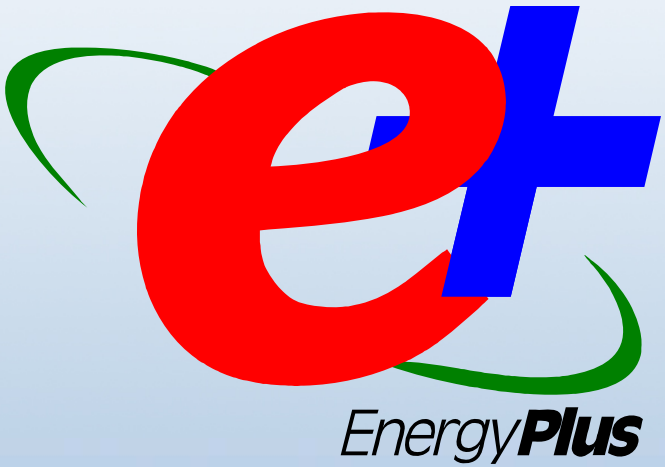
EnergyPlus Plugin for Google SketchUp



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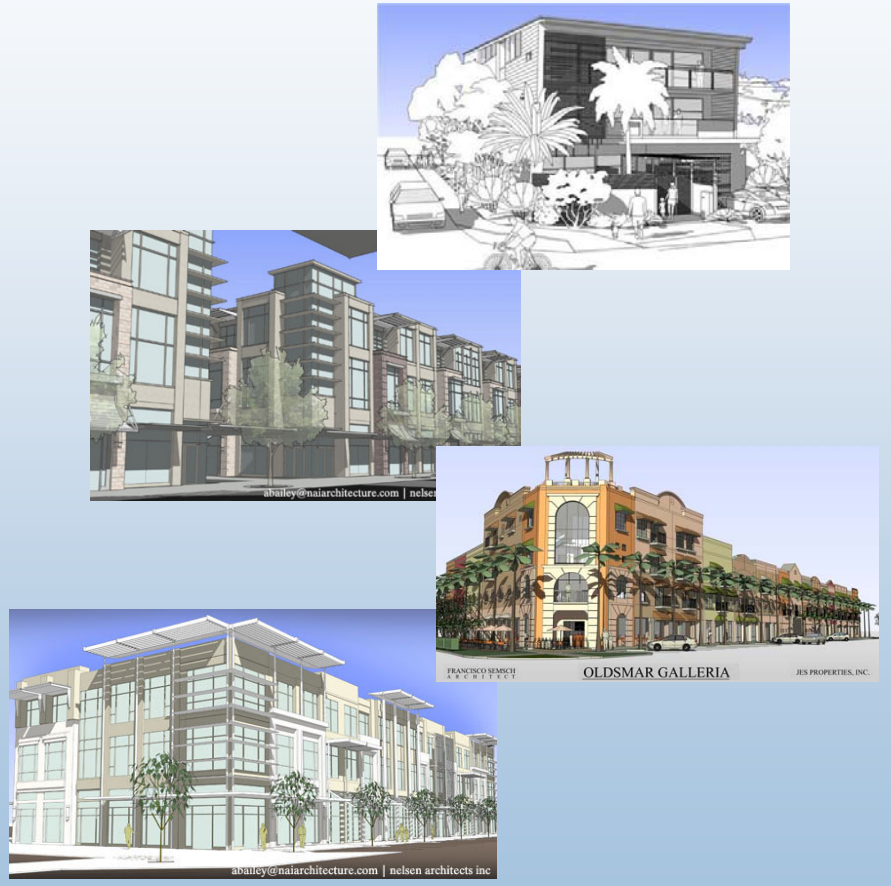
EnergyPlus

- Simulation engine only
- Capabilities beyond other programs
- Certified for EPACT and Title 24
- Continued funding $$$ from DOE
- Free

SketchUp

- Intuitive, easy-to-use 3-D drawing software
- Available from Google as free or pro versions
- Popular among architects
- Powerful API using Ruby programming language for plugins



EnergyPlus Plugin for SketchUp

Adds EnergyPlus functionality
to the SketchUp 3-D environment

- Create/Edit EnergyPlus Input Files
- Run EnergyPlus and view results
- Automatically create compliance model
- Integrate simulation into the early phases of the design process

