

## Progression of Campus Sustainability Planning

**2003:** ESF adopts Vision 2020 strategic plan

**2008:** King & King completes Combined Program of Study

**2009:** Architerra begins Gateway Building design

ESF submits its climate action plan, ECN 2015

**2010:** ESF breaks ground on Gateway Building



## The Design Firm

Architerra Inc. is a Boston-based architecture and planning firm dedicated to advancing sustainable design across a broad range of project types. The firm was established in 2004 by Ellen Watts and Dan Aros, who were soon joined by a third principal, Daniel Bernstein. Architerra's staff is 100 percent LEED accredited.

Architerra has been responsible for the planning and design of 28 green buildings and sustainable campus plans, including seven buildings designed to LEED Gold and Platinum standards.



# ESF's Gateway Building

Innovative, integrated, high-performance design generates significantly more energy than the building consumes.



The ESF Gateway Building overlooks Forestry Drive.

## The Building

The SUNY College of Environmental Science and Forestry's (ESF) Gateway Building houses space for conferences, events, exhibitions, administrative offices and food services. As part of the transformational expansion of the ESF campus, the Gateway Building gives visitors a snapshot of what ESF represents. The design of this high-performance building explores financially feasible and technologically sound strategies to operate using renewable energy, produce its own power, create a carbon-neutral facility, and conserve resources in innovative ways. The building is designed to achieve LEED Platinum certification.

## How Is U.S. Green Building Council LEED Platinum Certification Determined?

LEED certifications are awarded according to credits earned in seven topic areas, such as water efficiency, energy and atmosphere, and materials and resources. A Platinum distinction requires the highest standards in these areas, as determined by the following point distributions:

- Certified 40–49 points
- Silver 50–59 points
- Gold 60–79 points
- Platinum 80 points and above

To learn more about the U.S. Green Building Council and LEED certification visit: [www.usgbc.org/](http://www.usgbc.org/).

# Environmental Innovations

Utilizing green building standards makes the Gateway Building a representation of ESF's academic programs.

## Gateway Building Energy Features

- Contains 50,000 square feet of space
- Produces significantly more energy than it consumes
- Features a large roof-mounted photovoltaic array
- Houses a biomass-fueled combined heat and power system
- Employs a natural ventilation system with radiant floor heating
- Features lighting occupancy sensors and natural day lighting controls

Learn more about existing green building features at ESF:

[www.esf.edu/sustainability](http://www.esf.edu/sustainability)

## The Gateway Building's Other Features

The Gateway Building includes a number of elements that enhance student life and fulfill a variety of needs for the campus community.

They include:

- An event center
- A new and larger College Bookstore
- An exhibition gallery
- A new College cafeteria
- A sustainable green roof made from native plants with a walkout observation deck
- Roof-mounted photovoltaic and solar thermal systems
- A fitness center



The Gateway Building's green roof consists of native plants.

## Gateway Building Objectives

- Serves as the “gateway” to the ESF community and a benchmark for the College’s second century of leadership in environmental education
- Acts as the physical representation of ESF’s academic programs and institutional commitment to sustainability
- Decreases ESF’s fossil fuel dependence and energy costs
- Reduces campus carbon footprint
- Utilizes the local biomass effectively and efficiently
- Features a vegetated roof consisting of specialized plant communities to provide teaching and research opportunities

## Systems Design

- Begins with a high-performance building envelope; a bioclimatic façade controls thermal loss and solar gain to minimize building design loads
- Integrates building design with innovative energy systems connecting to campus infrastructure
- Uses renewable fuels to contribute to the reduction of ESF’s carbon footprint
- Showcases a variety of technologies to further research, community engagement and ESF’s educational mission

# Creating Sustainable Energy

The Gateway Building was designed to use 36 percent of the energy consumed by a typical, comparable building.

