Winners of the 2016 ENERGY STAR® CHP Award

Announced December 7, 2016

Our 2016 award winners demonstrate how CHP can save money and reduce pollution — a real win-win for the bottom line and the environment. Onsite power generation, like CHP, can also strengthen our nation's electrical infrastructure.

Three of the award-winning CHP systems are located at medical centers where energy efficiency is a key strategy to control the cost of health care. The fourth award-winning system is located at an Army National Guard facility where mission support helicopters are housed and maintained.

- Maine Army National Guard — Bangor, Maine
- South Oaks Hospital — Amityville, New York
- University of Maryland Upper Chesapeake Medical Center — Bel Air, Maryland
- University of Massachusetts Medical School, Worcester Campus — Worcester, Massachusetts

Maine Army National Guard — Bangor, Maine

Charged with the mission of providing rescue, MEDEVAC and security support operations throughout Maine and New England, the Maine Army National Guard operates the Aviation Support Facility (AASF) in Bangor, Maine.

The facility's CHP system, designed by Innovative Construction and Design Solutions, includes a natural gas-fired Aegis Energy Services internal combustion engine generator that produces up to 75 kW of electricity. Heat from the engine--which would otherwise be wasted--is recovered and used to produce hot water to radiantly heat the facility's hangar, maintaining the operational readiness of the aircraft in a region with over 5,000 heating degree days.

With an efficiency of 73 percent, the system requires approximately 32 percent less fuel than would be used by conventional production of electricity and hot water. An estimated 100 tons of carbon dioxide emissions are avoided annually, equal to the emissions from the generation of electricity used by more than 14 homes. A 40 kW photovoltaic panel further reduces energy costs and carbon emissions.

In 2016, Secretary of the Army Eric Fanning issued a challenge for the U.S. Army to commission 50 megawatts of new CHP each year over the next four years. The Army anticipates that the award-winning Bangor system could serve as a model for the approximately 500 Army aviation and ground vehicle support facilities across the U.S. with energy characteristics similar to AASF's.

South Oaks Hospital — Amityville, New York

The award-winning CHP system at South Oaks Hospital, a 400-bed facility in Amityville, New York, includes five natural gas-fired internal combustion engines powering 250 kW synchronous generators supplied by IntelliGen Power Systems. Heat from the engines' exhaust and cooling systems (which would otherwise be wasted) provides space heating and hot water for the hospital, and also powers an absorption chiller to provide air conditioning.

In the aftermath of Hurricane Sandy, when the area lost grid-supplied power for 14 days, the South Oaks CHP system continued to supply electricity during the outage, enabling the hospital to continue normal operations as well as provide emergency services to the nearby community.

With an efficiency of 70 percent, the system requires approximately 29 percent less fuel than would be used by conventional separate electricity and steam production, saving nearly $900,000 annually. An estimated 2,600 tons of carbon dioxide emissions are avoided annually, equal to the emissions from the generation of electricity used by more than 350 homes. A 47 kW solar photovoltaic system further reduces energy costs and emissions.

University of Maryland Upper Chesapeake Medical Center — Bel Air, Maryland

Located in Bel Air, Maryland, the Upper Chesapeake Medical Center (UCMC) serves the local community by annually providing emergency care to 4,200 patients and performing 730 surgical procedures.

UCMC's CHP system–designed by TMR Engineering and owned by CFSG Energy & Structured Finance–includes a 2 MW Caterpillar natural gas-fired internal combustion engine and a 350-ton Broad USA absorption chiller. Heat recovered from the engine—which would otherwise be wasted—provides space heating and hot water, and powers the absorption chiller for air conditioning.

Motivated by the desire to improve patient care, UCMC chose CHP to achieve three goals: decrease operating costs, enable continued operations when grid-supplied electricity is not available, and reduce the facility's carbon footprint.

With an operating efficiency of 75 percent, the system requires approximately 34 percent less fuel than would be used by conventional electricity and steam production, and also avoids emissions of air pollutants, including an estimated 4,700 tons of carbon dioxide annually (equal to the emissions from the generation of electricity used by more than 630 homes). The system saves the University an estimated $300,000 each year. Moreover, generating electricity on site reduces demands on the region's transmission and distribution infrastructure.

University of Massachusetts Medical School, Worcester Campus — Worcester, Massachusetts

Recognizing the importance of highly efficient and resilient energy production, the UMass Medical School (UMMS) relies on CHP to help power its Worcester, Massachusetts campus, which hosts over 7,300 employees and 2,900 visitors daily. This Energy Star CHP Award recognizes UMMS's third and most recent CHP expansion: the addition of a 7.5 MW natural gas-fired Solar Turbines combustion turbine generator, with the assistance of Waldron Engineering & Construction.

With an efficiency of 73 percent, the new CHP unit requires approximately 20 percent less fuel than conventional separate electricity and steam production. The reduced fuel use avoids emissions of more than 21,000 tons of carbon dioxide annually, equal to the emissions from the generation of electricity used by more than 2,800 homes. Moreover, by generating electricity on site, the system strengthens the regional transmission and distribution infrastructure.

The expanded power plant generates up to 90% of the campus's electricity needs. Because the plant's electrical output is responsible for less carbon pollution than grid-supplied electricity, the facility receives substantial payments through Massachusetts' Alternative Portfolio Standard program with the assistance of their representative, Green Harbor Energy. The plant reduces the facility's cost of energy services by approximately $3 million annually.

Winners of the 2015 ENERGY STAR® CHP Award

Announced June 29, 2015

- Bowdoin College, Brunswick, Maine
- Pepco Energy Services, Atlantic City, New Jersey
- Thermal Energy Corporation (TECO), Houston, Texas

Bowdoin College Cogeneration System

Bowdoin College is a distinguished liberal arts college in coastal Brunswick, Maine. Established in 1794, it is praised as a leader in sustainability for taking numerous measures to reduce greenhouse gas emissions. In 2007, Bowdoin President Barry Mills signed the American College and University Presidents' Climate Commitment—a pledge by leaders of 685 colleges and universities to increase sustainability and achieve carbon neutrality at their respective campuses. Bowdoin immediately began working on a strategy to eliminate its carbon footprint. The final plan outlined the college's path forward and included the installation of a CHP system which would not only reduce carbon emissions, but also reduce electricity costs and upgrade Bowdoin's century-old district heating system.

Bowdoin's CHP system–designed by RMF Engineering–includes an oil or natural gas-fired boiler and a 630 kW steam turbine manufactured by Dresser-Rand and Turbosteam. Operational since March 2012, the CHP system produces 630 kW of electricity and steam that provides space heating and hot water to 1.4 million square feet across 56 campus buildings.

With an operating efficiency of nearly 87 percent, the CHP system requires approximately 12 percent less fuel than grid-supplied electricity and conventional steam production. The system also avoids emissions of air pollutants, including an estimated 1,000 tons of carbon dioxide annually, equal to the emissions from the generation of electricity used by nearly 130 homes.

The college reports that the CHP system was smoothly integrated into plant operations, and campus energy managers were able to successfully operate and maintain the equipment with minimal training.

Using CHP, Bowdoin College has improved its energy efficiency, increased the reliability of its electricity supply, and reduced carbon pollution.

Pepco Energy Services (PES)

Pepco Energy Services' (PES) award-winning CHP system supplies chilled water for air conditioning and steam for space heating to Atlantic City's Midtown Thermal Control Center—a district energy system which serves seven casinos and Atlantic City Boardwalk Hall in Atlantic City's Boardwalk tourist district.

The district energy system, which delivers the chilled water and steam via four miles of underground piping, was originally built in 1996. PES acquired it in 2002 and upgraded it in 2012. Their goals for the upgrade were to reduce operating costs (by reducing purchases of expensive grid-supplied electricity and producing steam more efficiently), comply with future environmental regulations, and showcase PES capabilities.

To achieve these goals, PES installed a 5.2 megawatt Solar Taurus 60 gas turbine and a heat recovery steam generator (HRSG). Electricity produced by the turbine powers electric chillers that supply chilled water to the district energy system, while the HRSG recovers heat from the turbine exhaust to produce steam delivered through the district energy system. During the winter, when the system's entire electric output is not needed to run the chillers, the excess electricity is exported to the grid, which is managed to make such exports profitable.

With an operating efficiency of more than 76 percent, the system requires approximately 23 percent less fuel than grid-supplied electricity and conventional steam production. The system also avoids emissions of air pollutants, including an estimated 19,900 tons of carbon dioxide annually, equal to the emissions from the generation of electricity used by more than 2400 homes. Moreover, by generating electricity on site, the system reduces demands on existing transmission and distribution infrastructure.

Thermal Energy Corporation (TECO)

The Texas Medical Center (TMC) comprises the largest concentration of patient care, medical research, and health care education institutions in the world. Thermal Energy Corporation (TECO) operates a CHP district energy system on TMC's campus that delivers chilled water and steam to 45 buildings totaling 19.3 million square feet, through a distribution system of 35 miles of underground piping. As a result, the customers TECO serves in the TMC do not need to operate chillers or boilers in their buildings.

In 2006, the institutions TECO serves in the TMC were anticipating significant growth. TECO's challenge was to increase its capacity so that it could serve the expected expansion. In addition to expanding the system, TECO wanted to improve efficiency, reduce emissions, and strengthen overall system reliability and emergency operating capacity, especially during natural disasters and other crises.

TECO chose to add a CHP system to achieve these goals. The system, designed by Burns & McDonnell, includes a GE LM6000-PD SPRINT gas turbine which generates 48 megawatts of electricity, and a heat recovery steam generator (HRSG) which captures heat from the turbine's exhaust. Steam from the HRSG is piped to customers for domestic hot water, sterilization, food preparation, space heating, dehumidification, and cleaning use.

TECO's customers use electricity from the grid and operate their own emergency generators when needed. And because the individual buildings no longer rely on on-site electric chillers for air conditioning, their required emergency generator capacity can be reduced by as much as 50%.

Because the Texas grid is deregulated and managed to promote independent electricity generation, up to 100% of the 48 megawatts of electricity generated by TECO's CHP system can be exported to the grid during peak demand periods, supporting a sometimes-strained electricity supply. Moreover, the CHP system enables TECO to continue to operate its chillers and deliver chilled water to TMC campus facilities even during periods of peak electricity demand or grid power outages.

The system has improved the reliability of TECO's cooling and heating system while stabilizing operating costs and reducing emissions of carbon dioxide and other air pollutants. With an operating efficiency of 68 percent, the system requires approximately 30 percent less fuel than grid-supplied electricity and conventional steam production. The system also avoids emissions of air pollutants, including an estimated 32,700 tons of carbon dioxide annually, equal to the emissions from the generation of electricity used by more than 4,000 homes.

Winners of the 2014 ENERGY STAR® CHP Award

Announced September 30, 2014

- **Eastman Chemical Company, Tennessee Operations** for its 200 MW CHP system, which includes 17 GE steam turbine generators, at its Kingsport industrial campus—one of the largest chemical manufacturing sites in North America. This facility employs nearly 7,000 people and manufactures chemicals, fibers, and plastics used to produce hundreds of products from wall paint to credit cards.
- **Janssen Research & Development, LLC** for its 3.8 MW CHP system, powered by a Caterpillar lean-burn low-emissions reciprocating natural gas generator set, which is helping the company meet goals to reduce carbon dioxide emissions by 20 percent from 2011 levels and install 50 MW of clean energy generation by 2020.
- **Merck West Point CoGen3 Facility** for its 38 MW CHP system, powered by a GE 6B Heavy-Duty gas turbine, which produces steam to heat, cool, and dehumidify approximately 7 million square feet of manufacturing, laboratory, and office space, and is helping Merck to reduce its greenhouse gas emissions by 15 percent from 2012 levels by 2020.

Eastman Chemical Company, Tennessee Operations

Eastman Chemical Company ("Eastman") is meeting the energy demands of its Kingsport, Tennessee facility by using CHP. At the Kingsport industrial campus—one of the largest chemical manufacturing sites in North America—Eastman manufactures chemicals, fibers, and plastics used to produce hundreds of products, from wall paint to credit cards. Nearly 7,000 people are employed at the site.

Seventeen boilers produce steam to support manufacturing processes, help meet the space heating/cooling needs of 550 buildings, and drive 17 GE and two ABB steam turbine generators with a combined design output of 200 MW.

Industrial facilities typically use boilers to produce high-pressure steam, and then reduce the steam pressure with a series of valves. Instead of valves, Eastman captures the excess pressure with turbine-generators to produce low-cost electricity.

With an operating efficiency of more than 78 percent, the predominantly coal-fired system requires approximately 14 percent less fuel than grid-supplied electricity and conventional steam production. The system also avoids emissions of air pollutants, including an estimated 358,000 tons of carbon dioxide annually, equal to the emissions from the generation of electricity used by more than 44,000 homes. Moreover, by generating electricity on site, the system reduces demands on existing transmission and distribution infrastructure.

The extent of Eastman's CHP use is evidence of the company's commitment to corporate sustainability and its understanding of the environmental, economic, and reliability benefits of CHP. Eastman's Kingsport facility is a noteworthy example of how manufacturers can use CHP to improve industrial energy efficiency, enhance U.S. manufacturing competitiveness, and reduce carbon pollution—while saving Eastman Chemical approximately $45 million per year.

Janssen Research & Development, LLC

Janssen Research & Development, LLC, one of the Janssen Pharmaceutical Companies of Johnson & Johnson, operates a global research facility located in Spring House, Pennsylvania. The company is focused on citizenship and sustainability priorities, which include goals to reduce carbon dioxide emissions by 20 percent from 2011 levels and install 50 MW of clean energy generation by 2020. The CHP system at the Janssen R&D facility is helping to meet these goals.

At the heart of the system is a Caterpillar 3.8 MW lean-burn low-emissions reciprocating natural gas generator set, which can supply 60 percent of the annual power needs for the site. Heat from the engine exhaust and engine block that would otherwise be wasted is used to produce steam and hot water to supply approximately 40 percent of the thermal energy used to support R&D operations and heat, cool, and dehumidify the facility's buildings.

With an operating efficiency of more than 62 percent, the system requires approximately 29 percent less fuel than grid-supplied electricity and conventional steam production. The system also avoids emissions of air pollutants, including an estimated 8,700 tons of carbon dioxide annually, equal to the emissions from the generation of electricity used by more than 1,000 homes. Moreover, by generating electricity on site, the system reduces demands on existing transmission and distribution infrastructure.

Janssen Research and Development's CHP system saves approximately $1.1 million per year and is a noteworthy example of how research companies can use CHP to improve energy efficiency, enhance U.S. manufacturing competitiveness, and reduce carbon pollution.

Merck West Point CoGen3 Facility

Recognizing that climate change could significantly impact global health, Merck & Co.—one of the world's leading research driven healthcare product manufacturers—has committed to reducing its greenhouse gas emissions by 15 percent from 2012 levels by 2020.

In 2001, Merck installed and began operating the CoGen3 CHP system at its West Point facility, a pharmaceutical and vaccine manufacturing, R&D, and warehouse and distribution center that employs more than 8,500 people. The system, designed by Burns & Roe, is powered by a 38 MW GE 6B Heavy-Duty gas turbine and recovers otherwise-wasted heat to produce steam to heat, cool, and dehumidify approximately 7 million square feet of manufacturing, laboratory, and office space. The CoGen3 CHP system is the third CHP system that Merck has installed at the 400-acre West Point, Pennsylvania campus.

With an operating efficiency of more than 75 percent, the natural gas-fired system requires approximately 30 percent less fuel than grid-supplied electricity and conventional steam production. The system also avoids emissions of air pollutants, including an estimated 138,000 tons of carbon dioxide annually, equal to the

emissions from the generation of electricity used by more than 17,000 homes. Moreover, by generating electricity on site and with the capability of supplying excess electricity to the grid, the system reduces demands on existing transmission and distribution infrastructure.

The system increases energy reliability, and significantly reduces operating costs and the facility's environmental footprint. It also provided uninterrupted power and heat when hurricane Sandy threatened the facility's grid-supplied electricity. In addition, the system received the Pennsylvania Governor's Award for Excellence in 2001 for doubling the facility's onsite electric generation capacity without increasing nitrogen oxide emissions.

The CHP system is a noteworthy example of how manufacturers can use CHP to improve industrial energy efficiency, enhance U.S. manufacturing competitiveness and reduce carbon pollution.

Winners of the 2013 ENERGY STAR® CHP Award

Announced in November, 2013

- **Marine Corps Logistics Base Albany** for its 1.9 MW system which utilizes landfill gas to supply electricity to the base and steam to a factory employing 2,000 personnel to repair and rebuild ground combat and ground combat support equipment.
- **National Archives and Records Administration** for its 150 kW system which is a key part of its commitment to meet federal energy efficiency and emissions reduction goals.

Marine Corps Logistics Base Albany Georgia

The Marine Corps Logistics Base Albany's (MCLB Albany's) highly efficient 1.9 MW combined heat and power (CHP) system is central to the base's commitment to achieve energy efficiency and pollution reduction goals, while supporting the U.S. Marine Corps' operational capabilities and saving approximately $1.3 million per year in energy costs.

Installed in 2011, the CHP system has helped the base meet federal energy reduction, renewable energy consumption, and greenhouse (GHG) emission reduction mandates. The Energy Policy Act of 2005 requires that at least 7.5 percent of the total annual electricity used by the federal government come from renewable energy sources, beginning in FY 2013. Executive Order (EO) 13423 and the 2007 Energy Independence and Security Act require federal agencies to reduce the energy intensity of their buildings by 30 percent by FY 2015. And in response to EO 13514, which directed federal agencies to establish GHG emission reduction targets, the Department of Defense set an ambitious goal to reduce its emissions by 34 percent by FY 2020. According to MCLB Albany, the CHP system is fundamental to the base's progress towards exceeding these goals and has put the base on track to becoming the Department of the Navy's first net-zero facility.

