

Who we are...



Stephanie Egger

Autodesk Building Science Education Specialist; Building Science + Engineering



Adam Menter

Autodesk Sustainability Education Program Manager Mechanical Engineering



Who you are...

Students?

Educators?

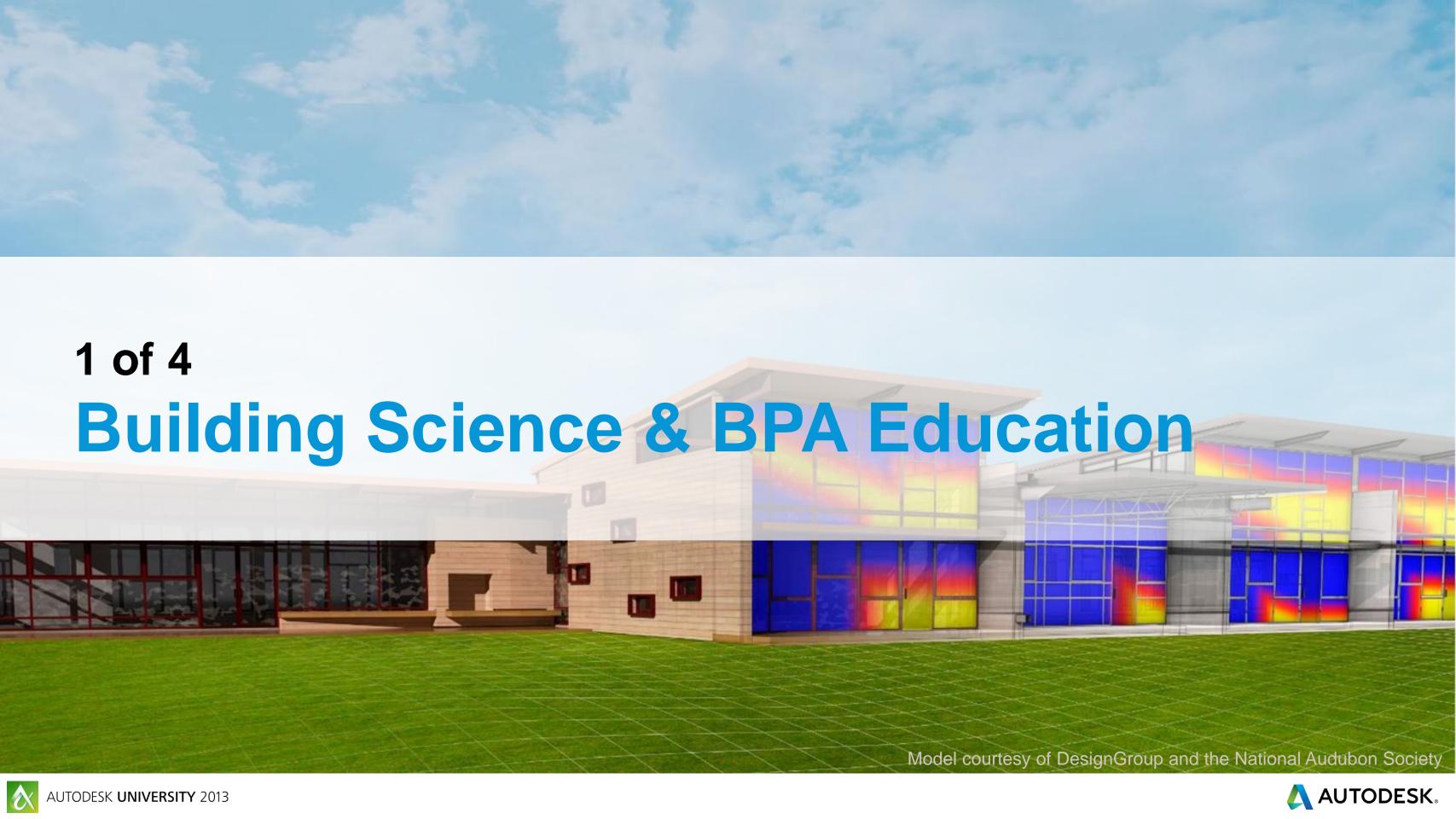
Professionals?

