Opened on December 6, 2006, Phipps’ 12,000 square foot Tropical Forest Conservatory was approached as an opportunity to set a new standard in glasshouse design and construction.

**Architect:** IKM, Inc.
**Client:** Phipps Conservatory and Botanical Gardens, Inc.
**Occupancy:** Assembly
**Heating Degree—Days:** -17.8 Degrees C
**Cooling Degree—Days:** 32 Degrees C
**Gross Area Above Ground:** 1,140 m²
**Gross Area Including Below-Ground:** 1,425 m²
**Stories Above Ground:** One
**Estimated Annual Population:** 250,000 in 2008
**Distance from Public Transport Stop:** 300 Meters
**Predicted Annual Motor Car Travel by Visitors:** 1,436,204 Kilometers

**Additional Design Team Members:**
- Greenhouse Consultant: Montgomery Smith, Inc., Burlington, KY
- Owner Representative: INDEVCO
- General Contractor: Turner Construction Co., New York, NY
New and existing technology were combined with fresh design strategies to produce comprehensive solutions that eliminated many of the high costs associated with supplemental heating and cooling of a glasshouse.

Prior to construction, a building performance simulation was performed to model energy and cost savings to be achieved from the palette of innovative strategies.

The first of its kind in the country, the conservatory exhibits a different tropical forest region every two years.

Through 2008, the plants and culture of Thailand are featured. Plans are well underway for a transition to the Amazon region in 2009.

Environmental issues and the culture of each region are interpreted through plant life throughout the conservatory, allowing visitors to better appreciate diversity in our world.
Performance Potential
Fluid Dynamics Study

The Tropical Forest Conservatory design incorporates glass roof openings every other row, creating a passive cooling effect.

In contrast, traditional glasshouse design incorporates minimal venting openings, creating significantly higher temperatures within the building.

Trane Trace 700 Energy and Economics Simulation

Construction: Tropical Forest Conservatory
• Double pane Insulating Glass in specific areas
• Automatic Shading at night
• Rootzone Heating and Unoccupied Setback to 16°C

Annual Energy Consumption:
• 250 million btus per year for space heating
• 265,000 pounds of steam used per year
• $2,370 annual cost from local steam provider
• $168 annual electrical cost to operate root zone pump during unoccupied hours

Construction: Conventional
• Single pane glass throughout
• No shading
• Maintain 22°C space temperature

Annual Energy Consumption:
• 1,780 million btus per year for space heating
• 1,880,000 pounds of steam used per year
• $16,800 annual cost from local steam provider

Architect: IKM, Inc.
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The Tropical Forest Conservatory is equipped with Argus software, a fully integrated environmental control system, maximizing energy and irrigation efficiency. The anticipatory computer controlled weather and temperature reacting system opens and closes vents according to internal conditions and outside wind direction and speed. While using less energy and water resources, the Tropical Forest Conservatory continually maintains an average cooler temperature of 3 degrees than a traditional glasshouse such as the Palm Court at Phipps Conservatory & Botanical Gardens.

Temperature Comparison: May & June 2008, 4:00PM

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