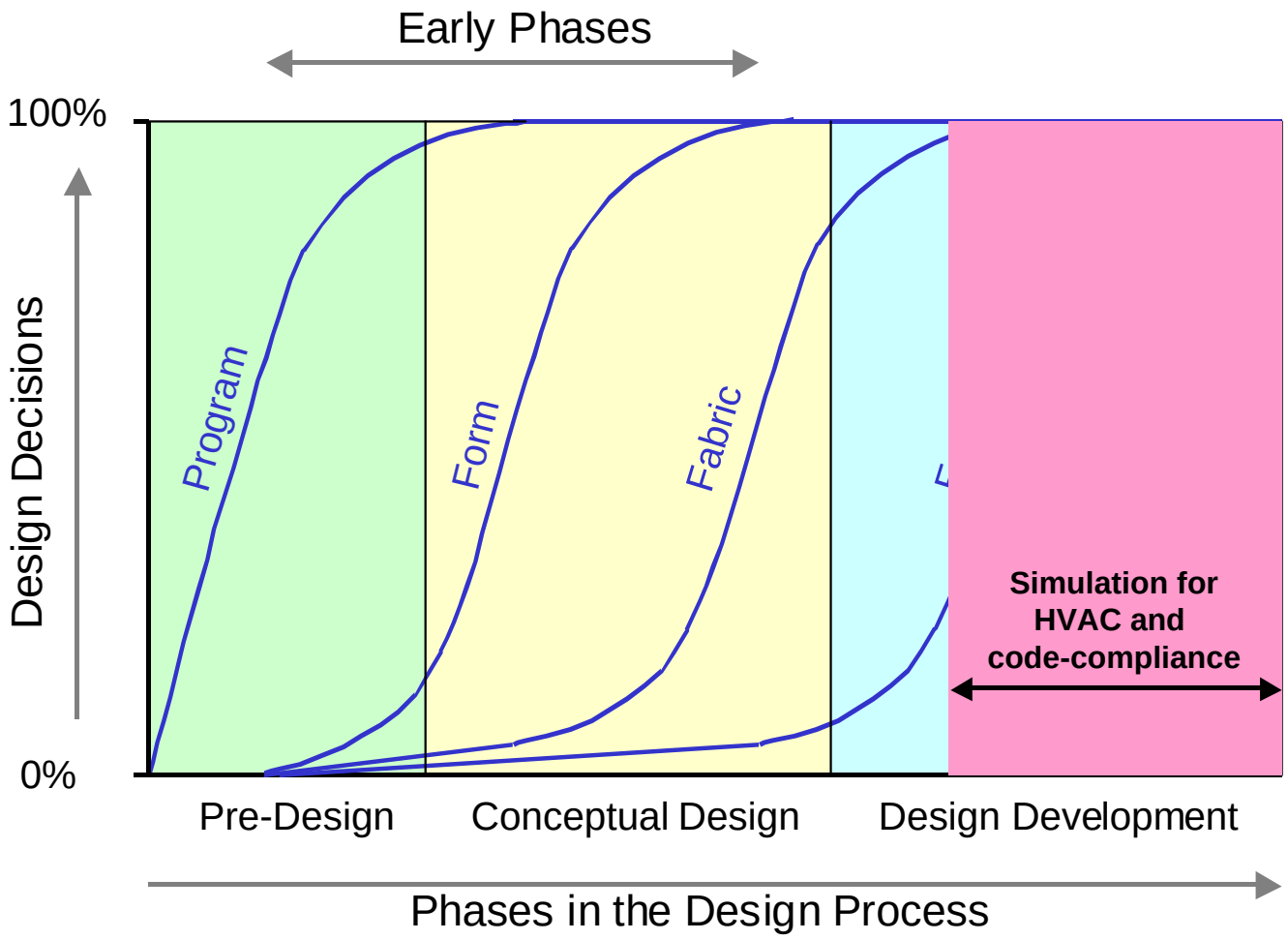
EnergyPlus Plugin for SketchUp

- Developed by NREL
- Still in development
- Initial release scheduled for Sept 2007
- Available for free at www.energyplus.gov
- Works with free and pro versions of SketchUp
- Available for Windows and Mac