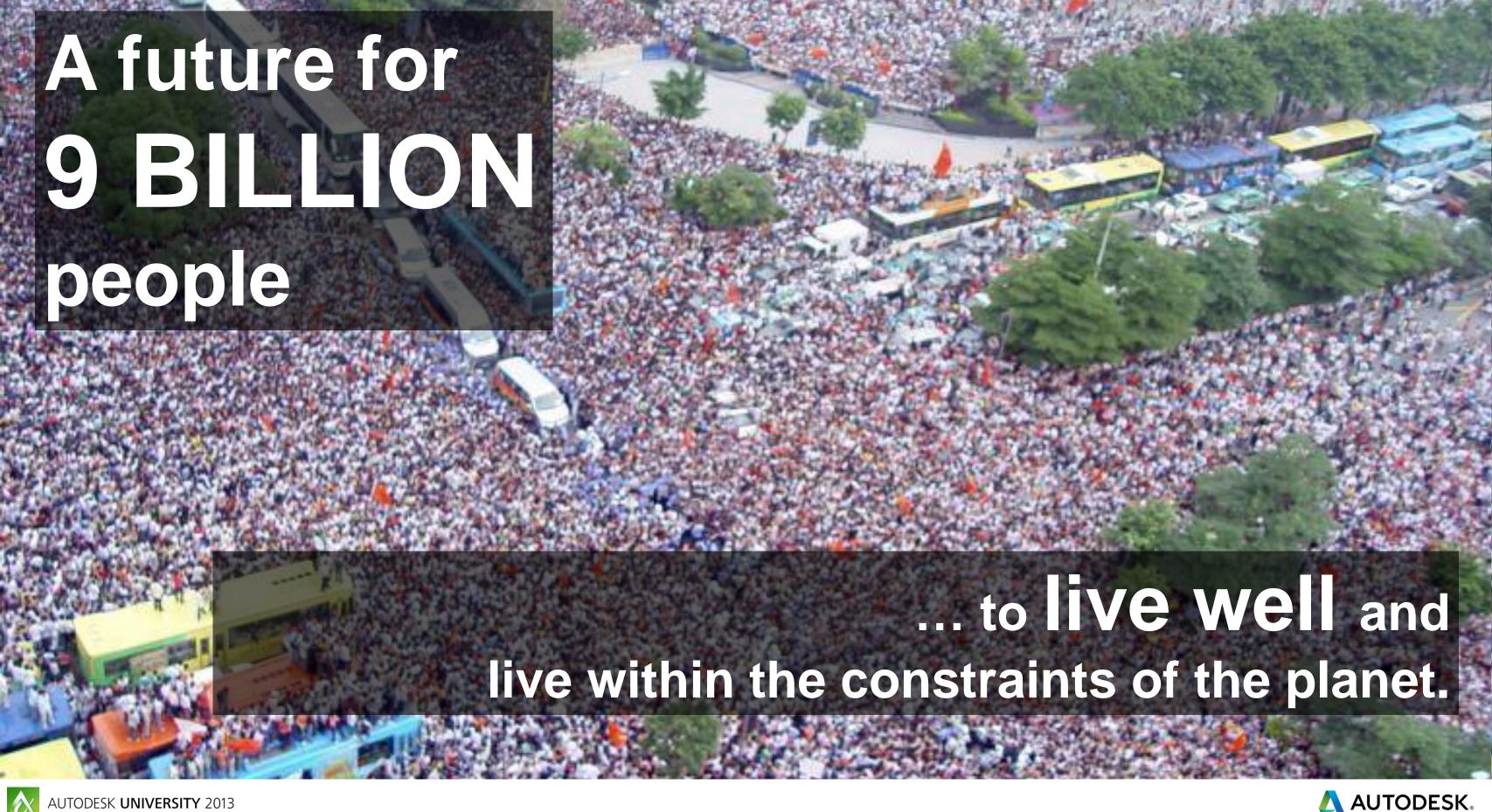


Agenda

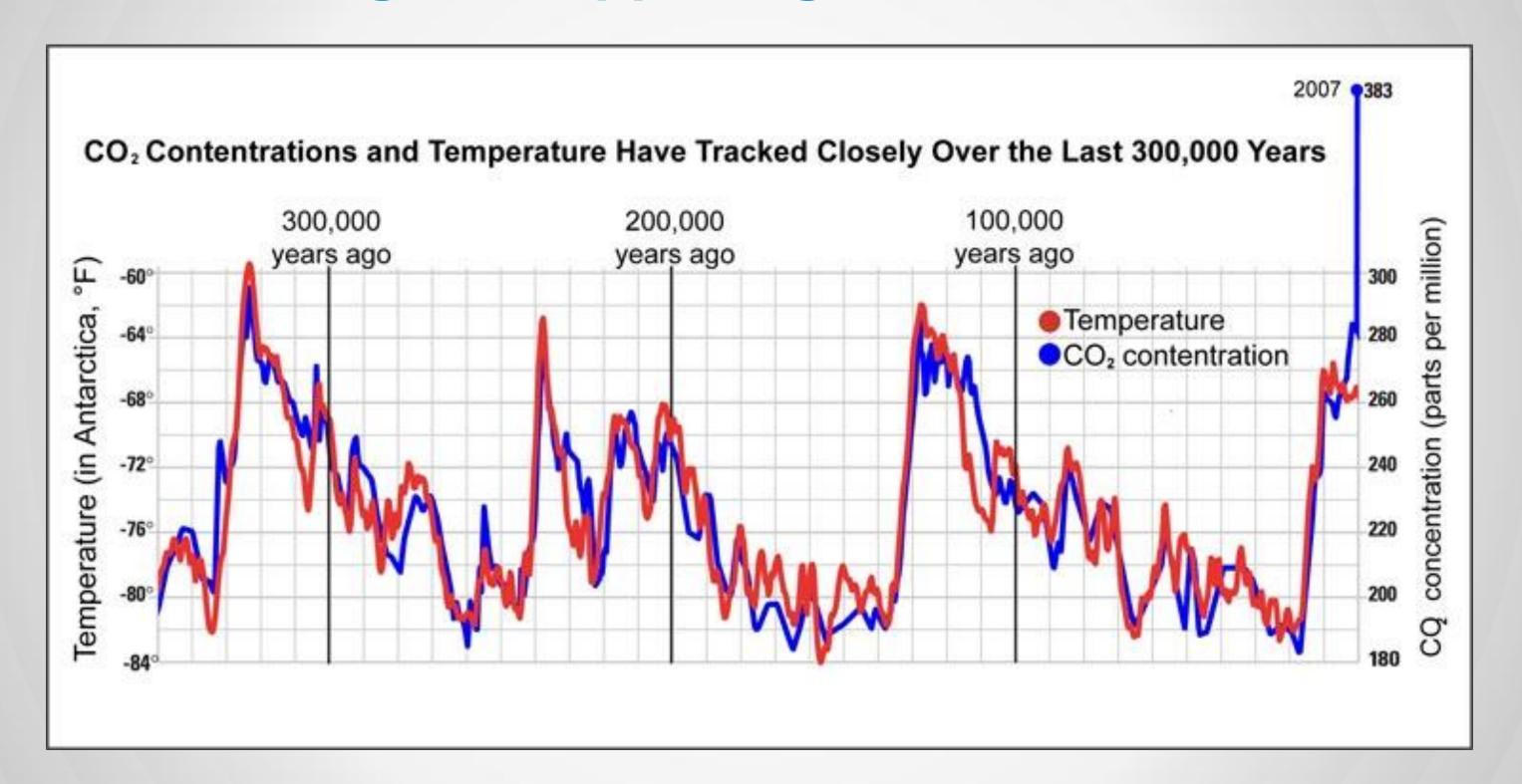
- 1. Importance of building science & BPA education
- 2. Using Autodesk tools in BPA education
- 3. Autodesk BPA education programs
- 4. Discussion