By using less fuel than conventional electricity and steam sources, and by using landfill gas that would otherwise be combusted unproductively ("flared"), the system avoids an estimated 10,300 tons per year of carbon pollution, equal to that from the electricity used by more than 1,200 homes.

By recovering otherwise-wasted heat from the engine exhaust, the CHP system also produces steam used by a 2,000-employee re-manufacturing plant where Marine Corps ground combat and combat support equipment is repaired and rebuilt. The CHP system also provides MCLB Albany with enhanced power reliability benefits. In the event of a grid power outage, the CHP system is capable of starting up and operating independently of the electric grid. In addition, in the case of a disruption in the landfill gas supply, the CHP system can quickly switch to natural gas.

The nearby Dougherty County Landfill is the source for the landfill gas that powers the CHP system's internal combustion engine (manufactured by GE's Jenbacher) which generates up to 20% of the base's electric demand. MCLB Albany partnered with Chevron Energy Solutions to develop the CHP system.

According to EPA's Landfill Methane Outreach Program, among the 2,430 currently open or recently closed landfills in the United States, approximately 450 are candidates for energy production with a potential capacity of 850 MW. Of those, more than 20 landfills are promising candidates for supporting CHP systems at federal facilities.

The CHP system is an excellent example of how federal agencies can use Energy Savings Performance Contracts (ESPCs) to partner with energy service companies (ESCOs) to accomplish energy savings projects without up-front capital costs. Through ESPCs, the ESCO typically pays all costs involved in installing energy-efficient equipment. The energy upgrades are paid for by a portion of the cost savings resulting from these

improvements over a set term. At the end of the ESPC, the customer owns all of the improvements and receives all of the continuing savings.

National Archives and Records Administration (NARA)

The National Archives and Records Administration (NARA) operates a highly efficient 150 kW combined heat and power (CHP) system at its National Archives Building, which houses the nation's most significant historical documents, including the U.S. Constitution, the Bill of Rights, and the Declaration of Independence. The CHP system is a key part of NARA's commitment to meeting energy efficiency and emissions reduction goals established by Executive Orders (EO) 13423 and 13514.

With an operating efficiency of 72 percent, the system requires approximately 24 percent less fuel than grid-supplied electricity and hot water from an on-site boiler. The system also prevents emissions of air pollutants, including an estimated 470 tons of carbon pollution annually, equal to that from the generation of electricity used by more than 50 homes.

Two Aegis Energy Services natural gas-fueled internal combustion engines generate electricity used in the building. By recovering otherwise-wasted heat from the engine exhaust, cooling system, and engine block, the system also produces all the hot water needed by the facility, and hot water not needed for conventional uses can help supply the building's dehumidification system. Documents stored and maintained at the facility are vulnerable to moisture, so dehumidification is crucial.

NARA's CHP system—developed under an energy savings performance contract (ESPC) with Ameresco—is an excellent example of how federal agencies can use ESPCs to partner with energy service companies (ESCOs) to accomplish energy savings projects without up-front capital costs. Through an ESPC, the ESCO typically pays all costs associated with installing energy-efficient equipment. During the term of the ESPC, a portion of the annual savings from the project—which are $265,000 in this case—is paid to the ESCO. At the end of the ESPC term—for this project, seven years—the customer owns all of the equipment and receives all of the continuing savings.

Based on the success of the National Archives CHP system, NARA installed a similar system at its facility in College Park, Maryland and plans to install additional CHP systems at other NARA facilities.

Announced in February, 2013

- **Medical Area Total Energy Plant (MATEP) LP** for its 46 MW CHP system which produces electricity, steam and chilled water for the Longwood Medical and Academic Area, home to five hospitals, numerous biomedical and pharmaceutical research centers and Harvard Medical School-affiliated teaching institutions.
- **Montefiore Medical Center** for its 11 MW CHP system which supplies electricity and steam to the Center. During Hurricanes Irene and Sandy, the Medical Center continued to operate and accept patients from other hospitals that were forced to close.
- **NewYork-Presbyterian Hospital/Weill Cornell Medical Center** for its 7.5 MW CHP system which produces electricity and steam for the hospital's operations. The hospital is believed to have been the first in New York City capable of operating independently from the grid in the event of a power outage.
- **New York University (NYU)** for its 12.8 MW CHP system that produces steam and electricity for its campus in lower Manhattan. The system provided uninterrupted electricity, heating, and cooling to the campus during Hurricane Sandy.
- **Texas A&M University** for its 45 MW CHP system which produces electricity, space cooling, space heating, and hot water for its campus in College Station, Texas. The CHP system enabled Texas A&M's facilities to provide emergency housing for people endangered or displaced by Hurricanes Katrina and Rita.

Medical Area Total Energy Plant (MATEP) LP

This award recognizes the Medical Area Total Energy Plant (MATEP) LP for the superior efficiency of its 46 MW CHP system that produces steam, chilled water, and electricity for the Longwood Medical and Academic Area (LMA).

A key driver for the development of the CHP system was to increase energy reliability by decreasing dependence on the local utility—particularly important because of the critically important missions of the medical facilities it serves. The MATEP system is designed to operate and remain fully functioning during a power outage, thus ensuring that critical operations at the hospitals and research centers served by MATEP can continue without interruption in the event of disruption to the local power grid. Located in Boston, Massachusetts, the LMA is home to five hospitals as well as numerous biomedical and pharmaceutical research centers and Harvard Medical School-affiliated teaching institutions. The LMA includes more than 1,800 patient beds and serves 103,000 inpatients and more than 2.4 million outpatients per year.

Two natural gas-fired combustion turbines equipped with heat recovery steam generators power the CHP system, producing up to 360,000 pounds of steam per hour and 24 MW of electricity. The steam is used in steam turbines to generate an additional 22 MW of electricity and also to heat water for space heating and other uses. In addition, several chillers use part of the steam output to produce chilled water for space cooling.

With an operating efficiency of 75 percent, the CHP system requires approximately 24 percent less fuel than supplying electricity from the grid and producing steam with a boiler. The system also prevents emissions of air pollutants, including an estimated 117,500 tons of CO_2 emissions annually, equal to that from the generation of electricity used by more than 13,000 homes.

MATEP is owned by Morgan Stanley Infrastructure Partners and Veolia Energy North America, a partner in EPA's CHP Partnership.

The Partnership also recognizes its Partner Siemens Energy for its contributions to the success of this project.

Montefiore Medical Center

This award recognizes Montefiore Medical Center for the superior efficiency of its CHP system, which produces both electricity and steam for the hospital's operations.

Montefiore's CHP system can provide uninterrupted electricity in the event of a power outage, ensuring that essential medical services and research activities are not affected by loss of grid power. The value of this energy security and reliability proved critical during Hurricanes Irene and Sandy when the Medical Center continued to operate and accept patients from other hospitals that were forced to close.

Founded by philanthropists in 1884 for patients with chronic illness, Montefiore Medical Center is now a teaching hospital with nearly 1,500 patient beds. Montefiore has been recognized for its nationally ranked

medical programs and its commitment to strategic investments in technology. Its CHP system enables Montefiore to provide efficient and reliable energy to approximately 90 percent of its patient areas.

Employing a network of five internal combustion engines and one combustion turbine, Montefiore's CHP system generates up to 11 MW of electricity and produces up to 27,000 pounds of steam per hour utilizing otherwise wasted heat. The steam is used to meet over 95 percent of the Medical Center's thermal energy demands, which include hot water, space heating, and space cooling.

With an operating efficiency of 69 percent, the CHP system requires approximately 26 percent less fuel than supplying electricity from the grid and producing steam with a boiler. The system also prevents emissions of air pollutants, including an estimated 17,900 tons per year of CO_2 emissions, equal to that from the generation of electricity used by more than 2,000 homes. Moreover, by generating electricity on site, the system displaces grid-supplied electricity and reduces demands on New York City's electric power transmission and distribution system.

EPA's CHP Partnership also recognizes its Partner Solar Turbines for its contributions to the success of this project.

NewYork-Presbyterian Hospital/Weill Cornell Medical Center

This award recognizes NewYork-Presbyterian Hospital/Weill Cornell Medical Center for the superior efficiency of its CHP system, which produces both electricity and steam for the hospital's operations.

Motivated by its interest in enhancing the reliability of its electricity supply, reducing its environmental footprint, and lowering operating costs, NewYork-Presbyterian Hospital installed a CHP system at its Weill Cornell Medical Center campus. The system is designed to operate and remain fully functioning during a power outage, ensuring that critical patient care operations at the hospital can continue without interruption. According to the hospital, it was the first in New York City capable of operating independently from the grid.

Founded in 1771 and located on Manhattan's Upper East Side, NewYork-Presbyterian/Weill Cornell Medical Center is an 850-bed teaching hospital.

Using a natural gas-fired combustion turbine and heat recovery steam generator, the CHP system generates up to 7.5 MW of electricity and produces up to 70,000 pounds of steam per hour. The steam is used to provide space heating and hot water for the hospital staff and its patients. The system can supply 100 percent of the electricity needed by the hospital's inpatient areas, mitigating the risk to inpatients from a power outage.

With an operating efficiency of 72 percent, the CHP system requires approximately 27 percent less fuel than supplying electricity from the grid and producing steam with a boiler. The system also prevents emissions of air pollutants, including an estimated 21,500 per year of CO_2, equal to that from the generation of electricity used by more than 2,400 homes. Moreover, by generating electricity on site, the system displaces grid-supplied electricity and reduces demands on existing transmission and distribution infrastructure—while saving the hospital approximately $5 million per year.

EPA's CHP Partnership also recognizes its Partners Dylan Associates, Gotham 360, Luthin Associates, NYSERDA, and Solar Turbines for their contributions to the success of this system.

New York University

This award recognizes New York University (NYU) for the superior efficiency of its CHP system that produces steam and electricity for its Greenwich Village campus in lower Manhattan.

Like a growing number of institutions of higher learning, NYU, a research university with 38,000 students and 12,000 faculty members, developed a Climate Action Plan to reduce the University's GHG emissions and enhance its overall sustainability. In 2010, NYU began operating a CHP system as a cornerstone of that plan.

NYU's CHP system is designed to operate and remain fully functioning during a power outage. The system was tested in 2012 when Hurricane Sandy knocked out power in lower Manhattan for several days. The system not only provided uninterrupted electricity, heating, and cooling to the campus as it was designed to do, but also enabled NYU and New York City officials to set up a command post on the campus as well as serve area residents forced to evacuate their homes in the wake of the storm.

The CHP system includes two combustion turbines, two heat recovery steam generators, and a steam turbine. Together this equipment generates up to 90,000 pounds of steam per hour and 12.8 MW of electricity. The electricity supplies 22 campus buildings. The steam is used to produce hot water distributed to 37 campus buildings to meet 100 percent of their space heating, space cooling, and hot water needs. When campus electrical demand is low, the excess electricity is sold to Con Edison. The system reduces the University's energy costs by over $5 million annually.

With an operating efficiency of nearly 75 percent, the CHP system requires approximately 27 percent less fuel than supplying electricity from the grid and producing steam with a boiler. The system also prevents emissions of air pollutants, including an estimated 43,400 tons per year of CO_2 emissions, equal to that from the electricity used by more than 4,900 homes. Moreover, by generating electricity on site, the system displaces grid-supplied power and reduces demands on existing transmission and distribution infrastructure.

EPA's CHP Partnership also recognizes its Partners Solar Turbines, SourceOne, and Vanderweil Engineers for their contributions to the success of this project.

Texas A&M University

This award recognizes Texas A&M University for the superior energy efficiency of the CHP system serving its campus in College Station, Texas.

Texas A&M's CHP system is designed to operate and remain fully functioning during a power outage, ensuring that critical operations can continue without interruption. The system's ability to operate independently from the grid ensures power reliability for university facilities, including numerous research facilities, dormitories, and a veterinary hospital. Texas A&M's facilities have provided emergency

housing for people endangered or displaced by storms, including Hurricanes Katrina and Rita.

In 2011, the university—which serves over 50,000 students while also supporting faculty, staff, research, and statewide agricultural and engineering extension services—replaced its existing CHP system with a new and more efficient system. In addition to generating up to 45 MW of electricity, the new system produces steam and chilled water that provide the 5,000-acre campus with space cooling, space heating, and hot water. CHP has played a key role in reducing the University's energy consumption by more than 40 percent per square foot over the last 10 years, resulting in nearly $150 million in savings.

With an operating efficiency of 70 percent, the CHP system requires approximately 33 percent less fuel than supplying electricity from the grid and producing steam with a boiler. The system also prevents emissions of air pollutants, including an estimated 99,600 tons per year of CO_2 emissions, equal to that from the generation of electricity used by more than 11,000 homes.

EPA's CHP Partnership also recognizes its Partners GE Energy, Jacobs Engineering, and the U.S. Department of Energy for their contributions to the success of this project.

Winners of the 2012 ENERGY STAR® CHP Award

Marine Corps Air Ground Combat Center, Marine Air Ground Task Force Training Command Twentynine Palms

Located in southern California, the Marine Corps Air Ground Combat Center, Marine Air Ground Task Force Training Command Twentynine Palms (MCAGCC) encompasses more than 998 square miles of high desert. MCAGCC's two-fold mission is to provide live fire arms training prior to overseas deployment, and to provide facilities, services, and support to up to 25,000 civilian staff, military personnel, and their families.

Maintaining successful base operations means ensuring the availability of secure and reliable electricity and thermal energy – a task that is met with the base's highly efficient MCAGCC cogeneration plant. A Solar Turbines combustion turbine generator produces up to 7.5 MW of electricity and, utilizing otherwise-wasted heat from the turbine exhaust, produces hot water that is used to heat and provide domestic hot water to several hundred buildings. Using an absorption chiller, hot water from the CHP system is also used to produce chilled water for building air conditioning.

With an efficiency of over 64 percent, the plant uses 24 percent less fuel than a conventional energy-supply system. Based on this comparison, the CHP system avoids an estimated 21,700 metric tons per year of CO2 emissions, equal to that from the electricity used by more than 2,400 homes. The base reports annual energy costs are reduced by $5.8 million.

Because the base is at the end of an electricity transmission and distribution system that can be interrupted by summer lightning strikes, maintaining a reliable electricity supply is critically important to achieving the base's mission. The CHP system has "black start" capability through a diesel generator linked to the plant. In the case of loss of power the plant can operate in "island mode" — independently from the grid — and supply power to a significant portion of the base. The base is developing a micro-grid which will enable power from the CHP system to be used to support critical base operations in the case of grid power outages.

Base energy managers are developing infrastructure that will enable it to supply electricity to the grid when required by the electric utility to meet peak demands.

The system was developed by Johnson Controls with assistance from Vanderweil Engineers. Johnson Controls is compensated based on system performance, and is responsible for system maintenance and training of the military personnel who operate the system.

Development of highly efficient energy supply systems like the MCAGCC cogeneration plant requires a team effort. And in this case, EPA is pleased to acknowledge the contribution of several collaborating CHPP partners: Johnson Controls, Solar Turbines, and Vanderweil Engineers. Through the implementation of an energy services performance contract, Johnson Controls guarantees a specified level of cost savings for the base while ensuring successful operation of the CHP system.

US Army Garrison, Fort Bragg, North Carolina

A Department of Defense priority is to improve the reliability of the electric power supply to its installations, recognizing the link between energy security and national security. The 82nd Airborne Division Combined Heat and Power Plant at the US Army Garrison, Fort Bragg in North Carolina plays a significant role in achieving this objective.

The CHP system, commissioned in 2004, consumes 18 percent less fuel than a conventional energy supply system producing the same amount of electricity and useful thermal energy. Based on this comparison, the CHP system avoids an estimated 13,600 metric tons per year of CO2 emissions, equal to that from the electricity used by more than 1,500 homes. The system is also reducing the base's energy costs by an estimated $1 million annually.

The system is powered by a combustion turbine-generator which produces up to 5 MW of electricity. Otherwise-wasted heat from the turbine exhaust is recovered and used to produce nearly 27,000 pounds of steam per hour – steam that is used to meet the space heating and domestic hot water needs of more than 10,000 soldiers, their families, and civilian base employees in 67 buildings across the base. Using an absorption chiller, the turbine exhaust also provides chilled water used for building air conditioning.

As part of a plan to improve the energy security of the base, the system output can be used to support continued critical base operations in the event of disruptions in the local electricity supply.

Development of highly-efficient energy supply systems like the 82nd Airborne Division Combined Heat and Power Plant typically requires the concerted efforts of a team. And in this case, EPA is pleased to acknowledge the contribution of several collaborating CHPP partners: the Department of Energy, Broad U.S.A., Honeywell, the North Carolina Solar Center, Solar Turbines, and Vanderweil Engineers. Through the implementation of an energy services performance contract, Honeywell guarantees a specified level of cost savings for the base while ensuring successful operation of the CHP system.

Winners of the 2011 ENERGY STAR® CHP Award

Cornell University
Cornell University set a goal of reducing its CO_2 emissions to 20-30% below its 1990 levels by 2012. The university's most recent step to improve its energy infrastructure and reduce CO_2 emissions was the addition of 30 MW of new CHP capacity in 2009.

Two new Solar combustion turbine/generators along with two existing backpressure steam turbines provide the university's 31,000 faculty, staff and students with up to 37 MW of electricity. Additional electricity is generated by a small 1904-vintage hydroelectric plant re-built in 1981. Three boilers and two exceptionally efficient heat recovery systems can produce 580,000 pounds per hour of steam to satisfy the demand of campus operations. The combined effect of the new CHP system and energy modernization activities will allow Cornell University to retire two coal boilers in 2011. These units previously burned 65,000 tons of coal each year.