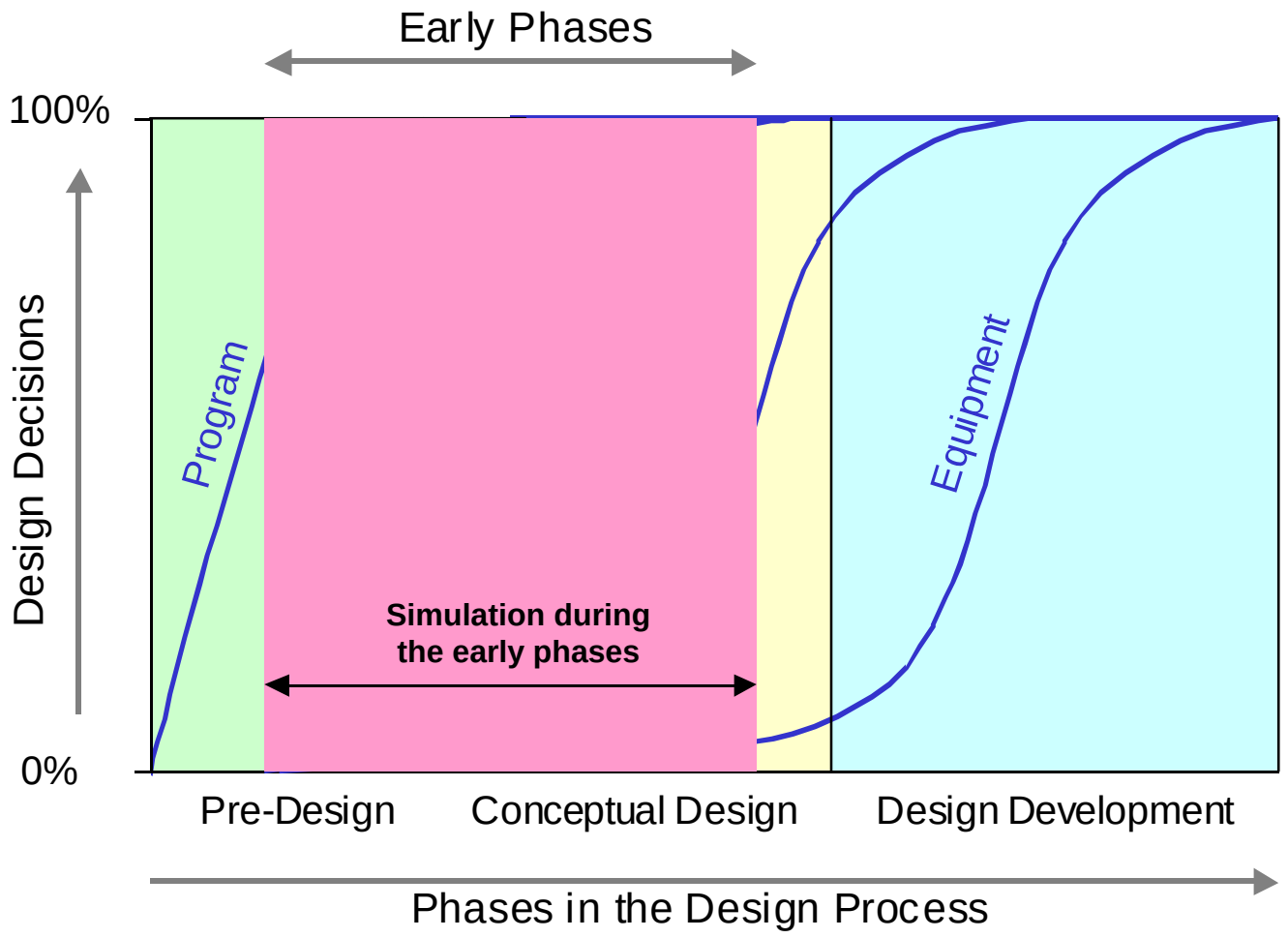
Integrating Simulation into the Early Phases of the Design Process

- "Form" decisions made during the early phases of the design process have a big impact on energy performance
- Traditionally simulation only used for HVAC options and code-compliance
- Simulation during the early phases can help optimize energy performance without adding to the cost of the design

Phases in the Design Process



Phases in the Design Process



SketchUp in the Design Process

- Conceptual Phase:
  - Quickly create building form and massing
  - Present design proposals to client
  - Changes based on client feedback
- Design Development:
  - Export from SketchUp to CAD tool
  - Design refinement with CAD