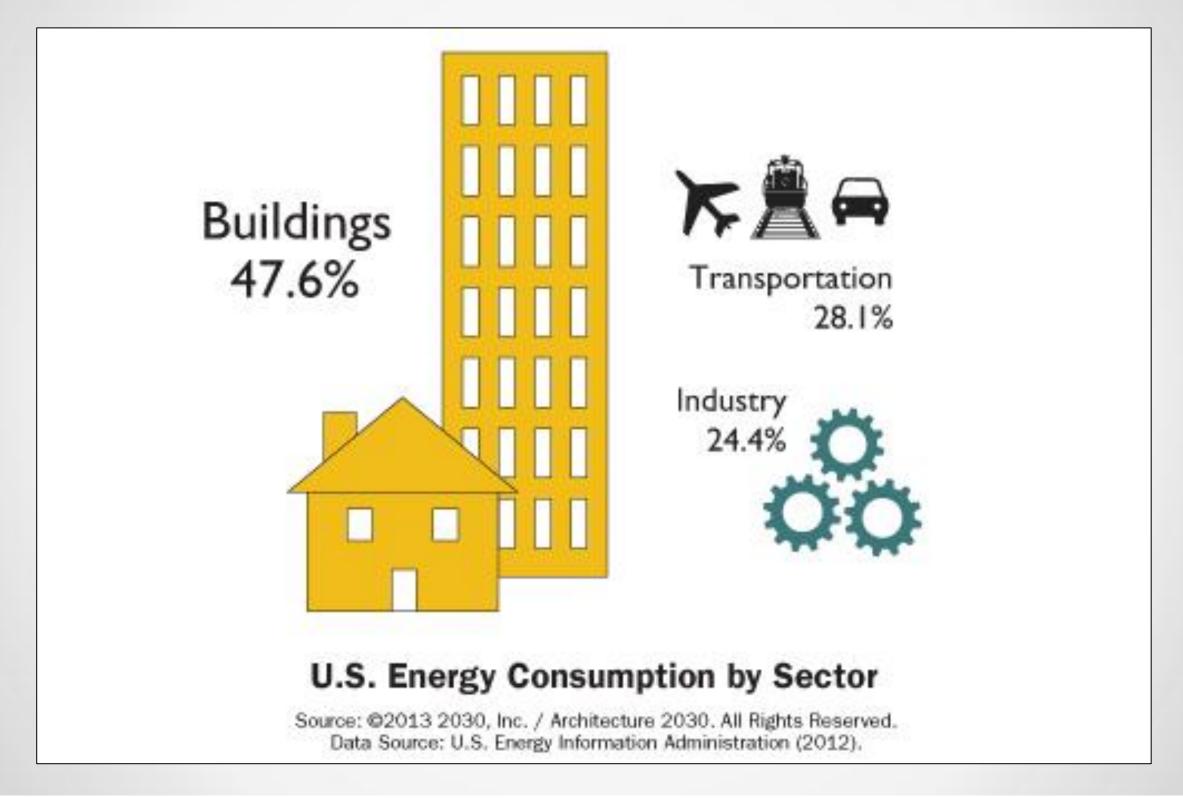


Climate Change is Happening

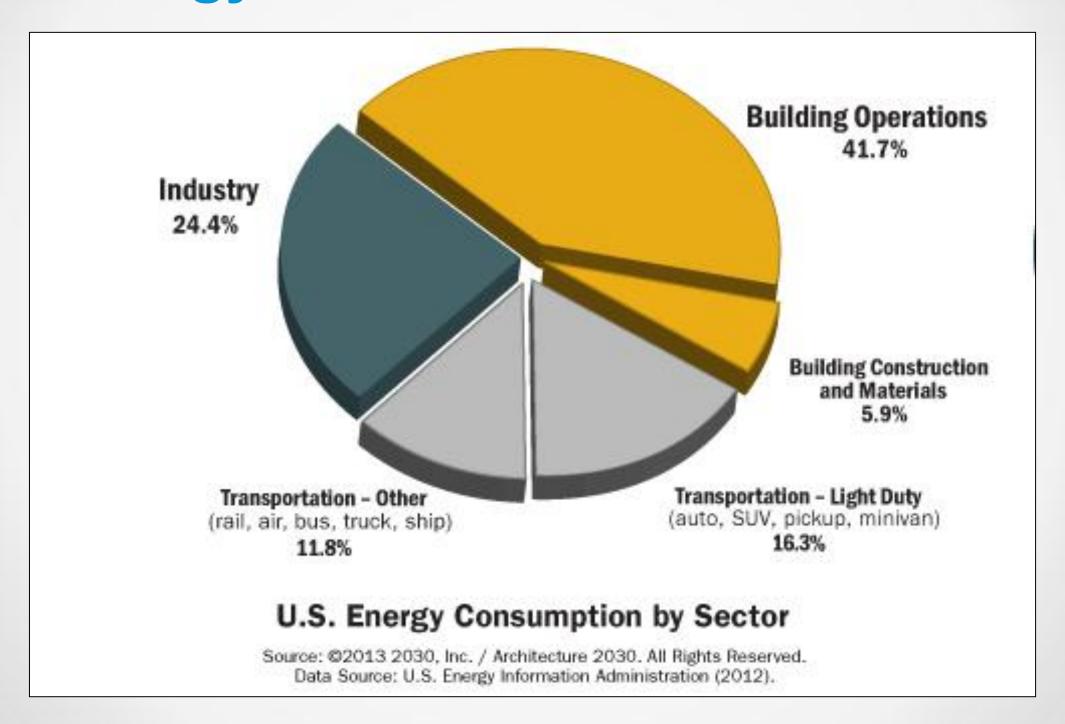




Buildings are the largest driver of energy use



Operational energy use is the largest factor in a building's energy use



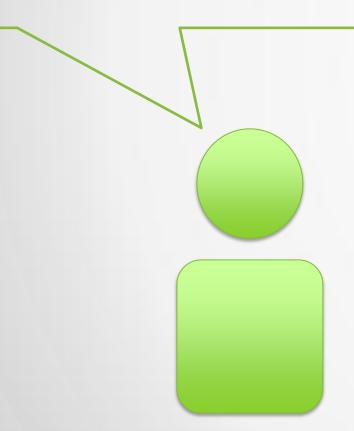


...so let's make sure we can design efficient buildings...



How will you measure the performance of your "sustainable design"?

How do you know that design's going to work?



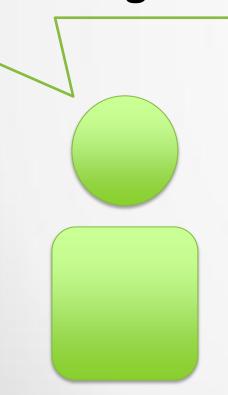
Uhh....

Look! It has a green roof!

"The Architecture Student"

You're learning all of this great stuff about heat transfer and thermodynamics. Do you know how you'll apply that?

Have you ever thought about a career in buildings?