With an operating efficiency of nearly 79 percent, the CHP system requires approximately 29 percent less fuel than a typical energy-supply system. Based on this comparison, the CHP system prevents an estimated 89,300 tons per year of CO_2 emissions, equivalent to the emissions from more than 15,400 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project with a 2011 ENERGY STAR® CHP Award.

Dominion Transmission — Crayne Station

Dominion Transmission is an interstate gas transmission company and operates one of the largest underground natural gas storage and transmission systems in the United States. This gas transmission network includes approximately 7,800 miles of pipeline in six states—Ohio, Maryland, New York, Pennsylvania, Virginia, and West Virginia. Some of Dominion's gas compression sites are located far from the electrical grid, or in areas that have limited availability of grid-supplied power, and microturbine/generators have been used to provide a reliable power supply.

Capable of functioning in remote locations, adhering to emissions standards, ensuring power reliability and reducing maintenance costs, CHP has been the answer to the varying operational obstacles Dominion faces at some of its gas compressor stations. The Crayne Compressor Station CHP system located in Waynesburg, Pennsylvania is a great example. Since 2004, three microturbines have been generating up to 195 kW of electricity—enough power to meet 100 percent of the station's electricity demand. The turbines that power the station's gas compressors are fueled with gas from the pipeline. Heat from the CHP system is used to warm raw gas chilled during the decompression process when it is taken from the pipeline.

With an operating efficiency of almost 73 percent, the CHP system requires approximately 25 percent less fuel than a typical system with similar output and prevents an estimated 440 tons of CO_2 emissions annually, equivalent to the emissions of approximately 80 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project with a 2011 ENERGY STAR CHP Award.

KPMG LLP

KPMG LLP may serve one-fifth of the Fortune 1,000 companies as clients, but that does not mean it is too busy providing audit, tax and advisory services to recognize the importance of energy efficiency, reliable power and the benefits of CHP. Late in 2007, KPMG launched its Living Green program to reduce the firm's consumption of natural resources and its carbon footprint. In the first three years of the program, KPMG reports it met its goals and reduced its carbon emissions by 22 percent. The CHP system located at the firm's administrative headquarters in Montvale, New Jersey is a key factor in that success.

Powered by over a dozen Capstone microturbines provided by UTC Power, the CHP system generates up to 720 kW of electricity—nearly 50 percent of the power needed by the data center located at the site. Using otherwise-wasted heat from the microturbine exhaust, the CHP system also produces chilled water used to cool the data center and keep the servers operating within specified temperature limits.

With an operating efficiency of 68 percent, the CHP system requires approximately 22 percent less fuel than a conventional energy supply system with similar output and prevents an estimated 2,200 tons of CO_2 emissions annually, equivalent to the emissions of 400 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project with a 2011 ENERGY STAR CHP Award.

National Institutes of Health

How do you meet the escalating energy needs of one of the world's largest medical research facilities that is growing, constrained for space, under pressure to minimize air pollution and challenged by a tight construction budget? The National Institutes of Health (NIH) answered that question in 2002 when it began operation of a natural gas- fired CHP system.

Located near the center of its 75-building, 300-acre main campus in Bethesda, Maryland, the CHP system — designed and developed by PEPCO Energy Services — generates up to 23 MW of electricity for the local grid. By using otherwise-wasted heat from the exhaust of the combustion turbine, it also produces up to 180,000 pounds per hour of steam that is used to provide space heating, space cooling and to support laboratory operations.

With an operating efficiency of 76 percent, the CHP system requires approximately 31 percent less fuel than a typical energy-supply system. Based on this comparison, the CHP system prevents an estimated 51,400 tons of CO_2 emissions annually, equivalent to the emissions of more than 8,900 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting the National Institutes of Health with a 2011 ENERGY STAR® CHP Award.

The University of Cincinnati

The University of Cincinnati greatly benefits from the reliability, environmental performance, and cost savings of

its 46 MW natural gas-fired CHP system. Powered by two combustion turbines produced by Solar Turbines, the system provides electricity and steam to the campus to support the University's faculty, six hospitals and over 35,000 students. According to the University, a key objective of the project was to improve the reliability of the power supply to support medical and other research. In addition to reducing the University's dependence on grid-supplied electricity, the turbines can also run on fuel oil in case of an unforeseen interruption in the natural gas supply.

While satisfying almost 50 percent of the campus electricity demand, the system saves the University an estimated $4 million each year by recovering the otherwise-wasted heat from the turbine exhaust and producing steam. During cooler months, the steam is used for space heating. When building cooling is required, the steam is utilized to produce additional electricity that makes chilled water to cool campus facilities. At night, when less cooling is required, the chilled water produced by the CHP system is stored in a 3.5-million-gallon underground storage tank. The chilled water is then pumped to buildings across campus during the day to meet cooling demands and reduce operating costs.

With an operating efficiency of 73 percent, the system requires approximately 32 percent less fuel than a conventional system with similar output and prevents an estimated 105,000 tons of CO_2 emissions annually, equivalent to the emissions of more than 18,900 passenger vehicles.

The EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project with a 2011 ENERGY STAR CHP Award.

University of Massachusetts Amherst
In December 2008, the University of Massachusetts Amherst began operation of a 14 MW CHP system. The system represents a major milestone for the university and is part of a multi-year initiative to reduce fuel consumption and minimize its environmental footprint. Activities ranging from the replacement of old light fixtures to the $133 million investment in the CHP system are the reason the university has reduced overall energy consumption by 21 percent since 2004.

A 10 MW Solar combustion turbine, a heat recovery steam generator, a 4 MW steam turbine and three natural gas-fired boilers replace the university's nearly 80 year-old coal-fired boilers. The CHP system produces nearly all of the electric and steam demand for a campus comprising over 200 buildings and nearly 10 million gross square feet of building space. Interestingly, a unique and environmentally progressive characteristic of the system has little to do with energy conservation; 160,000 gallons of treated effluent per day from the local wastewater treatment plant is used to generate steam. The effluent replaces the drinking water that would typically be used by such systems.

With an operating efficiency of nearly 75 percent, the CHP system requires approximately 18 percent less fuel than the separate production of thermal energy and electricity. Based on this comparison, the CHP system prevents an estimated 26,600 tons per year of CO_2 emissions, equivalent to the emissions from more than 4,600 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project with a 2011 ENERGY STAR® CHP Award.

Winners of the 2010 ENERGY STAR® CHP Award

Port Arthur Steam Energy
(Awarded on November 2, 2010, at 2010 CHP Partners Meeting)
Numerous government agencies (including EPA and DOE) and private companies agree that the recovery and use of industrial waste energy represents a massive energy savings and efficiency opportunity in the U.S. Port Arthur Steam Energy (PASE) is a great example of how that opportunity can be realized.

The PASE system produces electricity and steam using otherwise-wasted heat from a coke production facility owned by Oxbow Corporation. The Oxbow plant began operations in 1935 and has the capacity to produce 700,000 short tons per year of calcined petroleum coke, which is used primarily in aluminum production.

2000 °F flue gas exhausts from Oxbow's three large coke-production kilns. While similar processes at other industrial sites typically ignore the tremendous energy value of that exhaust, PASE captures and uses the heat in the flue gas to produce up to 450,000 pounds per hour of high-pressure steam. Most of the steam is routed to a neighboring petroleum refinery and used for crude oil processing with the remainder used on site to produce up to 5 MW of electricity.

The CHP system displaces 100% of the fuel that would be used by typical on-site thermal generation and purchased electricity. Consequently, the CHP system effectively reduces CO_2 emissions by more than 159,000 tons per year. This reduction is equivalent to the annual emissions from more than 27,000 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting **Port Arthur Steam Energy LP** with a 2010 ENERGY STAR CHP Award.

Gainesville Regional Utilities South Energy Center
(Awarded on November 2, 2010, at 2010 CHP Partners Meeting)
The Shands Cancer Hospital–a new hospital campus adjacent to the existing Shands Hospital at the University of Florida–opened its doors in November 2009. The 500,000 square foot facility houses approximately 190 patient beds and includes a critical care center for emergency and trauma services. To ensure uninterrupted treatment for its patients and to meet energy-efficiency goals, Shands Healthcare and Gainesville Regional Utilities partnered to develop and operate a CHP system that provides 100 percent of the electricity and other energy used by the hospital.

Designed by Burns and McDonnell, the CHP system generates up to 4.3 MW of electricity using a natural gas-fired turbine manufactured by Solar Turbines. Otherwise- wasted heat from the turbine exhaust produces steam used for space heating, space cooling and dehumidification. Because reliability is of foremost importance in an emergency-care facility, the CHP system is housed in a protective structure designed to withstand the 100 mile-per-hour winds of a Category 3 or 4 hurricane.

With an operating efficiency of more than 60 percent, the CHP system requires nearly 25 percent less fuel than a typical energy-supply system. As a result, the CHP system effectively reduces CO_2 emissions by more than 10,500 tons per year. This reduction is equivalent to the annual emissions from more than 1,800 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting the **Gainesville Regional Utilities** with a 2010 ENERGY STAR CHP Award.

Landis Sewerage Authority Combined Heat and Power Project
(Awarded on November 2, 2010, at 2010 CHP Partners Meeting)

Landis Sewerage Authority (LSA) has taken a diverse approach toward implementing its goal of becoming one of the most environmentally-friendly wastewater treatment plants in the state of New Jersey. With the objective of achieving a near-zero carbon footprint and optimizing the recycling and reuse of byproducts from the treatment process, LSA uses treated biosolids to fertilize 550 acres of corn, hay, straw and southern yellow pine trees, and operates a windmill, solar array and CHP system to generate electricity for the facility.

A portion of the biogas produced by a wastewater treatment plant's anaerobic digester is typically used to heat water for use on site. The remainder is flared and goes unused. LSA realized this traditional approach presented an opportunity for increased energy savings and instead utilizes the otherwise-wasted biogas to fuel a 170 kW CHP system. In addition, heat produced by the system's internal combustion engine is captured and used to produce hot water for facility space heating and to warm the anaerobic digester. Biogas and electricity production are maximized by a digestion-enhancing natural peat extract from Prodex.

The CHP system requires approximately 34 percent less fuel than would be used by a typical energy supply system. Consequently the CHP system effectively reduces CO_2 emissions by more than 800 tons per year. This reduction is equivalent to the annual emissions from more than 140 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting the **Landis Sewerage Authority** with a 2010 ENERGY STAR CHP Award.

Eastern Maine Medical Center—Combined Heat and Power
(Awarded on November 2, 2010, at 2010 CHP Partners Meeting)
Eastern Maine Medical Center (EMMC) is located in Bangor, Maine and houses over 400 patient beds attended by more than 300 physicians. The institution's accolades signify its dedication to exceptional and reliable healthcare services. EMMC received the 2008 Davies Organizational Award for its use of information technology to enhance patient care, safety and quality.

In 1998, a devastating ice storm in the region damaged local infrastructure and caused many homes and businesses to be without power for several weeks. After EMMC lost dependable power for 16 hours during this period, management realized the necessity of critical power reliability. The solution came in 2006, when the hospital began operation of a natural gas-fired CHP system powered by a turbine manufactured by Solar Turbines. Generating up to 4.4 MW of electricity and 25,000 pounds per hour of steam for building climate control and hot water, the CHP system provides over 90% of the hospital's electricity and steam.

With an operating efficiency of approximately 70 percent, the CHP system requires over 25 percent less fuel than would be required to generate purchased electricity and to produce steam on site. Therefore, the CHP system effectively reduces CO_2 emissions by more than 10,000 tons per year. This reduction is equivalent to the annual emissions from more than 1,800 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting the **Eastern Maine Medical Center** with a 2010 ENERGY STAR CHP Award.

Fairfield University CHP Plant
(Awarded on November 2, 2010, at 2010 CHP Partners Meeting)
Fairfield University in Fairfield, Connecticut, joined the ranks of institutes of higher learning that produce their own heat and power because of mounting concerns over rising energy costs and a congested utility grid. In December 2007, the University began operating a CHP system that generates nearly 95 percent of the power needed by the campus and produces up to 66 percent of the school's high temperature hot water heating and cooling supply. The recovery and utilization of otherwise wasted heat from the 4.6 MW Solar Turbine has led to estimated annual savings of $2.2 million.

With an operating efficiency of approximately 55 percent, the CHP system requires approximately 22 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system effectively reduces CO_2 emissions by an estimated 7,400 tons per year. This reduction is equivalent to the annual emissions from more than 1,200 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting **Fairfield University** with a 2010 ENERGY STAR CHP Award.

University of California San Diego CHP System
(Awarded on October 21, 2010, at the University)
Over 50,000 faculty, staff and students utilize the 1,200 acres and 11 gross million square feet of the University of California San Diego campus. To meet the corresponding electrical and thermal demands, the university began operating a natural gas fired CHP system in 2001. With two Solar Turbines combustion turbines at its core and otherwise wasted heat recovered for use, the CHP system generates nearly 30 MW of electricity and produces 140 MMBtu/hr of steam that meets 95 percent of the campus thermal needs. The impressively low NO_x emissions are one of the most remarkable features of the CHP system.

With an operating efficiency of approximately 66 percent, the CHP system requires approximately 26 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system effectively reduces CO_2 emissions by an estimated 82,500 tons per year. This reduction is equivalent to the annual emissions from more than 13,700 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting the **University of California, San Diego** with a 2010 ENERGY STAR CHP Award.

University of Missouri CHP Plant
(Awarded on June 15, 2010 at 2010 IDEA Annual Conference)
The University of Missouri has produced energy using CHP in one form or another for its Columbia campus since 1892. Six boilers, four steam turbine generators, and two combustion turbine generators with heat recovery boilers comprise the university's current CHP system and have the aggregate capacity to fully satisfy campus energy needs. This network of equipment produces up to 66 MW of electricity and over 1.1 million pounds of steam per hour to supply a daily population of over 40,000 people in 13 million square feet of campus facilities, including three hospitals, a research reactor and numerous research facilities. As part of the university's energy management and conservation program, otherwise wasted heat from the turbines is recovered to reduce fuel consumption, air emissions and energy costs.

With an operating efficiency of approximately 76 percent, the CHP system requires approximately 38 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system effectively reduces CO_2 emissions by an estimated 107,000 tons per year. This reduction is equivalent to the annual emissions from more than 17,900 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting the **University of Missouri** with a 2010 ENERGY STAR CHP Award.

Winners of the 2009 ENERGY STAR® CHP Award

Bridgewater Correctional Complex Cogeneration Plant
(Awarded ENERGY STAR CHP Award October 1, 2009, at 2009 CHP Partners Meeting)
The Bridgewater Correctional complex consists of 785,000 square feet of living and working space on 14,900 acres. In 2006, the Commonwealth of Massachusetts Department of Correction began operating a 1,500 kW CHP system to support those facilities and an inmate population of over 2000 people.

The CHP system utilizes a Kawasaki natural gas-fired combustion turbine to generate nearly 80 percent of the complex's annual electricity demand. Equipped with Kawasaki XONON combustors, the NO_X emissions from the turbine are low enough to meet NO_X emission requirements without the need for add-on pollution controls.

Otherwise wasted heat is recovered from the turbine exhaust and used to produce steam to support the daily heating, cooking, cleaning, and domestic hot water needs of the complex. Operation of the CHP system also allowed the Department of Correction to shut down an old and more-polluting diesel engine generator.

With an operating efficiency of approximately 67 percent, the CHP system requires approximately 17 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system effectively reduces CO_2 emissions by an estimated 3,600 tons per year. This reduction is equivalent to the annual emissions from 600 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting the **Commonwealth of Massachusetts Department of Correction** with a 2009 ENERGY STAR CHP Award.

Carville Energy Center
(Awarded ENERGY STAR CHP Award October 1, 2009, at 2009 CHP Partners Meeting)
Calpine's Carville Energy Center (CEC) in St. Gabriel, Louisiana has the capacity to generate up to 449 MW of electricity that is supplied to local wholesale power markets. That is enough power to meet the daily needs of approximately 205,000 residential households.

As a CHP system with two GE Energy natural-gas fired combustion turbines, the CEC recovers the waste heat and produces up to 410,000 pounds of high pressure steam per hour that is used in the production of styrene and polystyrene at an adjacent plastics manufacturing plant.

With an operating efficiency of approximately 57 percent, the CHP system requires approximately 31 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system effectively reduces CO_2 emissions by an estimated 733,000 tons per year. This reduction is equivalent to the annual emissions from more than 121,000 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting **Calpine Corporation** with a 2009 ENERGY STAR CHP Award.

Patterson Farms CHP System
(Awarded ENERGY STAR CHP Award October 1, 2009, at 2009 CHP Partners Meeting)
Patterson Farms, a sixth generation family-owned and operated business since 1830, has 1,000 dairy cows and young stock on 2,400 acres in Auburn near Cayuga Lake in upstate New York. In 2005, a first CHP system was installed to generate electricity and heat for the farm while addressing an odor problem that had arisen from the use of an on-site manure lagoon.

This CHP system generates up to 200 kW of electricity from the combustion of biogas in a Caterpillar internal combustion engine. The biogas is produced from an anaerobic digester that processes nearly 50,000 gallons per day of manure waste from the dairy cows and 15,000 gallons per day of food waste from a cream cheese production facility. Hot water produced by capturing the otherwise wasted heat from the engine block is used to maintain the digester temperature. Excess power generated by the CHP system is sold to the local utility grid due to the state's net metering provisions.

With an operating efficiency of approximately 58 percent, the CHP system requires approximately 6 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system effectively reduces $_{CO2}$ emissions by an estimated 340 tons per year. This reduction is equivalent to the annual emissions from 57 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting the **Patterson Farms** with a 2009 ENERGY STAR CHP Award.