SketchUp in the Design Process

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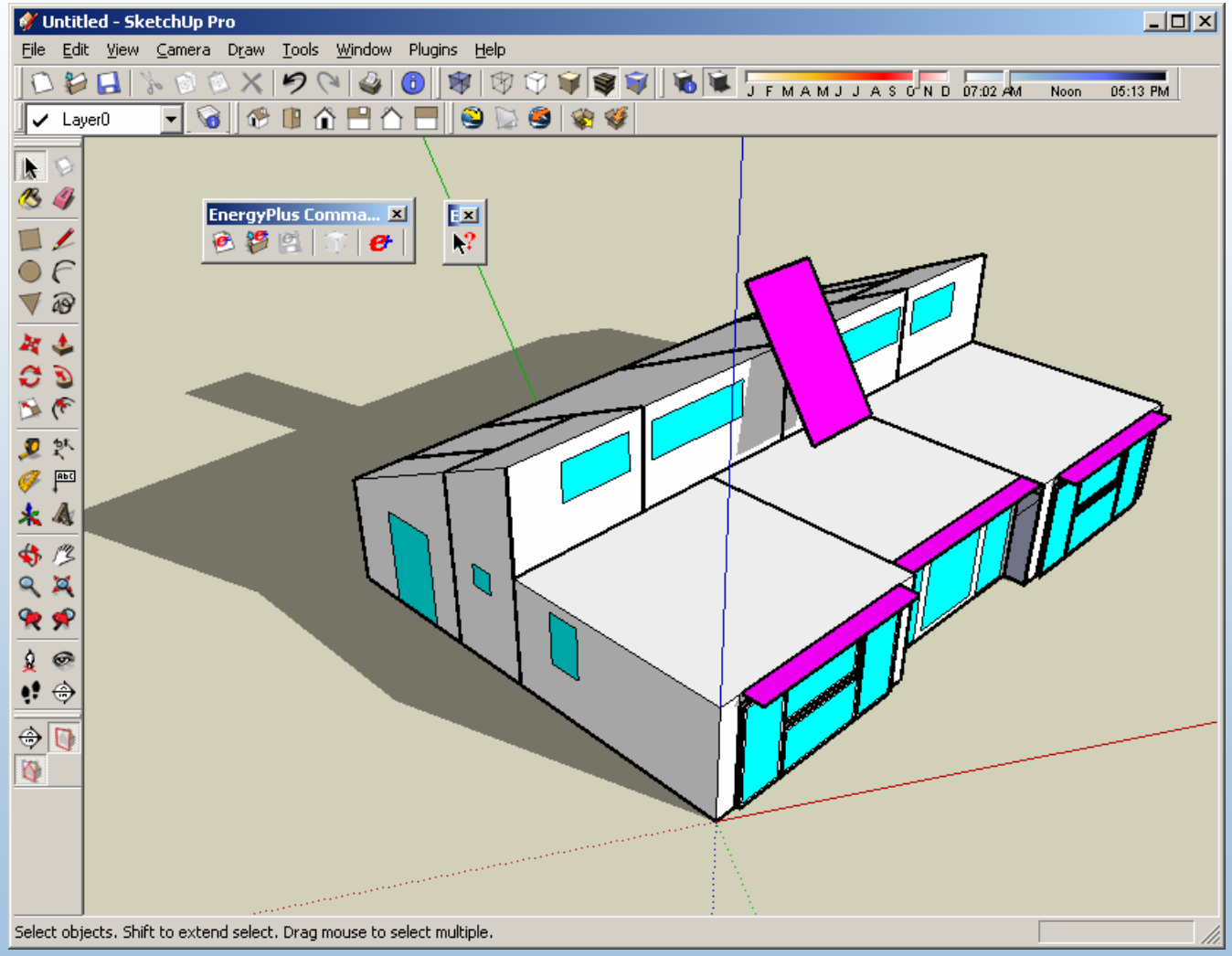
Plugin Screen Shot