## Gateway Building Energy Use

- Annual energy use: 1,874 million Btu
- Energy intensity: approximately 37 kBtu/sf/yr

## Gateway Building Energy Technologies

- 8,000 MBtu CHP wood pellet steam boiler
- 8,000 MBtu natural gas boiler
- 200 kW back-pressure steam turbine
- Three 65 kW CHP Natural Gas Microturbines
- Solar thermal demonstration project
- 100 kW solar PV array

## CHP System Output

### Thermal Output

Provide more than 65 percent of campus heating needs (35,000+MMBtu/yr)

### Electrical Output

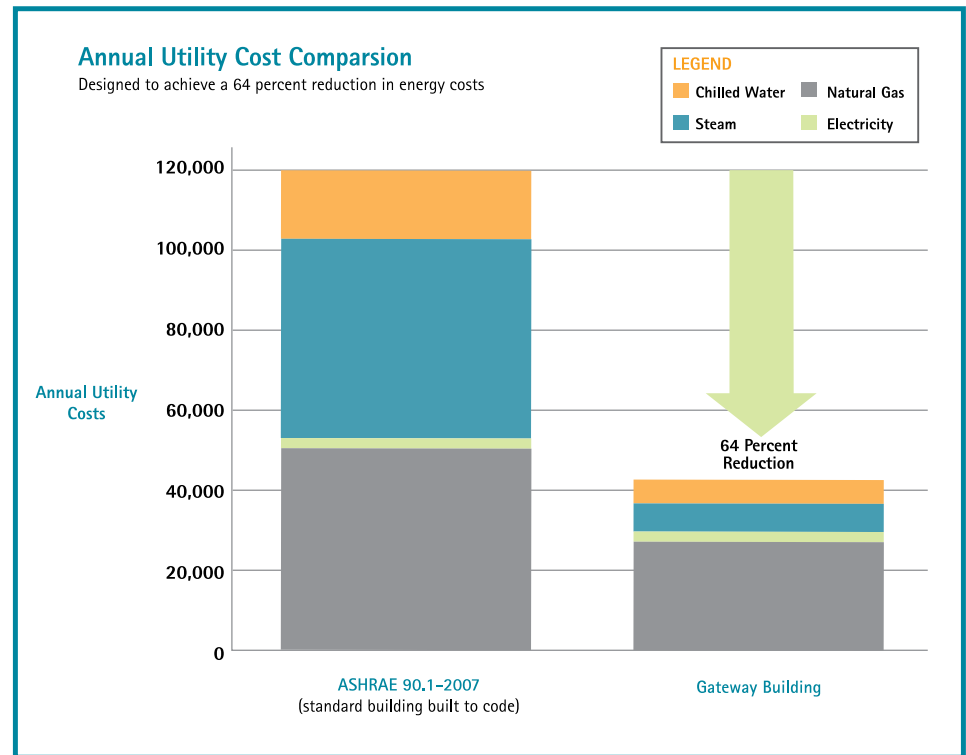
Provide more than 20 percent of campus electrical needs (2,000+ MWh/yr)

### Environmental Impact

Targets more than 22 percent reduction in campus carbon footprint (2,700 MTCO<sub>2</sub>e/yr)

## Additional Savings

- 25 percent improvement to overall efficiency of energy produced for the Gateway building and ESF campus
- Annual savings is the fossil-fuel offset equivalent of some 9,000 barrels of oil or 2,500 short tons of coal



## Gateway Building Energy System Overview

The Gateway Building includes the construction of a new combined heat and power (CHP) system that provides steam and electricity to the Gateway Building and four additional campus buildings.

While the four turbines generate electricity, the resulting heat is recovered from both the steam boiler and turbine exhausts for distribution to the campus and for use, via heat exchangers, in the Gateway Building itself. Cooling is provided by the existing high-performance chiller plant in ESF's Jahn Laboratory.