717 5th Avenue Cogeneration Plant
(Awarded ENERGY STAR CHP Award October 1, 2009, at 2009 CHP Partners Meeting)
Located in the Plaza District of New York City, the 717 5th Avenue building contains 450,000 square feet of Class-A office space owned and leased by Equity Office Properties. More than 60 percent of the building's electrical and thermal demands are met using 1.6 MW CHP system centered on a Caterpillar internal combustion engine. Supported by a grant from NYSERDA and operated by Endurant Energy, the natural gas-fired CHP system is the first of its kind to be synchronously interconnected to the midtown utility grid.

With an operating efficiency of approximately 77 percent, the CHP system requires approximately 33 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system effectively reduces CO_2 emissions by an estimated 1,200 tons per year. This reduction is equivalent to the annual emissions from 204 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting the **Equity Office Properties** with a 2009 ENERGY STAR CHP Award.

Consolidated Edison East River Repowering Project
(Awarded ENERGY STAR CHP Award June 29, 2009, at the Annual IDEA Conference)
Powered by two natural gas-fired combustion turbine generators and innovatively constructed within an existing structure, Consolidated Edison's East River Generating Station in New York City, New York is a CHP system that produces 360 MW of electricity and 3.2 million pounds of steam per hour. Con Edison operates the largest district steam system in the country. The system is a key component of the infrastructure of New York City. The steam generated helps to displace peak electricity demand on the grid in Manhattan. District steam, which is produced using otherwise wasted heat from the turbine exhaust, is supplied through 105 miles of underground piping to support both the daily steam heating and cooling needs of approximately 1,800 buildings in New York City. With an operating efficiency of nearly 80 percent, the CHP system requires approximately 34 percent less fuel than typical onsite thermal generation and purchased electricity. The CHP system effectively reduces CO_2 emissions by an estimated 900,000 tons per year. This reduction is equivalent to 185,000 acres of pine or fir forests storing carbon for one year or the annual emissions from 150,000 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting **Consolidated Edison Company of New York** with a 2009 ENERGY STAR CHP Award.

Duquesne University Energy Center
(Awarded ENERGY STAR CHP Award June 29, 2009, at the Annual IDEA Conference)

Powered by a natural gas-fired combustion turbine, Duquesne University's CHP system produces 4.75 MW of electricity and 19,000 pounds of steam per hour. It is the State of Pennsylvania's first approved distributed generation system for creating Alternative Energy Credits (AECs). The University meets all its electricity demand either with output from the CHP system or by purchasing from the local grid with Renewable Energy Credits offsets. With an operating efficiency of approximately 64 percent, the CHP system requires approximately 17 percent less fuel than typical onsite thermal generation and purchased electricity. The CHP system effectively reduces CO_2 emissions by an estimated 10,200 tons per year. This reduction is equivalent to 2,100 acres of pine or fir forests storing carbon for one year or the annual emissions from 1,700 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting **Duquesne University** with a 2009 ENERGY STAR CHP Award.

Missouri Joint Municipal Electric Utility Commission (MJMEUC)
Cogeneration System (Awarded ENERGY STAR CHP Award April 6, 2009)
In September 2006, an ethanol plant in Laddonia, MO began full production. The plant is owned and operated by POET Biorefining – Laddonia; an entity formed by East Central Ag Products, North East Missouri Grain and POET. Each year, the plant processes about 16 million bushels of corn and produces nearly 50 million gallons of ethanol. The ethanol plant also produces Dakota Gold brand livestock feed for regional, national and international markets.

In order to increase energy efficiency and improve the economic viability of the ethanol plant, the Laddonia facility includes a natural gas-fired combined heat and power (CHP) system. Designed and developed by Shaefer, Kline and Warren Inc., and centered on a Solar Turbines combustion turbine, the CHP system generates up to 13 MW of electricity for the Missouri Public Energy Pool. Otherwise wasted heat is recovered from the turbine exhaust and used to produce up to 63,000 pounds of steam per hour to support ethanol production.

With an operating efficiency of approximately 67 percent, the CHP system requires approximately 26 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO_2 emissions by an estimated 31,000 tons per year. This reduction is equivalent to 6,400 acres of pine or fir forests storing carbon for one year or the annual emissions from 5,200 passenger vehicles.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting the **Missouri Joint Municipal Electric Utility Commission (MJMEUC)** with a 2009 ENERGY STAR CHP Award.

Winners of the 2008 ENERGY STAR® CHP Award

One Market Plaza Cogeneration System
(Awarded ENERGY STAR CHP Award December 11, 2008)
One Market Plaza in San Francisco, CA is a Class-A office complex with approximately 1.4 million square feet of commercial space. Approximately 30 percent of the complex's electricity demand is generated by a 1.5 MW internal combustion engine-based CHP system. At its time of installation in 2004, the system was one of the largest interconnected systems in the U.S. and the first onsite generator permitted by the local utility. Otherwise wasted heat from the CHP system's engine block and exhaust is recovered and used to produce steam that satisfies nearly 85 percent of the complex's space heating demand.

With an operating efficiency of approximately 65 percent, the CHP system requires approximately 24 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO_2 emissions by an estimated 1,440 tons per year. This reduction is equivalent to removing the annual emissions from 240 cars or planting nearly 300 acres of forest.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting **PPF Paramount One Market Plaza Owner, L.P.** with a 2008 ENERGY STAR CHP Award.

East Kansas Agri-Energy CHP System
(Awarded ENERGY STAR CHP Award June 17, 2008)
In 2005, the East Kansas Agri-Energy dry mill ethanol plant set an industry record when construction was completed in only 18 months. In addition to this noteworthy accomplishment, the plant also includes a CHP system designed and developed by ICM, which transforms a requirement to control air pollution into an opportunity to address the plant's energy demands.

The plant's air pollution permit requires that emissions of volatile organic compounds and carbon monoxide from the plant be destroyed using a thermal oxidizer. Instead of venting the otherwise waste heat generated to ultimately satisfy this regulatory requirement, the plant recovers the heat from the oxidizer exhaust and produces steam. This steam is used to meet the steam demand of the ethanol production process. Excess steam is sent to a steam turbine that generates up to 1 MW of electricity and reduces the plant's dependence on the local grid.
And the ingenuity doesn't stop there. The plant achieves additional fuel and emission reductions because the thermal oxidizer is partially fueled by biogas - a renewable fuel. The biogas is produced by an anaerobic digester that removes unwanted organic acids from the plant's recycled water streams. This ICM design configuration also reduces the magnitude of the plant's wastewater discharge.

With an operating efficiency of approximately 82 percent, the CHP system requires approximately 23 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO_2 emissions by an estimated 14,500 tons per year. This reduction is equivalent to removing the annual emissions from 2,400 cars or planting 3,000 acres of forest.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting **East Kansas Agri-Energy LLC** with a 2008 ENERGY STAR CHP Award.

Doug Sommer (right), Plant General Manager of East Kansas Agri-Energy LLC receives an ENERGY STAR CHP Award from Beverly Houston Banister (left) of EPA's Air Pesticides and Toxics Management Division

POET Biorefining Ashton CHP System
(Awarded ENERGY STAR CHP Award June 17, 2008)

In April 2004, POET began full production at an ethanol plant in Ashton, IA. The plant currently processes about 16 million bushels of corn and produces nearly 56 million gallons of ethanol each year. The plant was POET's eighteenth ethanol plant at the time and its second plant equipped with CHP. Up to 7.2 MW of electricity is generated by a natural gas-fired Solar turbine to reduce the plant's dependence on the local grid. Heat recovered from the turbine's exhaust produces 56,000 pounds of steam per hour to support ethanol production.

With an operating efficiency of approximately 69 percent, the CHP system requires approximately 16 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO_2 emissions by an estimated 18,900 tons per year. This reduction is equivalent to removing the annual emissions from 3,100 cars and planting 3,900 acres of forest.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting **POET Biorefining** with a 2008 ENERGY STAR CHP Award.

Jeff Broin (right), CEO, POET and Dean VanRiesen, Plant General Manager of POET Biorefining receive an ENERGY STAR CHP Award from Beverly Houston Banister (left) of EPA's Air Pesticides and Toxics Management Division

Clinton Hill Apartments CHP System
(Awarded ENERGY STAR CHP Award June 10, 2008)
The Clinton Hill Apartments of Brooklyn, New York consist of twelve, medium-rise buildings that offer living space for a diverse resident population. The buildings were originally constructed in 1946 to provide housing for the workforce of the old Brooklyn Navy Yard. In 2006, the apartment complex became a home to a natural gas-fired CHP system. Principally funded by the New York State Energy Research and Development Authority and Clean Air Communities, manufactured by UTC Power and Capstone Turbine Corporation, the system generates up to 600 kW of electricity using 13 microturbines. Otherwise wasted heat from the microturbine exhaust is recovered and used to produce domestic hot water for 700 apartment units. Operation of the system allows Clinton Hill Apartments to shut down four, old, residual fuel oil-fired boilers during summer months when local air pollution is worst.

With an operating efficiency of approximately 82 percent, the CHP system requires approximately 23 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO_2 emissions by an estimated 1,680 tons per year. This reduction is equivalent to removing the annual emissions from 280 cars or planting nearly 350 acres of forest.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting **Clinton Hill Apartment Owners Corporation** with a 2008 ENERGY STAR CHP Award.

Mr. John Dew (third from right), Board President of Clinton Hill Apartments Owners Corporation, receives an ENERGY STAR CHP Award from Felicia Ruiz (left) of EPA's CHP Partnership

Red Hook Fairway Market CHP system
(Awarded ENERGY STAR CHP Award June 10, 2008)
In 2004, major renovations to an abandoned, pre-civil war warehouse at 480 Van Brunt Street in Brooklyn, New York were completed. Overlooking the New York City harbor, the revitalized structure contains a Fairway Supermarket and a mix of studios, offices and residences. The project was part of an aggressive economic development and urban renewal effort and was coupled with an energy conservation project - the installation of an efficient CHP system. Fueled by natural gas, the CHP system is centered on four modular Coast Intelligen internal combustion engines that generate up to a total of 950 kW of electricity. Recovered heat from the

engine block and exhaust is used to produce domestic hot water and provide space heating and cooling for the residents and guests of the Red Hook Fairway building.

With an operating efficiency of approximately 78 percent, the CHP system requires approximately 29 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO_2 emissions by an estimated 2,740 tons per year. This reduction is equivalent to removing the annual emissions from nearly 460 cars or planting nearly 570 acres of forest.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting **Red Hook Green Power, LLC** with a 2008 ENERGY STAR CHP Award.

Mr. Gregg O'Connell (third from right), Manager of Red Hook Fairway, receives an ENERGY STAR CHP Award from Felicia Ruiz (second from right) of EPA's CHP Partnership

Columbia Energy Center
(Awarded ENERGY STAR CHP Award June 5, 2008)
Powered by two General Electric natural gas-fired combustion turbines and a Toshiba steam turbine, Calpine's Columbia Energy Center in Gaston, South Carolina is a natural gas-fired CHP system, producing up to 500 MW of electricity - all of which is delivered to the local utility grid. Recovered heat from the turbines' exhaust is used to produce up to one million pounds of steam per hour that is utilized by an adjacent Eastman Chemical plant for the manufacture of thermoplastic polymer resins. The production and use of this steam has allowed the chemical plant to retire several old coal-fired boilers.

With an operating efficiency of approximately 54 percent, the CHP system requires approximately 31 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO_2 emissions by an estimated 142,000 tons per year. This reduction is equivalent to avoiding the annual emissions from 23,600 cars or planting 29,400 acres of forest.

EPA is proud to recognize the significant pollution reduction and energy efficiency qualities of this project by presenting **Calpine Corporation** with a 2008 ENERGY STAR CHP Award.

Dave Arthur (right), Director of Federal Affairs for the Calpine Corporation, receives an ENERGY STAR CHP Award from Brian McLean (left), Director of the U.S. EPA's Office of Atmospheric Programs

Verizon Garden City Fuel Cell Project
(Awarded ENERGY STAR CHP Award June 5, 2008)

The Verizon call routing center in Garden City, New York, is home to the largest U.S. commercial fuel cell installation of its kind. Designed by Keyspan Energy, the CHP system produces up to 1.4 MW of electricity, operates in parallel with the grid under normal circumstances, and serves as back-up in the event of a grid power failure or natural disaster. Hot water from seven natural gas-fired UTC Power fuel cells is recovered and utilized for space cooling and heating of the 292,000-square foot office that serves more than 35,000 telecommunication customers in the area.

With an operating efficiency of approximately 57 percent, the CHP system requires approximately 24 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO_2 emissions by an estimated 3,900 tons per year. This reduction is equivalent to removing the annual emissions from 650 cars or planting 810 acres of forest.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting **Verizon Communications** with a 2008 ENERGY STAR CHP Award.

Tom Donnelly (right), Team Leader of Verizon Corporate Real Estate, receives an ENERGY STAR CHP Award from Brian McLean (left), Director of the U.S. EPA's Office of Atmospheric Programs

Formosa Plastics Corporation - Louisiana CHP System
(Awarded ENERGY STAR CHP Award June 2, 2008)
Polyvinyl chloride (PVC) was one of the first polymers discovered and is widely used to produce a variety of building construction materials. The Formosa Plastics Corporation is a major U.S. manufacturer of both finished PVC resin and plastic intermediates. In a demonstration of its commitment to the concept that increasing energy efficiency protects the environment and improves profitability, the Formosa Plastics plant in Baton Rouge, Louisiana operates a combined-cycle CHP system. Fueled by natural gas, the CHP system has the capacity to produce up to 134 MW of electricity and 680,000 pounds of steam per hour to support its plastic manufacturing processes. Although not primarily operated for power export, approximately 4 MW of electricity is generally supplied to the local electric grid to optimize the facility's energy balance.

With an operating efficiency of approximately 71 percent, the CHP system requires approximately 26 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO_2 emissions by an estimated 143,300 tons per year. This reduction is equivalent to removing the annual emissions from 23,800 cars or planting 29,600 acres of forest.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting **Formosa Plastics Corporation** with a 2008 ENERGY STAR CHP Award.

Westfield YMCA CHP system
(Awarded ENERGY STAR CHP Award May 16, 2008)
The YMCA in Westfield, NJ supports the local community by providing active, healthy and educational programs and activities for children. Whether those children are enjoying aquatic activities, washing their hands after a full day or arts and crafts or staying warm during a cold winter day, they are unknowingly benefiting from CHP. Owned by American DG NY, LLC and based on a Tecogen natural-gas fired internal combustion engine, the CHP system produces up to 140 kW of electricity for the YMCA. Otherwise wasted heat from the exhaust and engine block is recovered and used to produce hot water that supplies heat for space heating, domestic hot water and the facility's multiple swimming pools.

With an operating efficiency of approximately 65 percent, the CHP system requires approximately 21 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO_2 emissions by an estimated 255 tons per year. This reduction is equivalent to removing the annual emissions from 42 cars or planting 53 acres of forest.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting **American DG NY, LLC** with a 2008 ENERGY STAR CHP Award.

University of New Mexico CHP Project
(University District Heating and Cooling System Awarded ENERGY STAR CHP Award February 12, 2008)
In 2004, the University of New Mexico continued its Ford Utilities Center renovations—part of a major energy infrastructure upgrade project—by installing a 6 MW CHP system that will supply the campus with roughly half of its total electricity demand during the winter months, and a little less than a third during the summer months. The CHP system, powered by a Solar Turbines natural gas-fired combustion turbine, provides 29,000 pounds of steam per hour to help meet the space heating, space cooling, and domestic hot water production needs for the campus' more than 25,000 students, staff, and faculty.

With an estimated operating efficiency of 64 percent, the CHP system requires approximately 18 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO_2 emissions by an estimated 8,200 tons per year. This reduction is equivalent to avoiding the annual emissions from 1,360 cars or planting 2,040 acres of forest.

EPA is proud to recognize the significant pollution reduction and energy efficiency qualities of this project by presenting the University of New Mexico with a 2008 ENERGY STAR CHP Award.

Jeff Zumwalt (left), Associate Director of Utilities for the University of New Mexico, receives an ENERGY STAR CHP Award from Felicia Ruiz (right) of EPA's CHP Partnership

Winners of the 2007 ENERGY STAR® CHP Award

Adkins Energy LLC CHP System
(Ethanol Facility Awarded ENERGY STAR CHP Award June 27, 2007)
When farmer-led cooperatives of northeastern Illinois built a 43 million gallon per year ethanol plant in 2002, they selected combined heat and power (CHP) to meet their energy demands. While saving the plant more than $900,000 per year in operating costs, the 5 megawatt (MW) CHP system produces nearly all the electricity and approximately one-third of the steam needed for ethanol production.

With an operating efficiency of 70 percent, the CHP system requires approximately 15 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces carbon dioxide (CO_2) emissions by an estimated 8,700 tons per year. This reduction is equivalent to removing the annual emissions from 1,400 cars or planting 2,100 acres of forest.

Darius Simler (left), Chairman of Adkins Energy LLC, receives an ENERGY STAR CHP Award from John B. Askew (right), EPA Region 7 Administrator

Macon Energy Center CHP Project
(Ethanol Facility Awarded ENERGY STAR CHP Award June 27, 2007)
Fuel ethanol is one of the fastest growing segments of the of the U.S. chemical industry. Between 2005 and 2012, domestic ethanol production is expected to double. In 2003, Macon Municipal Utilities, in partnership with Northeast Missouri Grain, LLC, began operating a CHP system that provides up to 51,000 pounds of steam per hour—approximately 60 percent of the steam demand of the ethanol plant. The CHP system, powered by a Solar Turbines natural gas-fired combustion turbine, provides up to 10 MW to the local power pool. If the grid experiences a power outage, the CHP system can provide full backup power to the ethanol plant.