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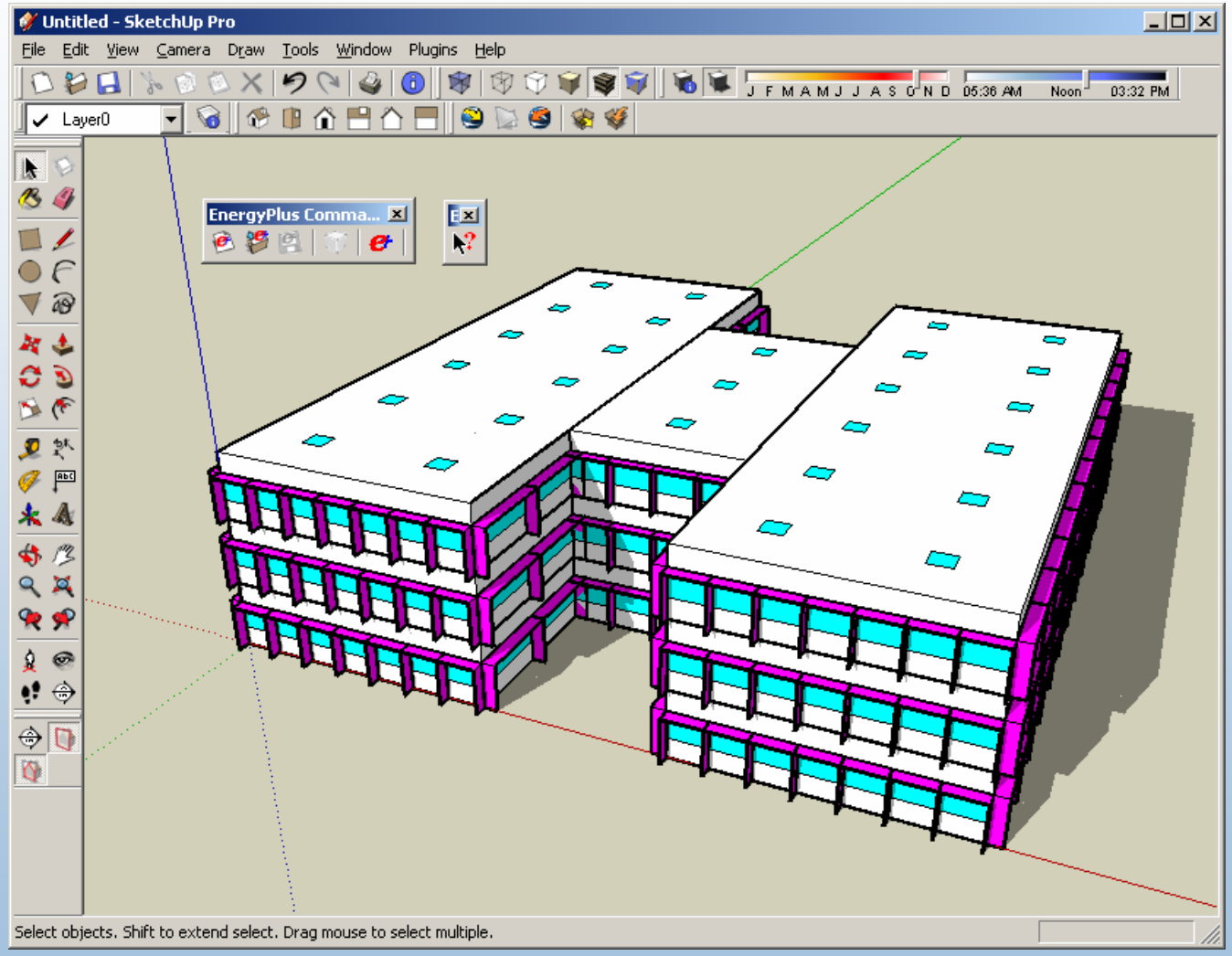