## Benefits of CHP System

- Twice as efficient as traditional technology
- Heating system captures waste energy and converts it to electricity so there is minimal thermal energy waste output; electricity-generating systems capture waste energy and use it for heating; low-quality energy is not wasted and is instead used for heating
- Runs on biomass

## Cost of a CHP System

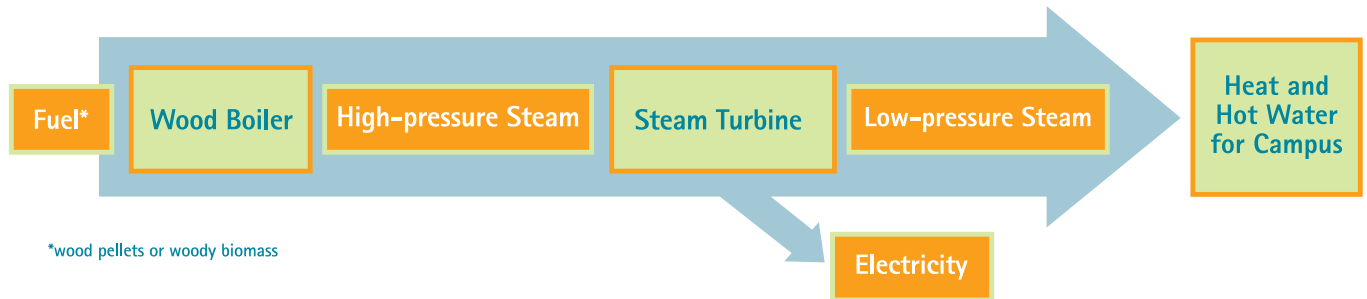
- Total cost: \$3.2 million
- Annual savings: \$350,000
- Grants and incentives: \$963,000 (from NYSERDA)
- 15-year net present value: \$1.5 million

# Using Sustainable Energy

## How Combined Heat and Power (CHP) Works

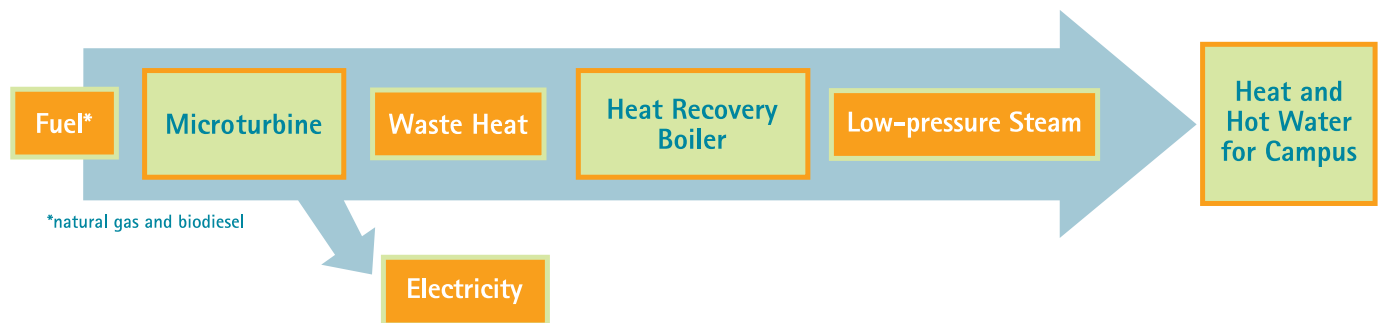
### Gateway Building Biomass System

The CHP System operates consistent with ESF's thermal (heat and hot water) needs. The thermal-rich biomass system operates eight to nine months per year to meet campus heating needs.



### Gateway Building Natural Gas and Biodiesel Microturbine System

The natural gas microturbines with more balanced electric and thermal output operate 12 months per year to meet campus electric and heating needs. The biodiesel microturbine operates three to five months per year to help meet peak electrical needs.



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For more information on ESF's sustainable energy efforts, go to: [www.esf.edu/sustainability](http://www.esf.edu/sustainability)

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