With an estimated operating efficiency of 66 percent, the CHP system requires approximately 25 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO_2 emissions by an estimated 28,200 tons per year. This reduction is equivalent to removing the annual emissions from 4,600 cars or planting 7,000 acres of forest.

Mitch Essing (left), representative of Northeast Missouri Grain, accepts an ENERGY STAR CHP Award on behalf of the Macon Energy Center from John B. Askew (right), EPA Region 7 Administrator

Arizona State University CHP System
(University District Heating and Cooling System Awarded ENERGY STAR CHP Award June 18, 2007)
Arizona State University, home of the Sun Devils, recently installed a CHP system in its Sun Devil Energy Center, making it a cornerstone of the university's new high-tech research facilities. Besides saving energy and lowering energy bills, the CHP system guarantees a reliable supply of electricity, steam, and chilled water for research and dormitory facilities, a critical factor for securing staffing and funding for research projects. The 8.8 MW natural gas-fired CHP system represents the first of two phases that will ultimately result in a 15 MW CHP system.

With an estimated operating efficiency of 79 percent, the CHP system requires approximately 21 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO_2 emissions by an estimated 16,000 tons per year. This reduction is equivalent to removing the annual emissions from 2,650 cars or planting 4,000 acres of forest.

David Brixen (left), Vice President of Capital Programs and Facility Services of Arizona State University, receives an ENERGY STAR CHP Award from Felicia Ruiz (right) of EPA's CHP Partnership

Princeton University Energy Plant
(University District Heating and Cooling System Awarded ENERGY STAR CHP Award February 28, 2007)
Two hundred and fifty years after founding its charter in 1746, Princeton University—the fourth-oldest college in the United States—installed a combustion turbine-based CHP system. The 15 MW natural gas-fired CHP system produces all of the steam, all of the chilled water, and approximately half of the electric power used by the campus and its approximately 7,000 students. In order to optimize operation of the system and minimize energy costs, the university utilizes a state-of-the-art, real-time economic dispatch system.

With an estimated operating efficiency of 75 percent, the CHP system requires approximately 21 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system

reduces CO_2 emissions by an estimated 27,900 tons per year. This reduction is equivalent to removing the annual emissions from 4,600 cars or planting 6,900 acres of forest.

Eric Wachtman (left), Chief Engineer of Princeton University, accepts an ENERGY STAR CHP Award from Tom Frankiewicz (right) of EPA's CHP Partnership

Kent State University Cogeneration Plant
(University District Heating and Cooling System Awarded ENERGY STAR CHP Award February 28, 2007)
Illustrative of its status as one of the nation's top 100 research universities, the Kent State University CHP plant is permitted as a working lab and offers tours and explanations of its equipment and programming. The 13 MW natural gas-fired combustion turbine CHP system produces almost 90 percent of the university's need for electric power during the winter months and 60 percent of its need for electric power during the summer months. Additionally, the CHP system provides half of the university's steam demand by utilizing waste heat from the turbines that would otherwise be wasted to the atmosphere.

With an estimated operating efficiency of 71 percent, the CHP system requires approximately 19 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO_2 emissions by an estimated 13,000 tons per year. This reduction is equivalent to removing the annual emissions from 2,100 cars or planting 3,200 acres of forest.

Michael McDonnell (left), Director of Campus Environment and Operations at Kent State University, accepts an ENERGY STAR CHP Award from Tom Frankiewicz (right) of EPA's CHP Partnership

Winners of the 2006 ENERGY STAR®
CHP Awards and CHP Certificates of Recognition

2006 ENERGY STAR® CHP Awards

ExxonMobil Baytown CHP Project
In 2004, ExxonMobil installed a natural gas-fired combined heat and power (CHP) system to support its 557,000 barrel-per-day refinery complex in Baytown, Texas. Consisting of a refinery, two research centers, and two processing plants for fuels conversion, lubricant production, and petrochemical processing, the Baytown complex is one of the largest refineries in the United States. The combustion turbine-based CHP system produces up to 171 megawatts (MW) of electricity and 560,000 pounds of steam per hour for the facilities' various processes.

In 2004, ExxonMobil installed a natural gas-fired CHP system to support its 557,000 barrel-per-day refinery complex in Baytown, Texas. Consisting of a refinery, two research centers and two processing plants for fuels conversion, lubricant production and petrochemical processing, the Baytown complex is one of the largest in the United States. The combustion turbine based CHP system produces up to 171 MW of electricity and 560,000 pounds of steam per hour for the facilities' various processes.

With an estimated operating efficiency of 73 percent, the CHP system requires approximately 33 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO2 emissions by an estimated 619,000 tons per year.

EPA and DOE are proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting ExxonMobil Corporation with a 2006 ENERGY STAR CHP Award.

Shown left to right accepting the Award at the ExxonMobil Baytown Award ceremony: Zeb Nash, ExxonMobil Baytown Chemical Plant Manager; Chris Eckleson, ExxonMobil Baytown Refinery Plant Manager; Katrina Pielli, EPA; Representative Wayne Smith (R-Texas House District 128); Bob Bailes, ExxonMobil Baytown Olefins Plant Manager

2006 CHP Certificates of Recognition

University of New Mexico CHP Project

In 2004, the University of New Mexico continued its Ford Utilities Center renovations—part of a major energy infrastructure upgrade project—by installing a 6 MW CHP system that will supply the campus with roughly half of its total electricity demand during the winter months, and a little less than a third during the summer months. The CHP system, powered by a Solar Turbines natural gas-fired combustion turbine, provides 29,000 pounds of steam per hour to help meet the space heating, space cooling, and domestic hot water production needs for the campus' more than 25,000 students, staff, and faculty.

With an estimated operating efficiency of 76 percent, the CHP system requires approximately 16 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO2 emissions by an estimated 9,700 tons per year.

EPA is proud to recognize the pollution reduction and energy efficiency qualities of this project by presenting the University of New Mexico with a 2006 CHP Certificate of Recognition.

The EPA CHP Certificate of Recognition recognized efficient CHP systems that demonstrated leadership in environmental performance. The CHP Partnership is no longer issuing these certificates.

Shown left to right accepting the Award at the 19th Annual IDEA Campus Energy Conference: Rob Thornton, President, IDEA; Katrina Pielli, EPA; Larry Schuster, Utilities Engineer, University of New Mexico; Steve Beffort, Associate Vice President for Facilities, University of New Mexico; Congresswoman Heather Wilson, R-NM; Jeff Zumwalt, Associate Director for Utilities, University of New Mexico

Winners of the 2005 ENERGY STAR®
CHP Awards and CHP Certificates of Recognition

2005 ENERGY STAR® CHP Awards

Hexion Specialty Chemicals CHP Project
The Hexion Specialty Chemical plant located in the Moreau Industrial Park of South Glens Falls, New York, is a host site for an unusual and creative combined heat and power (CHP) project. Built in 1998, the plant produces up to 200 million pounds of formaldehyde per year. The formaldehyde is manufactured in a reactor by combining methanol with air in the presence of a catalyst with heat generated as a byproduct. To maintain proper reactor temperature, a heat transfer fluid loop removes the waste heat from the chemical reactor while a water/steam loop is in turn used to cool the heat transfer fluid. Until January 2004, most of the heat entrained in the steam was vented to the atmosphere via a condenser. Since that time, a turbine-generator system, designed by Turbosteam Corporation and financially supported by the New York State Energy Research & Development Authority (NYSERDA), uses the otherwise wasted steam to produce up to 451 kilowatts (kW) of electricity.

This unique CHP system uses no fuel and therefore generates zero emissions. Compared to typical onsite thermal generation and purchased electricity, the system reduces carbon dioxide (CO2) emissions by an estimated 8,300 tons per year.

EPA and the Department of Energy (DOE) are proud to recognize the outstanding energy efficiency and pollution reduction qualities of this CHP system by presenting Hexion Specialty Chemicals, Inc. with the 2005 ENERGY STAR® CHP Award.

The University of Texas at Austin CHP Project
The University of Texas at Austin has grown into one of the nation's largest research-oriented universities. To ensure that its growing educational and research objectives are supported with reliable power and heat, the university depends on CHP. Since 1998, campus space has increased by over 2 million square feet and energy demand has increased by more than 8 percent. Due to the university's continual investment in CHP, however, fuel consumption since that time has increased by only 4 percent. The most recent addition in 2004 included expansion of an existing natural gas-fired combustion turbine and HRSG system. With the installation of a 25-megawatt (MW) steam turbine, the renovated system produces up to 61 MW of electricity, 280,000 pounds per hour of steam and 150,000 pounds per hour of boiler feedwater. The steam and hot water is utilized for space heating, space cooling, domestic hot water, boiler preheat and process steam in 160 campus buildings. To maximize efficiency and overall performance, the system utilizes operational management software developed by Lightridge Resources.

With an estimated operating efficiency of 60 percent, the University of Texas at Austin's CHP system requires approximately 24 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the system reduces CO2 emissions by an estimated 136,000 tons per year.

EPA and DOE are proud to recognize the significant energy efficiency and pollution reduction qualities of this CHP system by presenting the University of Texas at Austin with the 2005 ENERGY STAR CHP Award.

Shown left to right accepting the award at the 19th Annual IDEA Campus Energy Conference: Rob Thornton, President, IDEA; Katrina Pielli, EPA; Juan Ontiveros, Director of Utilities and Energy Management, University of Texas at Austin; Congresswoman Heather Wilson, R-NM; Steven Krall, Associate Vice President, University of Texas at Austin

Arrow Linen CHP Project

Family owned for 58 years, Arrow Linen Supply Company operates a commercial restaurant linen service in Brooklyn, New York. In September 2004, Arrow Linen installed and began operating a natural-gas fired CHP system to support the 56,000-square foot facility. Manufactured by Coast Intelligen, and financially supported by NYSERDA, the CHP system is centered on an internal combustion engine. Capable of generating up to 300 kW of electricity, the system recovers otherwise wasted heat from the engine block, lube oil cooling circuit, and engine exhaust to produce hot water. Combined with an existing preheating scheme that utilizes laundry wastewater, the hot water produced by the CHP system is used by the laundry machines and to preheat boiler feed water.

With an estimated operating efficiency of 82 percent, the CHP system requires an estimated 36 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the system reduces CO2 emissions by an estimated 651 tons per year.

EPA and DOE are proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting Arrow Linen Supply Company with the 2005 ENERGY STAR CHP Award.

Shown left to right accepting the award at the 6th Annual CHP Roadmap Workshop: Tom Kerr, EPA; Frank Park, Facility Engineer, Arrow Linen; Merrill Smith, DOE; Peter Smith, President, New York State Energy Research and Development Authority

Rego Park Nursing Home CHP Project

The Rego Park Nursing home in Flushing, New York provides continuous health care for approximately 200 residents. Recognizing the advantages of CHP, the Rego Park facility decided to add a new resident in 2003, a

natural gas-fired CHP system. Developed, owned, and operated by AES-NJ Cogen Co. Inc., and receiving financial support from NYSERDA, the internal combustion-based system generates up to 70 kW of electricity. Heat recovered from the engine block, lube oil cooling circuit, and engine exhaust is either used to power an absorption chiller or produce domestic hot water.

With an estimated operating efficiency of 81 percent, the CHP system requires an estimated 32 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO2 emissions by an estimated 325 tons per year.

EPA and DOE are proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting AES-NJ Cogen Co. Inc. with the 2005 ENERGY STAR CHP Award.

The Hermany Farms CHP Project
Hermany Farms Dairy has been pasteurizing and bottling milk for more than 50 years in the Bronx, New York. In late 2003, American DG replaced Hermany Farms' 45-year old oil-fired boiler with a reliable and energy efficient natural gas-fired CHP system. The 210-kW internal combustion engine-powered CHP system recovers heat from the exhaust, engine block, and lube oil cooling circuit. The recovered heat satisfies a substantial portion of the thermal load of the facility, which includes milk pasteurization, bottle-washing, domestic hot water, and space heating. The financial support provided by NYSERDA for this project, along with the energy cost savings attributed to the CHP system has allowed Hermany Farms to stay in business, while improving the quality of the energy the company uses.

With an estimated operating efficiency of 59 percent, the CHP system requires approximately 21 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the system reduces CO2 emissions by an estimated 663 tons per year.

EPA and DOE are proud to recognize the beneficial pollution reduction and energy efficiency qualities of this project by presenting American DG New York, LLC with the 2005 ENERGY STAR CHP Award.

The Greenpark Care CHP Project
Under constant pressure to keep its operating costs down, the Greenpark Care Center in Brooklyn, New York, worked with American DG New York LLC and installed an energy-efficient CHP system at the 400-bed healthcare facility. The natural gas-fired internal combustion engine-based system provides up to 140 kW of electricity while recovered heat from the exhaust, engine block, and lube oil cooling circuit is used for domestic hot water production, laundry, and space heating. Thanks to financial support from NYSERDA, Greenpark Care Center recognizes the CHP system as an excellent, cost-effective energy solution for its 30-year-old facility.

With an estimated operating efficiency of 76 percent, the CHP system requires approximately 27 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the system reduces CO2 emissions by an estimated 530 tons per year.

EPA and DOE are proud to recognize the significant pollution reduction and energy efficiency qualities of this project by presenting American DG New York LLC with a 2005 ENERGY STAR CHP Award.

The Sea Rise I & II CHP Projects
In 2004, Bay Park Associates, with financial support from NYSERDA, began operating a fuel-efficient CHP system in each of two of its neighboring apartment buildings: Sea Rise I and Sea Rise II. Designed to replace a CHP system that failed in 1988, the backbone of each system is a 11 0-kW-rated natural gas-fired internal combustion engine, manufactured by Coast Intelligen. The otherwise wasted heat from the engine block, lube oil cooling

circuit, and engine exhaust is recovered and used to satisfy approximately 75 percent of the rental apartments' domestic hot water demand.

With an estimated operating efficiency of more than 85 percent, the Sea Rise I CHP system requires approximately 39 percent less fuel than typical onsite thermal generation and purchased electricity. The Sea Rise II CHP system achieves an estimated operating efficiency of 84 percent, reducing its fuel use by about 35 percent over typical separate heat and power systems. Based on these comparisons, the two systems combined are expected to reduce CO2 emissions by an estimated 1,198 tons per year — 630 tons per year from Sea Rise I and 568 tons per year from Sea Rise II.

EPA and DOE are proud to recognize the outstanding pollution reduction and energy efficiency qualities of these projects by presenting Bay Park I Associates, Bay Park II Associates with 2005 ENERGY STAR CHP Awards for the Sea Rise I and Sea Rise II CHP systems.

Shown left to right accepting the award at the 6th Annual CHP Roadmap Workshop: Tom Kerr, EPA; Merrill Smith, DOE; Barbara Tillman, Senior Vice President, Grenadier Realty Corporation; Peter Smith, President, New York State Energy Research and Development Authority

South Houston Green Power 2 CHP Project

In April 2004, Cinergy Solutions, Inc., and BP Global Power, the power development unit of BP, began operating the newest CHP system addition to BP's plant in Texas City, Texas. The project, known as the South Houston Green Power 2 project, includes three production trains, each train consisting of a GE combustion turbine, duct burner set, and heat recovery steam generator. Together, these three trains are designed to produce up to 564 MW and 3.1 million pounds of steam per hour for the adjacent refinery and chemical plant. As the largest refinery in BP's portfolio, and one of the largest in the United States, it processes approximately 450,000 barrels of crude oil per day. Electricity produced by the CHP system that is not needed by the plant is sent to the local power grid for use by Houston residents and businesses.

Operating at nearly 78 percent efficiency, this outstanding example of CHP uses 33 percent less fuel than typical onsite thermal generation and purchased electricity. This exceptional operational performance results estimated annual CO2 reductions of 1.94 million tons.

EPA and DOE are proud to recognize the tremendous pollution reduction and energy efficiency qualities of this project by presenting Cinergy Solutions, Inc. and BP Global Power with the 2005 ENERGY STAR CHP Award.

Shown left to right accepting the award at the 6th Annual CHP Roadmap Workshop: Tom Kerr, EPA; Merrill Smith, DOE; Charles Beacom, Plant Manager, VP of Operations, Cinergy Solutions; Peter Smith, President, New York State Energy Research and Development Authority

Mohegan Sun CHP Project

Created by the Mohegan Tribe of Connecticut in 1996, the Mohegan Sun casino property encompasses 300,000 square feet of gaming space and features a day spa, 29 dining options, more than 30 shops and boutiques, a convention center, a sports arena, and the world's largest planetarium dome. Mohegan Sun is also the home of the WNBA's Connecticut Sun.

A portion of Mohegan Sun's electrical and thermal demands are satisfied with a fuel cell-based CHP system developed by UTC Power. The natural gas-fired system provides up to 400 kW of electricity to the entertainment complex. Heat recovered from the fuel cell is used to preheat boiler feed water and generate domestic hot water.

With an estimated operating efficiency of almost 58 percent, Mohegan Sun's CHP system requires an estimated 26 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO2 emissions by an estimated 1,458 tons per year.

EPA and DOE are proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting Mohegan Sun with the 2005 ENERGY STAR CHP Award.

Shown left to right accepting the award at the Connecticut Green Building Forum: Jan van Dokkum, President, UTC Power; Christina Murtha, Environmental Liaison, Mohegan Tribe; Katrina Pielli, EPA

The Middlebury College Central Plant

Located in the verdant Champlain valley of central Vermont, Middlebury College owns and operates a central CHP plant to support the faculty and students of its 205-year old institution. Developed in part by Turbosteam

Corporation, the 1.8-MW CHP system consists of four fuel oil-fired boilers and three steam turbine generators. The steam turbine generators replace pressure-reducing valves and supply steam to the campus at a usable pressure while satisfying up to 20 percent of the college's electricity demand. The low-pressure steam is used to produce hot water for the college's 2,300 undergraduate students, provide heat to more than 1.6 million square feet of building space, and power absorption chillers for space cooling.