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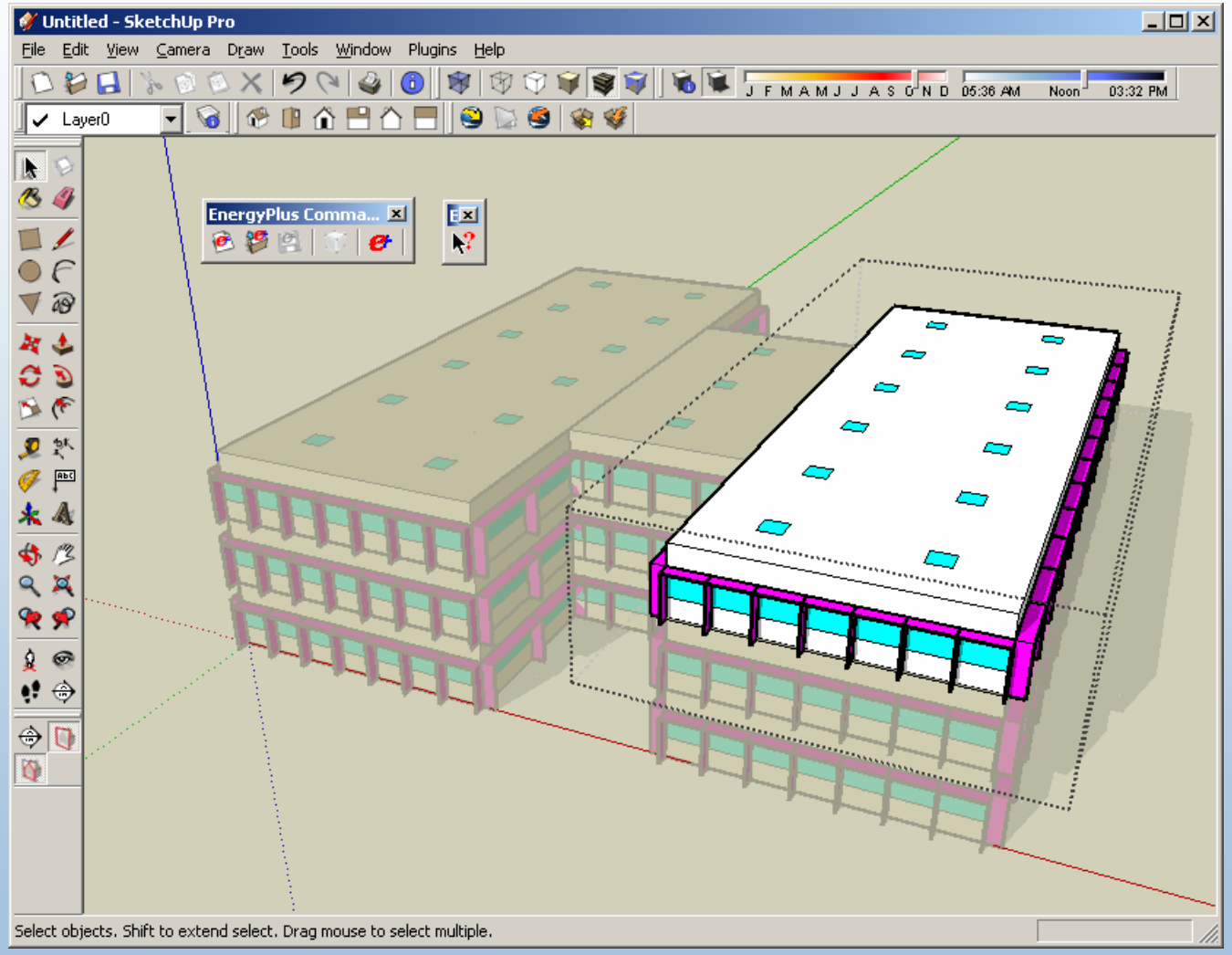
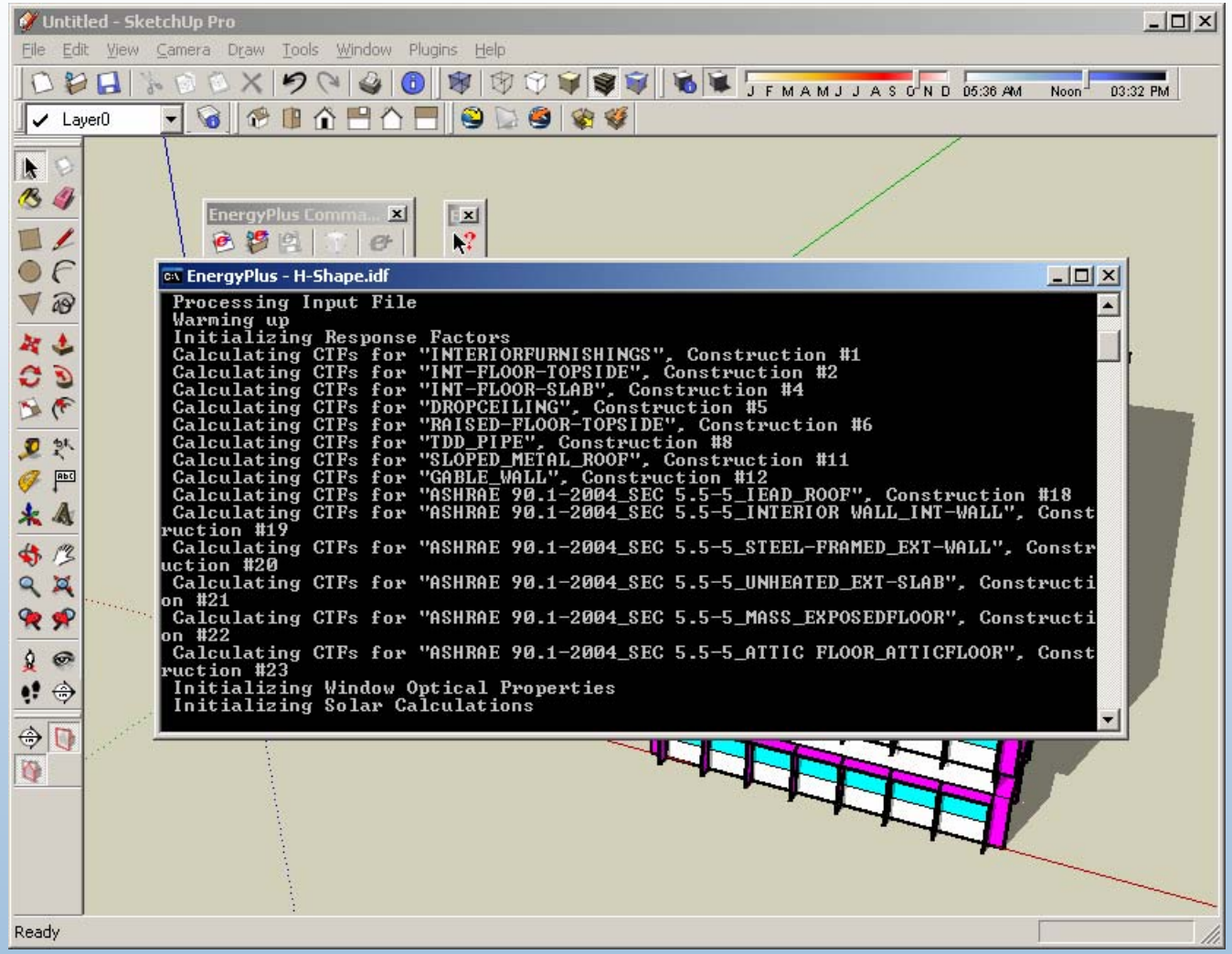


