conditioning control through programming of operation and temperature settings, changing the wiring and programming of the digital control system, adjusting the temperature and humidity sensors, documenting operation and maintenance, and the project has been carried out within this scope.