Operating at more than 81 percent efficiency, the CHP system requires an estimated 6 percent less fuel than typical purchased electricity and onsite thermal generation. This operational performance results in estimated annual CO2 reductions of 1,200 tons.

As a result, EPA and DOE are proud to recognize the energy efficiency and pollution reduction qualities of this CHP system by presenting the Middlebury College with the 2005 ENERGY STAR CHP Award.

Shown left to right accepting the award at the Sixth Annual CHP Roadmap Workshop: Tom Kerr, EPA; Michael Moser, Assistant Director, Mechanical, Electrical and Utilities, Middlebury College; Merrill Smith, DOE; Peter Smith, President, New York State Energy Research and Development Authority

St. Francis Hospital and Medical Center CHP Project

One of the largest hospitals in Connecticut, the St. Francis Hospital and Medical Center was founded in 1897 by the Sisters of Saint Joseph. St. Francis affiliated with Mount Sinai Hospital in 1990 to create a regional health care system and was the first recorded collaboration between a Catholic hospital and a Jewish hospital in U.S. history.

In 2003, St. Francis installed a CHP system centered on a UTC Power fuel cell. Paid for by the Connecticut Clean Energy Fund, the CHP system produces up to 200 kW of electricity and preheats boiler feed water with heat recovered from the fuel cell. By preheating the boiler feed water, St. Francis reduces the amount of fuel consumed by the boiler and operating costs.

With an estimated operating efficiency of almost 57 percent, St. Francis' CHP system requires an estimated 25 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO2 emissions by an estimated 686 tons per year.

EPA and DOE are proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting St. Francis Hospital and Medical Center with the 2005 ENERGY STAR CHP Award.

Shown left to right accepting the award at the Connecticut Green Building Forum: Katrina Pielli, EPA; Charlie Moret, Marketing Director, Connecticut Clean Energy Fund; Robert Falaguerra, Vice President: Facilities, Support Services, Construction, Saint Francis Hospital and Medical Center; Jan van Dokkum, President, UTC Power

The University of Maryland–College Park CHP project

In early 2003, the University of Maryland College Park began operating a 27.3-MW CHP system. A product of a public-private collaboration between the university and the Maryland Economic Development Corporation, Trigen-Cinergy Solutions LLC was selected to develop and install the natural gas-fired CHP system.

Primarily consisting of two 11.2-MW General Electric combustion turbines, a HRSG (with supplemental firing) and a 4.9-MW steam turbine, the system provides electricity and steam to the campus to support the university's faculty and nearly 35,000 students. The otherwise waste steam exiting the steam turbine is recovered and used for campus heating and domestic hot water.

Operating at almost 68 percent efficiency, the CHP system requires an estimated 16 percent less fuel than typical purchased electricity and onsite thermal generation. This operational performance results in estimated annual CO2 reductions of 53,000 tons.

As a result, EPA and DOE are proud to recognize the energy efficiency and pollution reduction qualities of this CHP system by presenting the University of Maryland with the 2005 ENERGY STAR CHP Award.

Shown left to right accepting the award at the Smart and Sustainable Campuses Conference: Dave Cosner, Assistant to the Director of Operations & Maintenance, University of Maryland– College Park; Scott Lupin, Associate Director for the Department of Environmental Safety, University of Maryland–College Park; Maureen Cotliss, Director of the Department of Environmental Safety, University of Maryland–College Park; Frank Brewer, Assistant Vice President for Facilities Management, University of Maryland–College Park; Katrina Pielli, EPA; John Vucci, Associate Director of Operations & Maintenance for HVAC, University of Maryland– College Park

The Weyerhaeuser Albany Containerboard Mill
Weyerhaeuser's containerboard mill in Albany, Oregon, was originally constructed in 1955. Starting in the late 1990s, Weyerhaeuser upgraded the mill to one of the most modern linerboard mills in the world. Using residual wood chips and recycled fiber, it produces enough high-quality containerboard and grocery bag paper annually to cover the Interstate Highway from Canada to Mexico 332 times.

Part of the mill upgrade included a CHP system fueled by natural gas and biomass. It has the capacity to produce 93 MW of electricity to power the mill and two adjacent Weyerhaeuser plants and supply power to the grid depending on demand. The CHP system also produces steam for use in various processes within the mill.

It operates at 70 percent efficiency and requires 17 percent less fuel than typical onsite thermal generation and purchased electricity. As a result, the system reduces annual greenhouse gas emissions by an estimated 94,000 metric tons of carbon equivalent.

EPA and DOE are proud to recognize the energy efficiency and pollution reduction qualities of this project by presenting the Weyerhaeuser Company with the 2005 ENERGY STAR CHP Award.

Shown left to right accepting the award at the IDEA Campus Energy Conference: Tom Kerr, EPA; James Connaughton, Chairman of the White House Council on Environmental Quality; Mark Copeland, Environmental Engineering Manager, Weyerhaeuser; Pat Hoffman, DOE

The Weyerhaeuser Hawesville Complex CHP System
Following initial construction and operation in 1969, Weyerhaeuser Company's Bleached Pulp Mill, located in Hawesville, Kentucky, produced 220 tons per day of bleached hardwood pulp. Expansions and modernization improvements since that time have transformed the mill such that it now produces 1,400 tons per day of pulp and 1,500 tons per day of paper.

In order to effectively support this pulp and paper manufacturing complex, Weyerhaeuser installed and began operating a CHP system in 2001. Fueled almost entirely by biomass and a capacity to produce 88 MW of electricity and a million pounds of steam per hour, the system primarily consists of two recovery boilers, a fluidized bed boiler, and a steam turbine generator.

Operating at almost 86 percent efficiency, the system requires 23 percent less fuel than typical onsite thermal generation and purchased electricity. This operational performance results in estimated annual CO2 reductions of 267,000 tons.

EPA and DOE are proud to recognize the energy efficiency and pollution reduction qualities of this project by presenting Weyerhaeuser Company with the 2005 ENERGY STAR CHP Award.

Shown left to right accepting the award at the Sixth Annual CHP Roadmap Workshop: Tom Kerr, EPA; Casper Keller, Process Engineer, Weyerhaeuser; Merrill Smith, DOE; Peter Smith, President, New York State Energy Research and Development Authority

2005 CHP Certificates of Recognition

ExxonMobil Beaumont CHP Project
In 2005, ExxonMobil Corporation installed three CHP units to produce efficient electricity and steam for its Beaumont Refinery and adjacent Olefins and Aromatics Chemical Plant in Beaumont, Texas. The 2,415-acre complex houses the nation's largest refinery—processing 365,000 barrels of crude per day. The CHP system will support fuel and chemical processing operations, providing approximately 470 MW of power and 3.1 million pounds of steam per hour. Approximately 110 MW of electricity will be used on site, with the balance sold in the market. The steam from the CHP system provides a portion of the electric load and exhaust steam for process units in the olefins plant and the refinery, which has allowed ExxonMobil to shut down seven of its old utility boilers.

With an estimated operating efficiency of 88 percent, the CHP system requires approximately 37 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this performance, the CHP system reduces CO2 emissions by an estimated 2.4 million tons per year.

EPA is proud to recognize the outstanding pollution reduction and energy efficiency qualities of this project by presenting ExxonMobil Corporation with a 2005 CHP Certificate of Recognition.

Shown left to right accepting the award at the ExxonMobil Beaumont Award ceremony: Tom Frankiewicz, EPA; Lori Ryerkerk, ExxonMobil Beaumont Refinery Plant Manager

University of Cincinnati CHP project
In 1993, the University of Cincinnati began a 10-year effort to reduce energy consumption, increase energy reliability, and create an environmentally friendly operation. Since 1993, the university has implemented 36 measures, including a 46-MW CHP system. The CHP plant is designed to operate independent of the electric grid, which allows the university to maintain power at its six hospitals, research laboratories, computing facilities, student dormitories, and other campus buildings. The plant can run on natural gas or fuel oil, of which the university has a four-day supply stored in underground tanks on campus. As the largest employer in Cincinnati and the provider of power to six hospitals, this reliability is critical.

Through the recovery of otherwise wasted heat to produce steam, the University of Cincinnati has demonstrated exceptional leadership in energy use and management. The CHP system operates at approximately 70 percent efficiency, uses approximately 22 percent less fuel than equivalent separate heat and power, and reduces CO2 emissions by an estimated 34,198 tons per year.

As a result, EPA and DOE are proud to recognize the considerable pollution reduction quality of this project by presenting the University of Cincinnati with a 2005 CHP Certificate of Recognition.

Waldbaums Supermarket CHP Project
In April 2003, A&P Tea Company began operating a CHP system in its Waldbaums supermarket located in Hauppege, New York. A first of its kind in the United States, the Capstone microturbine-based CHP system generates up to 60 kW of electricity, while heat recovered from the turbine exhaust is used for space heating or desiccant dehumidification. With financial support from NYSERDA, the natural gas-fired CHP system was an attractive and reliable investment for A&P Tea Company and serves as a pioneer for CHP in an underdeveloped market.

The Waldbaums CHP system has an estimated operating efficiency of almost 40 percent, and compared to typical onsite thermal generation and purchased electricity, it reduces CO2 emissions by an estimated 76 tons per year.

As a result, EPA and DOE are proud to recognize the considerable pollution reduction quality of this project by presenting A&P Tea Company with the 2005 CHP Certificate of Recognition.

Shown left to right accepting the award at the Sixth Annual CHP Roadmap Workshop: Tom Kerr, EPA; Merrill Smith, DOE; Hugh Henderson, CDH Energy; Peter Smith, President, New York State Energy Research and Development Authority

The 10 West 66th Street CHP Project
In 2004, property management company 10 West 66th Street Corporation installed and began operating a 70-kW CHP system to satisfy a portion of its tenants' electric and domestic hot water demand. Manufactured by Ingersoll-Rand, the CHP system is powered by a natural gas-fired microturbine. Heat recovered from the turbine exhaust and lube oil cooling circuit is used to produce domestic hot water. Financial support for the project was provided by NYSERDA.

The CHP system achieves an estimated operating efficiency of 67 percent, requiring an estimated 21 percent less fuel than typical onsite hot water generation and purchased electricity. Based on this comparison, the system reduces CO2 emissions by an estimated 100 tons per year EPA and DOE are proud to recognize the significant pollution reduction and energy efficiency qualities of this project by presenting 10 West 66th Street Corporation with a 2005 CHP Certificate of Recognition.

Shown left to right accepting the award at the Sixth Annual CHP Roadmap Workshop: Tom Kerr, EPA; Tony Pellosie, Manager, 10 West 66th Street Corporation; Merrill Smith, DOE; Peter Smith, President, New York State Energy Research and Development Authority

The 4C Foods CHP Project

Fatigued by the high price of natural gas, privately owned 4C Foods began operation of a 380-kW CHP system to support its food processing operations, with finance support from NYSERDA. Manufactured by Coast Intelligen, the internal combustion engine-based CHP system satisfies approximately 80 percent of the facility's electricity demand. Heat recovered from the engine block, lube oil cooling circuit, and engine exhaust is used to for space heating, cheese drying, and space cooling.

With an estimated operating efficiency of 82 percent, the CHP system requires an estimated 38 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the system reduces CO2 emissions by an estimated 717 tons per year.

EPA and DOE are proud to recognize the considerable pollution reduction and energy efficiency qualities of this project by presenting 4C Foods Corporation with the 2005 CHP Certificate of Recognition.

Shown left to right accepting the award at the Sixth Annual CHP Roadmap Workshop: Tom Kerr, EPA; Merrill Smith, DOE; Bill Cristofaro, Energy Concepts; Peter Smith, President, New York State Energy Research and Development Authority

The Holliswood Care CHP Project

In order to reduce energy use and operating costs, the Holliswood Care Center utilizes CHP to support its 314-bed nursing home located in Queens County, New York. Financially supported by NYSERDA, the CHP system is built around a natural gas-fired 140 kW internal combustion engine. Heat recovered from the exhaust, engine block, and lube oil cooling circuit is used for domestic hot water production, laundry, and space heating in the care facility.

With an estimated operating efficiency of almost 58 percent, the CHP system requires approximately 16 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the system reduces CO2 emissions by an estimated 185 tons per year.

EPA and DOE are proud to recognize the pollution reduction and energy efficiency qualities of this project by presenting American DG New York, LLC, with a 2005 CHP Certificate of Recognition.

South Windsor High School CHP Project
Home of the Bobcats, South Windsor High School is an educational platform for more than 1,600 students and 170 staff members. In October 2003, South Windsor also became the home of a new fuel cell-based CHP system. Paid for by the Connecticut Clean Energy Fund and developed by UTC Power, the natural gas-fired 200-kW system generates enough electricity to satisfy approximately 50 percent of the school's peak electric demand and 100 percent of its off-peak demand. Heat recovered from the fuel cell is used to preheat boiler feed water and provide space heating. In addition to reducing the school's dependence on the local utility, the CHP system serves as an educational tool for the student's and local community.

With an estimated operating efficiency of more than 53 percent, South Windsor's CHP system requires an estimated 22 percent less fuel than typical onsite thermal generation and purchased electricity. Based on this comparison, the CHP system reduces CO2 emissions by an estimated 547 tons per year.

As a result, EPA and DOE are proud to recognize the considerable pollution reduction and energy efficiency qualities of this project by presenting South Windsor High School with the 2005 CHP Certificate of Recognition.

Shown left to right accepting the award at the Connecticut Green Building Forum: Charlie Moret, Marketing Director, Connecticut Clean Energy Fund; Jan van Dokkum, President, UTC Power; John Dilorio, Principal, South Windsor High School; Katrina Pielli, EPA

NiSource Energy Technologies' Projects
The Vestil Manufacturing CHP Project
Vestil Manufacturing of Angola, Indiana, manufactures and distributes materials handling equipment that includes hand trucks, fork lifts, and larger industrial equipment. All these tools have fine paint finishes that are oven-cured and therefore require significant amounts of energy. Vestil recognized an opportunity to use CHP to obtain clean, efficient, and reliable energy.

NiSource Energy Technologies designed a system with two Ingersoll-Rand microturbines. The micro turbines produce 130 KW of electricity, and the exhaust is used to cure products in a powder coat curing oven. The waste heat from this oven is recovered and used a second time in a drying oven and a product wash tank.

The Utilimaster CHP Project
Utilimaster Corporation has been building custom commercial vehicles since 1973 in its Wakarusa plant. Before the completed vehicles can be transported off site, they are thoroughly washed and dried. For a number of years, this process proved difficult due to the use of industrial radiant heaters. The heaters consumed significant amounts of energy, created a potentially unsafe working environment, and bottlenecked the production process.

NiSource Energy Technologies designed a CHP system consisting of an Ingersoll-Rand microturbine and a unique desiccant drying system. Instead of purchased electricity and radiant heating, the micro turbine produces up to 68 kW of electricity and the exhaust heat used to regenerate the system desiccant. This design has allowed for product drying at almost four times the previous rate.

The Manchester Tank CHP Project
Manchester Tank, in Elkhart, Indiana, manufactures low-pressure vessels for propane, air, refrigerant, and industrial applications. In an effort to increase its plant's efficiency and reduce operating costs, Manchester Tank enlisted the services of NiSource Energy Technologies to design and construct a 68-kW CHP system. The system consists of an Ingersoll-Rand microturbine and uses the turbine exhaust to cure the finish on the tanks in a powder coat curing oven. The system is designed to operate at about 76 percent efficiency and require an estimated 21 percent less fuel than typical onsite thermal generation and purchased electricity.

These three projects are expected to operate at about 75 percent efficiency and require an estimated 20 percent less fuel than typical separate heat and power. Combined, these projects reduce annual greenhouse gas emissions by an estimated 100 metric tons of carbon equivalent.

EPA and DOE are proud to recognize the energy efficiency and pollution reduction qualities of these three projects by presenting NiSource Energy Technologies with three 2005 CHP Certificates of Recognition.

Shown left to right accepting the award at the IDEA Campus Energy Conference: Tom Kerr, EPA; James Connaughton, Chairman of the White House Council on Environmental Quality; Rebecca Sczudlo, Vice President for Federal Governmental Affairs, NiSource; Pat Hoffman, DOE

General Services Administration Federal Research Center – White Oak Central Utility Plan
The General Services Administration (GSA) capitalized on two great opportunities in acquiring real estate to house and consolidate the Food and Drug Administration's (FDA) Center for Drug Evaluation and Research: First, GSA chose to acquire the former brownfield at the Naval Surface Warfare Center, in White Oak, Maryland, and develop it into a new campus for the FDA. Second, GSA chose to power the campus with a CHP district energy system. FDA's new Research Center under construction will be a state-of-the-art office and laboratory complex consisting 14 buildings and 3 million square feet.

There is currently one building in service and one to be commissioned in April 2005. Energy is currently supplied by a 5.6-MW CHP district energy system consisting of a natural gas reciprocating engine with heat recovery to provide hot water, space heating, and air conditioning. The CHP system is housed in a historic firehouse and is expected to be expanded as the campus development progresses.

This system is expected to operate at 58 percent efficiency and require an estimated 25 percent less fuel than purchased electricity and onsite thermal generation. This project is estimated to reduce annual greenhouse gas emissions by 1,200 metric tons of carbon equivalent.

EPA and DOE are proud to recognize the energy efficiency and pollution reduction qualities of this system by presenting the General Services Administration with the EPA 2005 CHP Certificate of Recognition.