Like cars or airplanes?

No. That's for civil engineers, right?



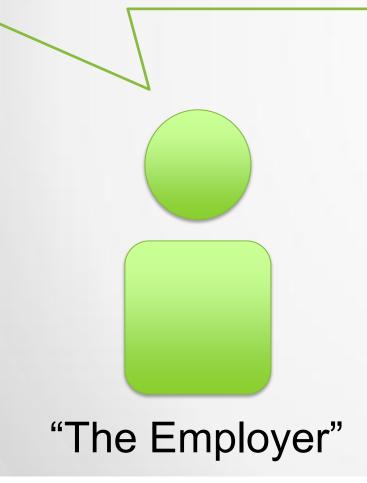
"The Mechanical Engineering Student"

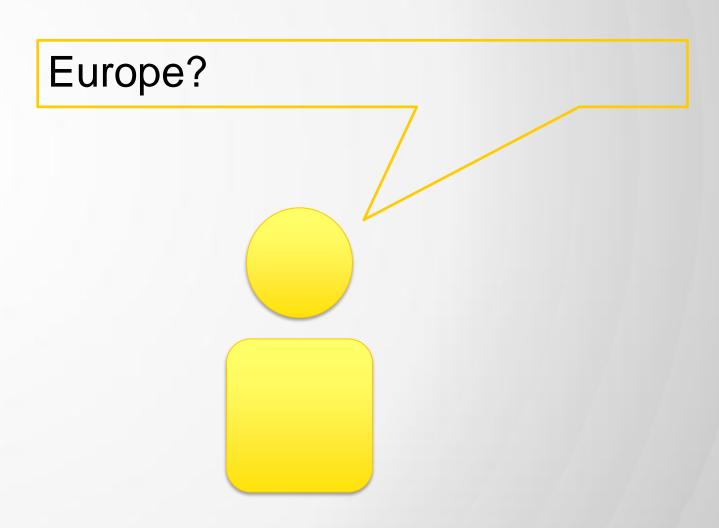




I can't find new graduates that know how to design stuff that works anymore.

Where should I look?







Architecture students don't learn enough building science and analysis.

Many engineering students don't learn about buildings.

Professionals are being asked to use new tools and processes.

Important job skills...

"For hiring it's now a core competency to be able to predict and assess building performance."

David Hinson

Auburn University
Head of School of Architecture,
Planning, & Landscape Architecture





Not enough people have those skills...