Plugin Screen Shot



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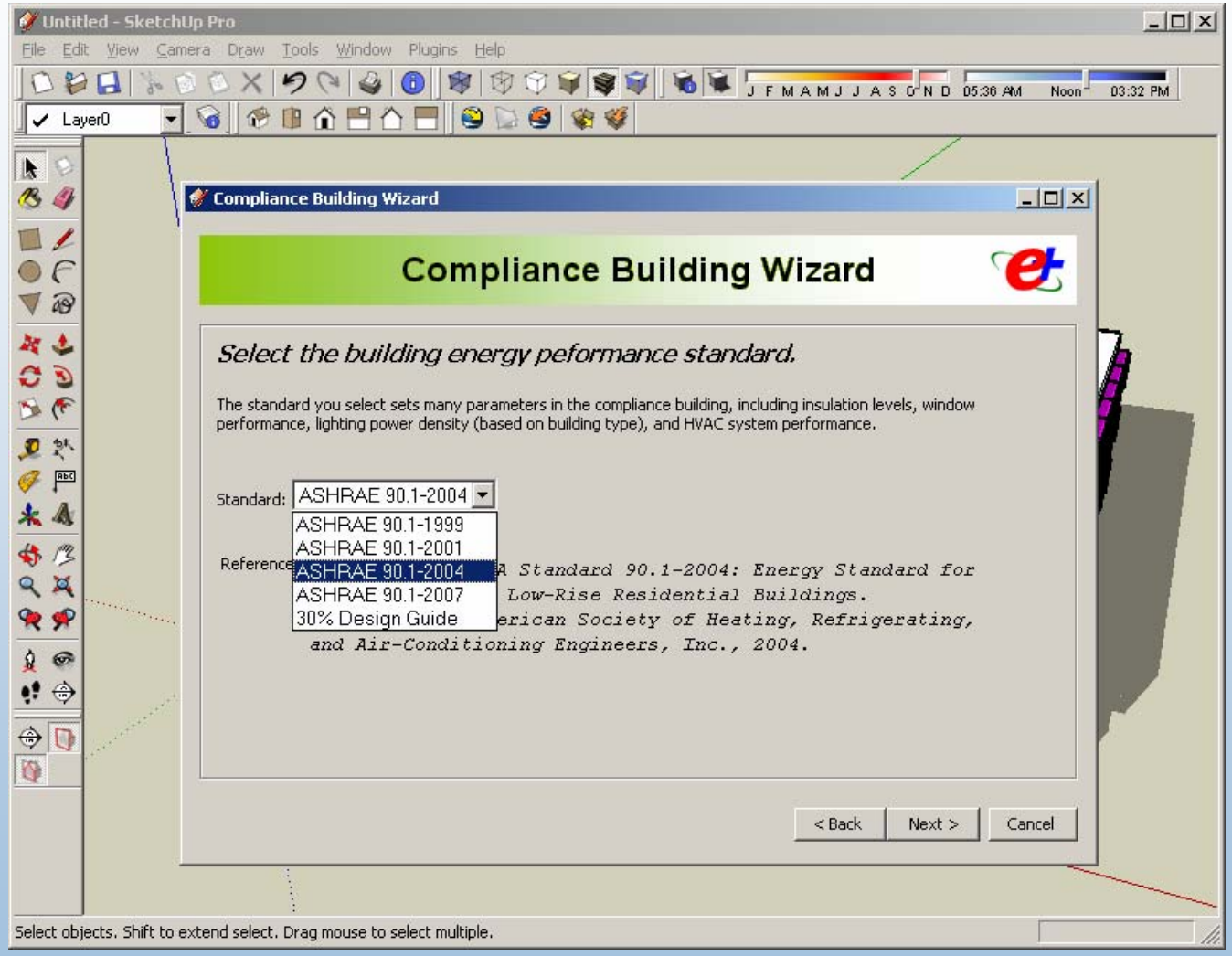

Performance-Based Compliance

- Proposed Building Model
- Compliance Building Model
  - Also: Baseline or Budget Model

Compliance Building Wizard

- Input
  - Code standard
  - Location
  - Construction type
  - Building type
- Output
  - EnergyPlus input file of compliance model

Compliance Building Wizard

- What changes:
  - Insulation levels
  - Window performance
  - Window-to-wall ratio
  - Lighting power density
  - HVAC system
- What does not change:
  - Building form/geometry
  - People and equipment loads (optional)

Prototype Building Wizard

- Input
  - Code standard
  - Location
  - Construction type
  - Building type
  - Total floor area
  - Building shape: Rect, H, L, U, T, Courtyard
  - Other: Window fractions, daylighting, overhangs, fins, HVAC system type, service hot water, PV
- Output
  - EnergyPlus input file of prototype “starter” model

EnergyPlus Plugin, Version 1.0

- Goals
  - Make entering 3-D geometry *easy*
  - Automatic prototype “starter” model
  - Automatic compliance model
- Audience
  - Current E+ users
  - Prospective E+ adopters

EnergyPlus Plugin, Version 2.0

- Goals
  - Manage and edit most simulation inputs
  - Couple to NREL optimization server?
- Audience
  - Simulation experts
  - Brave architects

EnergyPlus Plugin, Version 2.0

- Goals
  - Launch open source project
- Audience
  - Developers in industry
  - Collaborators at national labs, universities
  - Enthusiasts, students

EnergyPlus Plugin, Version X.X

- Goals
  - "Simulation for everyone"
  - Appeal similar to Energy-10
- Audience
  - Engineers
  - Architects
  - Homeowners

Value to Industry

- Key to bringing energy simulation into the early phases of the design process (before architectural drawings or CAD)
- Bridges the gap between simulation tools and the design process
- Demonstration that an existing software tool can be leveraged to add energy functionality without reinventing the wheel

Thank you!

Questions?