Shown left to right accepting the award at the IDEA Campus Energy Conference: Tom Kerr, EPA; James Connaughton, Chairman of the White House Council on Environmental Quality; Denise Avery-Craft, Contract Specialist for General Services Administration; Pat Hoffman, DOE

The Department of Veterans Affairs' La Jolla Medical Center CHP Project

The Department of Veterans Affairs' San Diego Healthcare System consists of the La Jolla medical center and five community clinics located in San Diego and Imperial Valley counties. The system provides health care to more than 238,000 veterans and is affiliated with the University of California, in San Diego. It hosts one of the largest research programs in the department.

The medical center at La Jolla is the core center of this vast healthcare system. To ensure the availability of reliable power and cooling for the center, the Department of Veterans Affairs installed a CHP system based on a Solar Turbines Mercury 50 combustion turbine. The CHP system produces up to 4.5 MWe of electricity while recovering exhaust heat from the turbine to drive an absorption cooler for space cooling.

With an estimated operating efficiency of 60 percent, this CHP system requires an estimated 27 percent less fuel than typical onsite thermal generation and purchased electricity and reduces annual greenhouse gas emissions by an estimated 320 metric tons of carbon equivalent.

EPA and DOA are proud to recognize the energy efficiency and pollution reduction qualities of this CHP system by presenting the Department of Veterans Affairs with the 2005 CHP Certificate of Recognition.

Shown left to right accepting the award at the IDEA Campus Energy Conference: Tom Kerr, EPA; James Connaughton, Chairman of the White House Council on Environmental Quality; Raj Garg, Energy Management Director for The Department Veteran Affairs; Pat Hoffman, DOE

The 30 North LaSalle CHP Project

Equity Office Properties' 44-story office building in downtown Chicago is home to a 1.1-MW natural gas-fired CHP system. The system consists of a Cummins engine with heat recovery to produce heating and domestic hot water. Due to utility practices, this system typically operates in a peak-shaving mode during the local utility's peak pricing period. In the event of a utility power outage, the electric output of the CHP system is automatically switched and dedicated to serve a data center in the building.

This project is supported by Peoples Energy Corporation and owned by Equity Office Properties, and it reflects Equity Office Properties' leadership and dedication to making CHP a standard practice in its buildings. Operating at almost 52 percent efficiency, the CHP system uses approximately 13 percent less fuel than typical purchased electricity and onsite thermal generation and annually reduces carbon dioxide emissions by more than 640 tons.

EPA and DOE are proud to recognize Equity Office Properties' leadership and the efficiency and emission benefits of this project by presenting Equity Office Properties with the EPA 2005 CHP Certificate of Recognition.

Shown left to right accepting the award at the USCHPA Policy Summit Conference: Thomas Smith, Vice President - Energy Operations, Equity Office Properties; Tom Kerr, EPA

Winners of the 2004 ENERGY STAR®
CHP Awards and CHP Certificates of Recognition

2004 ENERGY STAR® CHP Awards

California Institute of Technology
In 2003, the California Institute of Technology (Caltech) replaced an aging 5.5–megawatt (MW) combined heat and power (CHP) system with a new 12.5-MW system. This system consists of a Solar Turbines Mars 100 natural gas turbine, a heat recovery steam generator, a steam turbine, and an absorption cooler.

This system generates 80 to 90 percent of the university's peak electric load and 44,500 pounds of steam per hour and reduces Caltech's vulnerability to rolling blackouts. This system not only produces power for about 4 cents per kilowatt-hour, but it is also more than 70 percent efficient and requires 30 percent less fuel than typical onsite thermal generation and purchased electricity. The project reduces annual greenhouse gas emissions by an estimated 7,000 metric tons of carbon equivalent.

EPA and the Department of Energy (DOE) are proud to recognize the energy efficiency and pollution reduction qualities of this project by presenting the California Institute of Technology with the 2004 ENERGY STAR® CHP Award.

Shown left to right accepting the award at the IDEA Campus Energy Conference: Tom Kerr, EPA; James Connaughton, Chairman of the White House Council on Environmental Quality; Reza Ohadi, Director, Campus Operations, California Institute of Technology; Pat Hoffman, DOE.

The Lafarge Silver Grove CHP Project
In 2000, Lafarge North America, the largest diversified construction materials company in the United States, began operation of the nation's largest drywall manufacturing plant. To satisfy a portion of the plant's electricity and thermal demands, Lafarge made the decision to implement a CHP system. Trigen-Cinergy Solutions of Silver Grove, LLC, designed, installed, owns, and operates a combustion turbine CHP system at Lafarge's plant. The system produces up to 5.2 MW of electricity, and the system's exhaust is used to dry up to 900 million square feet of gypsum wallboard per year. This system operates at 87 percent efficiency, uses 29 percent less fuel than typical onsite thermal generation and purchased electricity, and annually reduces carbon dioxide emissions by almost 15,000 tons.

EPA and DOE are proud to recognize the important pollution reduction and energy efficiency qualities of this project by presenting Trigen-Cinergy Solutions of Silver Grove, LLC and Lafarge North America with the 2004 ENERGY STAR CHP Award.

Shown left to right accepting the award at the Fifth Annual CHP Roadmap Workshop: Chip O'Donnell, Vice President of Market Development, Cinergy Solutions Inc.; Kevin Bright, Manager, Power Operations, Cinergy Solutions, Inc.; Luis Troche, EPA; Merrill Smith, DOE.

2004 CHP Certificates of Recognition

Borden Chemical CHP Project

The Borden Chemical plant, located in the Moreau Industrial Park of South Glens Falls, New York, is a host site for an unusual and creative CHP project. Built in 1998, the plant produces up to 200 million pounds of formaldehyde per year. The formaldehyde is manufactured in a reactor by combining methanol with air in the presence of a catalyst, with heat generated as a byproduct. To maintain proper reactor temperature, a heat transfer fluid loop removes the heat from the chemical reactor while a water/steam loop is in turn used to cool the heat transfer fluid. Until January 2004, most of the heat entrained in the steam was vented to the atmosphere via a condenser. Since that time, a turbine-generator system, designed by Turbosteam Corporation, and financially supported by the New York State Energy Research & Development Authority, uses the otherwise wasted steam to produce up to 451 kilowatts (kW) of electricity. This unique CHP system uses no fuel and produces zero emissions, which is equivalent to annually reducing carbon dioxide emissions by more than 2,700 tons.

EPA and DOE are proud to recognize the creativity and pollution prevention qualities demonstrated by this project by presenting Borden Chemical with the 2004 EPA CHP Certificate of Recognition.

Shown left to right accepting the certificate at the Fifth Annual CHP Roadmap Workshop: Darren Schaperjahn, Maintenance Supervisor, Borden Chemical Inc., Moreau Division; Barbara Kucharczyk, Site Leader Borden Chemical Inc., Moreau Division; Merrill Smith, DOE; Luis Troche, EPA.

The Greater Rochester International Airport Onsite Power Project
The Greater Rochester International Airport, in Rochester, New York, uses two 728 kW CHP systems to provide more than 50 percent of the airport's electricity demand. Developed by Siemens Building Technologies, Inc., the power from each system is generated by a natural gas-fired Waukesha internal combustion engine. Heat from both the engine exhaust and engine block is captured by heat exchangers and used to produce hot water. The hot water is in turn used for space heating and to support an absorption cooler for space cooling. The system operates at 61 percent efficiency and requires 21 percent less fuel than typical onsite thermal generation and purchased electricity.

EPA and DOE are proud to recognize the innovative pollution reduction and energy efficiency qualities of this project by awarding the Greater Rochester International Airport with the 2004 CHP Certificate of Recognition.

Shown left to right accepting the award at the CHP in New York State Two Years Later Conference: Kim Crossman, EPA; Christine Vitt, Associate Engineer, Department of Environmental Services, Monroe County; Vincent A. DeIorio, Esq., Chairman, NYSERDA

Johnson & Johnson San Diego
Johnson & Johnson Pharmaceutical Research and Development, LLC, is not only a global leader in the pharmaceutical industry, but it is also a strong adopter of energy efficiency and CHP.

In 2004, Johnson & Johnson's La Jolla facility in California doubled its space to accommodate up to 600 researchers and staff. With financial support from the San Diego Regional Energy Office, Johnson & Johnson installed a CHP system that provides more than 85 percent of its electricity and most of the heating and cooling for the facility. The system consists of natural gas reciprocating engines with heat recovered to drive an absorption cooler. Operating at about 60-percent efficiency, the CHP system requires 18 percent less fuel than typical onsite thermal generation and purchased electricity and reduces annual greenhouse gas emissions by an estimated 250 metric tons of carbon equivalent.

EPA and DOE are proud to recognize Johnson & Johnson as a leader in promoting the energy efficiency and pollution reduction qualities of CHP by presenting the company with the 2004 CHP Certificate of Recognition.

Shown left to right accepting the award at the IDEA Campus Energy Conference: Tom Kerr, EPA; James Connaughton, Chairman of the White House Council on Environmental Quality; Duane Kihne, Senior Facilities Engineer, Johnson & Johnson; Pat Hoffman, DOE.

The New York Power Authority Fuel Cell Project

In 2003, the New York Power Authority (NYPA), the nation's largest state-owned electric utility, began operating of eight 200-kW phosphoric acid fuel cells at four wastewater treatment plants in New York State. The projects were completed as part of NYPA's pledge to achieve zero net emissions from the earlier installation of approximately 400 MW of simple-cycle turbine generators. The projects are a collaborative effort of NYPA, the New York City Department of Environmental Protection, the New York State Energy Research Development Authority (NYSERDA), the U.S. Department Energy, and Fuel Cell Energy, Inc. Each of the eight fuel cells is designed to operate on biogas generated as a byproduct of the wastewater treatment process. By running on digester gas produced by the anaerobic treatment of waste water, the fuel cells make use of a fuel source that would otherwise be disposed of through flaring. Each fuel cell provides 200 kW of electricity for use at the respective wastewater treatment plant. Heat generated by the fuel cells is recovered and used to support and maintain the anaerobic digestion process at the wastewater treatment plants and produces hot water for space heating and domestic use. The units operate at an average efficiency of 78 percent and use 38 percent less fuel than typical onsite thermal generation and purchased electricity.

EPA and DOE are proud to recognize the pollution reduction, energy efficiency, and innovative qualities of these units by presenting NYPA with the 2004 CHP Certificate of Recognition.

Shown left to right accepting the award at the CHP in New York State Two Years Later Conference: Yan Kishinevsky, Program Manager, Distributed Generation & Energy Utilization, Research & Technology Development, New York Power Authority; Kim Crossman, EPA; Shalom Zelingher, Director, Research & Technology Development, New York Power Authority; Vincent A. DeIorio, Esq., Chairman, NYSERDA.

The Yale University Environmental Science Center Project

The DFC® FuelCell technology at Yale University is one of the first of its kind in a commercial application and the first one implemented by a university. Fueled by natural gas, the fuel cell operates at a high temperature and produces up to 250-kW of electricity. The unit supplies approximately one-half of the power needs of the Yale Environmental Science Center, an archival storage facility for the Yale Peabody Museum, which holds more than 11 million specimens and objects. Heat from the fuel cell is recovered and used to maintain a controlled humidity environment for the museum's collection. This CHP system, developed by EPA CHP partner FuelCell Energy, operates at 58 percent efficiency and requires 32 percent less fuel than typical onsite thermal generation and purchased electricity.

EPA and DOE are proud to recognize the innovation, pollution reduction, and energy efficiency qualities of this project by presenting Yale University with the 2004 CHP Certificate of Recognition.

Shown left to right accepting the certificate at the International District Energy Association's (IDEA) 95th Annual Conference and Tradeshow: Luis Troche, EPA; Dan Beachy, FuelCell Energy; Mike Shea, Yale University; Rob Thornton, International District Energy Association

Winners of the 2003 ENERGY STAR®
CHP Awards and CHP Certificates of Recognition

2003 ENERGY STAR® CHP Awards

BP Solvay Polyethylene North America CHP Project
In 2001, BP Solvay Polyethylene North America replaced seven older, natural gas-fired boilers at its Deer Park, Texas, facility with four Solar Taurus 60 gas turbines with heat recovery steam generators. This system has reliably generated up to 20 megawatts (MW) of electricity and 480,000 pounds of steam per hour for the facility. This outstanding application of combined heat and power (CHP) has an estimated efficiency of 78 percent and uses 25 percent less fuel than typical onsite thermal generation and purchased electricity.

EPA and the Department of Energy (DOE) are proud to recognize the important pollution reduction and energy efficiency qualities of this project by presenting BP Solvay Polyethylene North America with the 2003 ENERGY STAR® CHP Award.

Shown left to right: **Richard Moorer, DOE; Brad Walters, Solvay America; Oliver Schneider, BP Solvay Polyethylene North America; Kathleen Hogan, EPA**

Calpine Corporation CHP Project
In 2003, EPA CHP partner, Calpine Corporation completed the first phase of its Deer Park Energy Center project by placing the first of four CHP units online at Shell Chemicals Company's facility in Deer Park, Texas. This first phase of the project includes a combustion turbine and heat recovery steam generator that provides up to 1.1 million pounds per hour of steam to Shell's facility and approximately 178 MW of electricity that Calpine sells to its wholesale customers in ERCOT. Based on 2003 operational data, this outstanding application of CHP has an overall efficiency of 72 percent and uses 30 percent less fuel than typical onsite thermal generation and purchased electricity.

EPA and DOE are proud to recognize the important pollution reduction and energy efficiency qualities of this project by presenting Calpine Corporation with the 2003 ENERGY STAR CHP Award.

Shown left to right: **Tom Kerr, EPA; Luis Troche, EPA; Richard Moorer, DOE; Peter Gross, Calpine Corporation; Kathleen Hogan, EPA; Kim Crossman, EPA**

University of North Carolina at Chapel Hill CHP System

The University of North Carolina at Chapel Hill's (UNC's) CHP system produces 28 MW of electrical and thermal energy in a state-of-the-art facility. UNC has been generating electricity on site since 1895 and operating CHP systems since 1939. In the early 1990s, faced with increasing energy needs and a desire to reduce energy costs, UNC replaced its cogeneration system with one based on circulating fluidized bed combustion technology. The plant operates at 78 percent efficiency and uses 13 percent less fuel than traditional electricity and thermal power generation. The project also has innovative design features, such as blue glass exteriors for the boiler and turbine buildings, which help the buildings blend in with the surrounding residential area. Numerous noise reduction elements also minimize noise from the plant. UNC previously received the 1999 CHP Certificate of Recognition.

EPA and DOE are proud to further recognize the leadership, innovation, and energy efficiency qualities of this project by presenting the University of North Carolina at Chapel Hill with the 2003 ENERGY STAR CHP Award.

2003 CHP Certificates of Recognition

Austin Energy CHP System

EPA CHP partner Austin Energy will be the first community-owned electric utility to own and operate a new packaged, modular CHP system. The system was developed by DOE, Burns & McDonnell, Broad USA, Solar Turbines, and Oak Ridge National Laboratory. This 4.6-MW system will provide its electricity to the grid and provide cooling to a high-tech industrial park within the Domain, a mixed-use development in North Austin, Texas. The CHP system's pairing of a Solar turbine and Broad exhaust-fired absorption chiller is expected to operate at greater than 60 percent efficiency.

EPA and DOE are proud to recognize the collaboration and leadership demonstrated by Austin Energy, with the 2003 CHP Certificate of Recognition.

Shown left to right: **Richard Moorer, DOE; Cliff Braddock, Austin Energy; Kathleen Hogan, EPA**

Harrah's Entertainment, Inc. CHP System

The CHP system at the Rio All-Suite Hotel and Casino, owned and operated by Harrah's Entertainment, Inc., is the first CHP system at a Las Vegas casino. The 4.9-MW system will provide electricity and hot water to the hotel and save energy costs. This outstanding application of CHP is expected to operate at about 75 percent overall efficiency and use 34 percent less fuel than onsite thermal generation and purchased electricity.

EPA and DOE are proud to recognize the innovation, pollution reduction, and energy efficiency qualities of this project by presenting Harrah's Entertainment, Inc. with the 2003 CHP Certificate of Recognition.

Shown left to right: **Kathleen Hogan, EPA; Richard Emmons, Harrah's Entertainment, Inc.; Richard Moorer, DOE**

Cinergy Solutions, Inc. and BP Global Power CHP Project

In April 2004, Cinergy Solutions, Inc. and BP Global Power began operating a new CHP plant at BP's refinery in Texas City, Texas. The South Houston Green Power 2 project is designed to produce up to 564 MW of electricity and 3.1 million pounds of steam per hour for the plant's refinery and chemical processes. This outstanding application of CHP has an expected overall efficiency of greater than 80 percent and will use an estimated 40 percent less fuel than typical onsite thermal generation and purchased electricity.

EPA and DOE are proud to recognize the tremendous pollution reduction and energy efficiency qualities of this project by presenting Cinergy Solutions, Inc. and BP Global Power with the 2003 CHP Certificate of Recognition.

Shown left to right: **Luis Troche, EPA; Richard Moorer, DOE; Kathleen Hogan, EPA; Andy Cranfill, Cinergy Solutions, Inc.; Kim Crossman, EPA**

Winners of the 2002 ENERGY STAR®
CHP Awards and CHP Certificates of Recognition

2002 ENERGY STAR® CHP Awards

City of Russell, Kansas CHP Project
On August 23, 2000, the city of Russell's power plant exploded, destroying 75 percent of its generation facility. In response to the disaster, the city of Russell collaborated with U.S. Energy Partners and installed two Solar Taurus 70 combustion turbines with heat recovery steam generators. The operational combined heat and power (CHP) system not only provides electricity to the city and 50 square miles of surrounding rural area but also supplies steam and direct heat to a new ethanol facility. The plant can generate 14 megawatts (MW) of electricity at an overall efficiency of 67 percent while using 28 percent less fuel than typical onsite thermal generation and purchased electricity. The city previously received the ENERGY STAR® CHP Certificate of Recognition in 2001.

EPA and the Department of Energy (DOE) are proud to recognize the important pollution reduction and energy efficiency qualities of this project by presenting The City of Russell with the 2002 ENERGY STAR® CHP Award.

Kinder Morgan Power Company CHP System
Developed and operated by Kinder Morgan Power Company, the 28-MW natural gas turbine system at Swift & Company's meat processing plant in Greeley, Colorado, is an outstanding example of the significant cost savings and energy reductions that come from using CHP in industrial settings. The unit is a single LM6000 PA engine with a heat recovery steam generator operating at 65 percent efficiency while requiring 25 percent less fuel than comparable separate heat and power systems. The site exports its excess power to the local power grid.

EPA and DOE are proud to recognize the achievements of Kinder Morgan Power Company with the 2002 ENERGY STAR CHP Award.

University of Michigan, Ann Arbor CHP System
The University of Michigan, Ann Arbor's central energy plant utilizes CHP (in the form of conventional boilers, gas turbines, heat recovery steam generators, and steam turbines) to produce up to 33 MW of power and 520,000 pounds per hour of steam to meet the needs of its central and medical campuses. This steam is directly or indirectly used for heating, cooling, humidity control, cooking, and sterilization by the majority of the university's approximately 39,000 students in more than 400 buildings. The university's plant operates at 78 percent efficiency and uses 18 percent less fuel than comparable onsite thermal generation and purchased electricity. The award-winning project replaces the university's original plant, which was a coal-fired, boiler-only system constructed in 1914.

EPA and DOE are proud to recognize the innovation, pollution reduction, and energy efficiency qualities of this project by presenting the University of Michigan, Ann Arbor, with the 2002 ENERGY STAR Award.

2002 CHP Certificates of Recognition

KSL Resorts' Grand Wailea Resort CHP System
Guests at KSL Resorts' 40-acre Grand Wailea Resort in Maui might not appreciate that their swimming pools, spa, and laundry services are all being powered through the hotel's CHP system, but the Resort's CHP system is cutting-edge technology. Built in cooperation with Maui Electric, the Hawaiian Electric Company, and the Electric Power Research Institute, the hotel's 150–kilowatt (kW) natural gas-fired reciprocating engine was the first utility-owned, customer-sited CHP system in Hawaii. Grand Wailea's CHP system operates at 68 percent efficiency and uses 24 percent less fuel than traditional separate heat and power systems.

EPA and DOE proud to recognize the collaboration and leadership demonstrated by the KSL Resorts' Grand Wailea Resort with the 2002 CHP Certificate of Recognition.

Kern Oil and Refining Company CHP System
Kern Oil and Refining Company uses a 5-MW Solar Turbine system to increase its energy efficiency and significantly reduce costs in its Bakersfield, California refinery. The system operates at 72 percent efficiency and, each year, saves the company approximately 19 percent of its traditional fuel costs. Kern's CHP system's energy efficiency also reduces air pollution in Kern County from smog and nitrogen oxides from automobile travel and its expanding population.

EPA and DOE are proud to recognize the pollution reduction and energy efficiency qualities of this project by presenting Kern Oil and Refining Company with the 2002 CHP Certificate of Recognition.

NiSource Energy Technologies and Breeden YMCA CHP System
For more than a decade, the members and staff at the Breeden YMCA in Angola, Indiana, have enjoyed the space heat and heated pools provided by the facility's CHP system. The system, which includes two microturbines, generates 120 kW of electricity and uses 10 percent less fuel than non-CHP systems. Operated by NiSource Energy Technologies, the system also provides backup power in the event of any power grid outage, allowing the YMCA to serve as a disaster center.

EPA and DOE are proud to recognize the important CHP technology development qualities of this project by presenting NiSource Energy Technologies with the 2002 CHP Certificate of Recognition.

NiSource Energy Technologies and Hilton Garden Inn CHP System
NiSource Energy Technologies began operating a three-microturbine CHP system at the Hilton Garden Inn in Chesterton, Indiana, in 1992. The recovered heat provides supplemental heat for the hotel's general water supply, spa, and swimming pool, as well as heat for the hotel's common areas. The project is part of NiSource's efforts to develop integrated energy services for the hotel industry, which includes expanding CHP opportunities and promoting energy efficiency.

EPA and DOE are proud to recognize the important CHP technology development qualities of this project by presenting NiSource Energy Technologies with the 2002 CHP Certificate of Recognition.

RealEnergy and Arden Realty Oceangate Tower CHP System
RealEnergy and Arden Realty are collaborating to advance the use of CHP in commercial and office real estate. Arden's Oceangate Tower in Long Beach, California, is a good example of this working relationship and of a CHP system in the commercial real estate sector. Oceangate Tower is a 15-story office building with 210,000 square feet of space, heated and powered by a 300-kW CHP system installed by RealEnergy. The CHP system at Oceangate Tower operates at 52 percent efficiency and reduces fuel needs by 16 percent.

EPA and DOE proudly recognize the collaboration and leadership demonstrated by this project by presenting RealEnergy and Arden Realty with the 2002 CHP Certificate of Recognition.

University of Maryland in College Park CHP Project

The University of Maryland (UM) in College Park completed a CHP project that upgrades the school's central steam plant, built in the 1930s, to meet the modern demands of the school's 47,400 students, faculty, and staff. UM's development of this project was assisted by the Maryland Economic Development Corporation, which selected Trigen-Cinergy Solutions to make the improvements to UM's plant. The project included the removal of two existing boilers, upgrading the remaining two with low nitrogen oxide control technology, and upgrading the distribution system. Two 11.2-MW natural gas-fired combustion turbines with heat recovery steam generators and a steam turbine generator were installed to provide electricity and steam to the campus. Today, the plant operates at 75 percent efficiency and uses 34 percent less fuel than comparable separate heat and power systems.

EPA and DOE are proud to recognize the important pollution reduction and energy efficiency qualities of this project by presenting the University of Maryland with the 2002 CHP Certificate of Recognition.

University of Missouri–Columbia CHP System

At 66-MW, the University of Missouri–Columbia's CHP system could power a small city. In fact, it generates the heat and power needed by the 35,000 people who work in and visit the campus' three hospitals, veterinary hospital, research reactor, numerous research facilities and laboratories, classroom buildings, residence halls, dining facilities, athletic facilities, computer centers, and administrative buildings. Producing both steam and electricity in its current location since 1923, today the plant has six coal-fired boilers and four turbine generators. The university estimates that the project reduces fuel consumption by 25 percent compared to comparable separate heat and power systems.

EPA and DOE proudly recognize the important pollution reduction and energy efficiency qualities of this project by presenting the University of Missouri with the 2002 CHP Certificate of Recognition.

Winners of the 2001 ENERGY STAR®
CHP Awards and CHP Certificates of Recognition

2001 ENERGY STAR® CHP Awards

Cinergy Solutions CHP System
In 2001, Cinergy Solutions (in partnership with BP Global Power Corp.) purchased and leased existing separate heat and power equipment from BP Amoco Chemical Company and Amoco Oil Company at its Texas City, Texas, site and completed a significant overhaul of the equipment. This upgrade allowed Cinergy Solutions to switch the gas turbine and boiler from independent operation to run as a combined heat and power (CHP) unit. The 13-megawatt (MW) gas turbine CHP unit uses 17 percent less fuel than typical onsite thermal generation and purchased electricity.

EPA and the Department of Energy (DOE) are proud to recognize the important pollution reduction and energy efficiency qualities of this project by awarding Cinergy Solutions with the 2001 ENERGY STAR® CHP Award.

Massachusetts Institute of Technology (MIT) CHP Project
In 1995, the Massachusetts Institute of Technology (MIT) completed installation of a 21-MW gas turbine with a heat recovery steam generator. The turbine incorporates a dry low-nitrogen oxide combustor technology, which was developed at MIT, to lower nitrogen oxide emissions while avoiding the expense, parasitic power losses, and ammonia emissions from typical end of pipe controls. MIT's central CHP facility provides power, process steam, heating, and cooling to campus and uses 28 percent less fuel than typical onsite thermal generation and purchased electricity.

EPA and DOE are proud to recognize the important pollution reduction and energy efficiency qualities of this project by awarding MIT with the 2001 ENERGY STAR CHP Award.

Primary Energy and National Steel CHP System
In 1997, Primary Energy completed the installation of the 63-MW natural gas-fired combined-cycle CHP Portside Energy facility that provides electricity, process steam, and softened hot water to National Steel's Midwest Operations. The new facility replaced a less efficient and higher emitting low-pressure boiler house, and Primary Energy was awarded the 2000 Governor's Award for Excellence in Pollution Prevention. Portside Energy supplies 100 percent of the thermal energy requirements and nearly 100 percent of the electrical requirements of the steel finishing operation while using 28 percent less fuel than typical onsite steam generation and purchased electricity.

EPA and DOE are proud to recognize the important pollution reduction qualities of this project by awarding Primary Energy and National Steel with the 2001 ENERGY STAR CHP Award.

Primary Energy and U.S. Steel CHP Project
In 1997, Primary Energy completed the installation of the 161-MW steam turbine CHP Lakeside Energy Corporation facility that provides electricity and process steam to U.S. Steel’s Gary Works in Gary, Indiana. The new facility replaced existing, less-efficient electric generation and provided an outlet for blast furnace gas that was being flared. In recognition of this outstanding project, Lakeside Energy was awarded the 1999 Project Excellence Award by the Association of Iron and Steel Engineers (AISE), and Primary Energy, the parent company of Lakeside Energy, was awarded the 2000 Governor's Award for Excellence in Pollution Prevention. In excess of 95 percent of the blast furnace gas produced at the steel mill is now utilized to produce steam. Approximately 40 percent of this steam is consumed by the Lakeside Energy facility, which in turn provides thermal energy and 40 percent of the electrical requirements of the steel-making complex.

EPA and DOE are proud to recognize the important pollution reduction and energy efficiency qualities of this project by awarding Primary Energy and U.S. Steel with the 2001 ENERGY STAR CHP Award.

2001 CHP Certificates of Recognition

The City of Russell, Kansas CHP System
On August 23, 2000, the city of Russell power plant in Kansas suffered an explosion that destroyed 75 percent of its generation facility. After much research on several different replacement options, it was decided that a combustion turbine provided the optimal solution. The city collaborated with US Energy Partners and installed two Solar Taurus 70 combustion turbines with heat recovery steam generators (HSRG) to provide electricity, steam, and direct heat for drying to a new ethanol facility.

EPA and DOE are proud to recognize the important pollution reduction and energy efficiency qualities of this project by presenting the city of Russell with the 2001 CHP Certificate of Recognition.

BP Solvay Polyethylene North America CHP Facility
In 2001, BP Solvay Polyethylene North America in Deer Park, Texas, replaced seven older natural gas fired boilers with four Solar 5 MW Taurus 60 gas turbines with separate heat recovery steam generators (HRSG). Replacing the existing boiler with a new standard CHP facility would have, by itself, reduced both emissions and energy consumption. To achieve greater gains, a new state-of-the-art, first-of-its-kind ABC/TBC Combustor system was installed. In addition, the selection of a Reverse Osmosis unit to reduce boiler blowdown and to provide feed water further reduced energy use and emissions.

EPA and DOE are proud to recognize the important pollution reduction and energy efficiency qualities of this project by presenting BP Solvay Polyethylene North America with the 2001 CHP Certificate of Recognition.

Trigen-Cinergy Solutions of Ashtabula CHP Project
In 2001, Trigen-Cinergy Solutions of Ashtabula LLC began operation of a 25-MW combined-cycle CHP facility to provide electricity and steam to Millennium Chemicals in Ashtabula, Ohio. The facility consists of 5 Rolls Royce 501-KB7 model gas turbines with heat recovery steam generators (HRSG). Four of the HRSGs include duct firing to increase steam generation, and the facility includes two backpressure steam turbines to generate additional electricity and reduce steam pressure.

EPA and DOE are proud to recognize the important pollution reduction and energy efficiency qualities of this project by presenting Trigen-Cinergy Solutions of Ashtabula with the 2001 CHP Certificate of Recognition.

Winners of the 2000 ENERGY STAR®
CHP Awards and Certificates of Recognition

2000 ENERGY STAR® CHP Awards

The College of New Jersey CHP System
In 1999, the College of New Jersey replaced its existing 3.2–megawatt (MW) gas turbine with a 5.2-MW gas turbine. The upgrade increased both output and efficiency of the combined heat and power (CHP) unit while decreasing nitrous oxide emissions. The CHP facility now supplies 90 percent of total campus electrical requirements, along with space heating and cooling. The combined efficiency of the plant allows it to operate using 13 percent less fuel than modern separate heat and power.

EPA and the Department of Energy (DOE) are proud to recognize the College of New Jersey for the significant fuel savings realized through the use of highly efficient CHP technology.

Winners of the 1999 ENERGY STAR®
CHP Awards and CHP Certificates of Recognition

1999 ENERGY STAR® CHP Awards

The Dow Chemical Company CHP Project
The Dow Chemical Company's Texas Operations facility in Freeport, Texas, has been cogenerating since the mid-1980s and continues to expand as the need for power and steam grow. Dow's Power Conversion Project in Freeport uses 14 percent less fuel than modern separate heat and power. Company-wide, Dow cogenerates the majority of its electric demand.

EPA and the Department of Energy (DOE) are proud to recognize the Dow Chemical Company for the significant fuel savings realized at the Freeport, Texas Power Conversion Project through the use of highly efficient combined heat and power (CHP) technology.

Louisiana State University and Sempra Energy Services CHP Project
In 1992, Sempra Energy Services installed a cogeneration facility at Louisiana State University (LSU) to meet the campus's chilled water and steam requirements. The energy and financial savings convinced the university to exercise its option to buy out the project after only two years of operation. The direct mechanical drive chiller combined with heat recovery enable the plant to operate using 14 percent less fuel than modern separate heat and power.

EPA and DOE are proud to recognize LSU and Sempra Energy Services, for the significant fuel savings realized at the LSU central plant chiller facility through the use of highly efficient CHP technology.

Trigen Energy Corporation CHP Projects
EPA and DOE are proud to recognize Trigen Energy Corporation for five CHP projects that realized significant fuel savings through the use of highly efficient combined heat and power technology at the following facilities:

- **Oklahoma City Energy Corporation CHP Project.** In 1989, Trigen Energy Corporation purchased a central heating and cooling facility servicing downtown Oklahoma City, Oklahoma. Almost immediately, Trigen began improvements to the plant to increase efficiency and reduce emissions. The CHP technology used at this facility uses 12 percent less fuel than modern separate heat and power.

- **Tulsa Energy Corporation CHP Project.** In 1989, Trigen Energy Corporation purchased a 19-year-old district heating and cooling facility from the local gas utility company in Tulsa, Oklahoma. Trigen improved the heating and cooling production equipment and also installed a 500-kilowatt (kW) back pressure steam turbine to generate electricity from high pressure steam that was previously expanded through a pressure reducing valve. The technology at this facility uses 11 percent less fuel than modern separate heat and power.

- **Peoples Gas at McCormick Place CHP Project.** In 1995, the McCormick Place Convention Center in Chicago, Illinois, expanded and additional capacity was required. Trigen Energy Corporation integrated the existing equipment with a 8.5-million gallon thermal energy storage system. The technology at this facility uses 11 percent less fuel than modern separate heat and power.

- **Trenton Energy Company, L.P. CHP Project.** In 1983, Trigen Energy Corporation developed a district energy system producing hot water, chilled water, and electricity to serve downtown Trenton, New

Jersey. The technology at this facility uses 13 percent less fuel than modern separate heat and power and also utilizes a desiccant dehumidification system.

- **Philadelphia Grays Ferry Project.** In 1997, Trigen Energy Corporation began operation its 170-MW combined cycle district energy project in Philadelphia, Pennsylvania. The Grays Ferry facility uses 13 percent less fuel than modern separate heat and power.

1999 CHP Certificates of Recognition

All Systems Cogeneration CHP Projects
Since 1995, All Systems Cogeneration, headquartered in Bayshore, New York, has installed high-efficiency and low-polluting gas internal combustion engines in 11 New York retirement centers. These projects demonstrate the outstanding use of cogeneration.

EPA and DOE are proud to recognize All Systems Cogeneration for the superior environmental performance of its 11 CHP projects.

Malden Mills CHP Project
In 1999, Malden Mills installed two turbines as part of a pilot program in Lawrence, Massachusetts. The turbines, manufactured by Solar Turbines, use continuous fiber ceramic composite combustion liners, which reduce nitrous oxide emissions while avoiding the expense and energy losses associated with end-of-pipe pollution controls.

EPA and DOE are proud to recognize Malden Mills for the superior environmental performance of the Lawrence, Massachusetts, Power Plant achieved through the use of pollution-preventing CHP.

Rutgers University CHP Project
In 1995, Rutgers University replaced its central heating plant, built in 1955, with a cogeneration system to supply electricity in addition to district heating and cooling. Annual savings amount to $1.5 million to $2 million when compared to boilers and purchased electricity.

EPA and DOE are proud to recognize Rutgers University for the superior environmental performance of the Busch Cogeneration Plant achieved through the use of pollution-preventing CHP.

The University of North Carolina at Chapel Hill CHP Project
In 1992, The University of North Carolina at Chapel Hill installed a circulating fluidized bed coal cogeneration facility. This facility features quiet, clean, and efficient operation while burning coal as a primary fuel in the midst of residential surroundings.

EPA and DOE are proud to recognize the University of North Carolina at Chapel Hill for the superior environmental performance of the central utility plant achieved through the use of pollution preventing CHP.