56% of architecture firms are having difficulty finding employees with adequate "green skills"

Fall 2012 AIA Survey

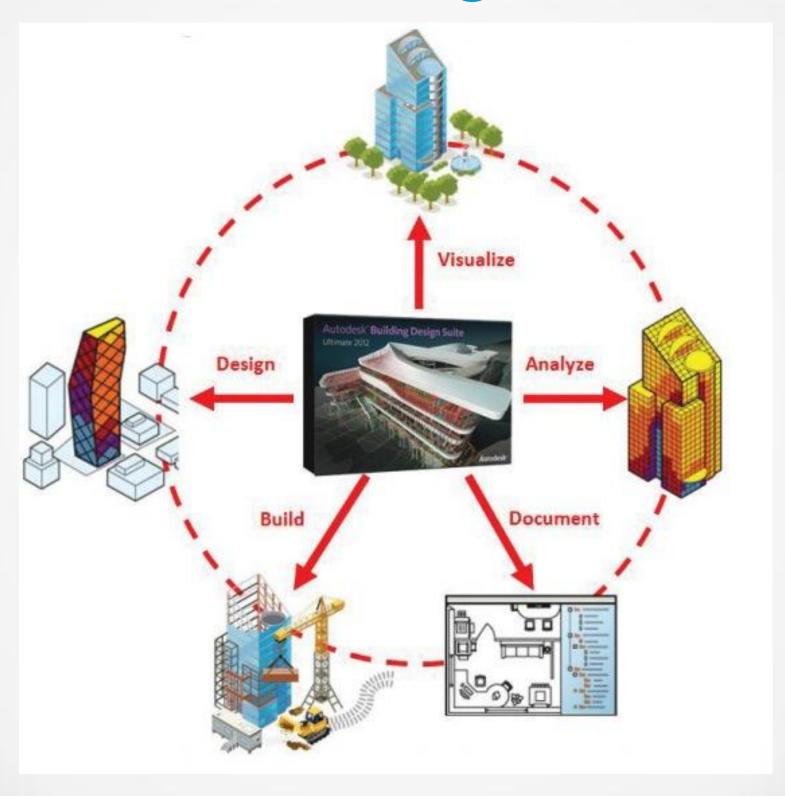


Building science and building performance analysis education is in demand.



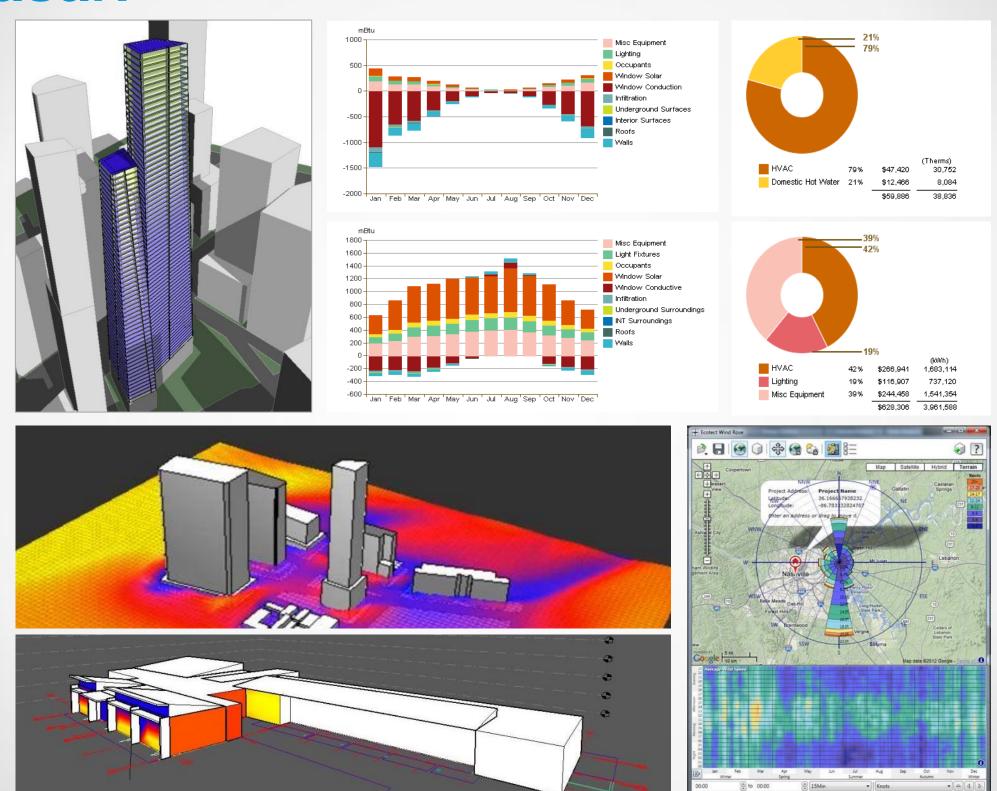


Building Information Modeling





Revit & Vasari



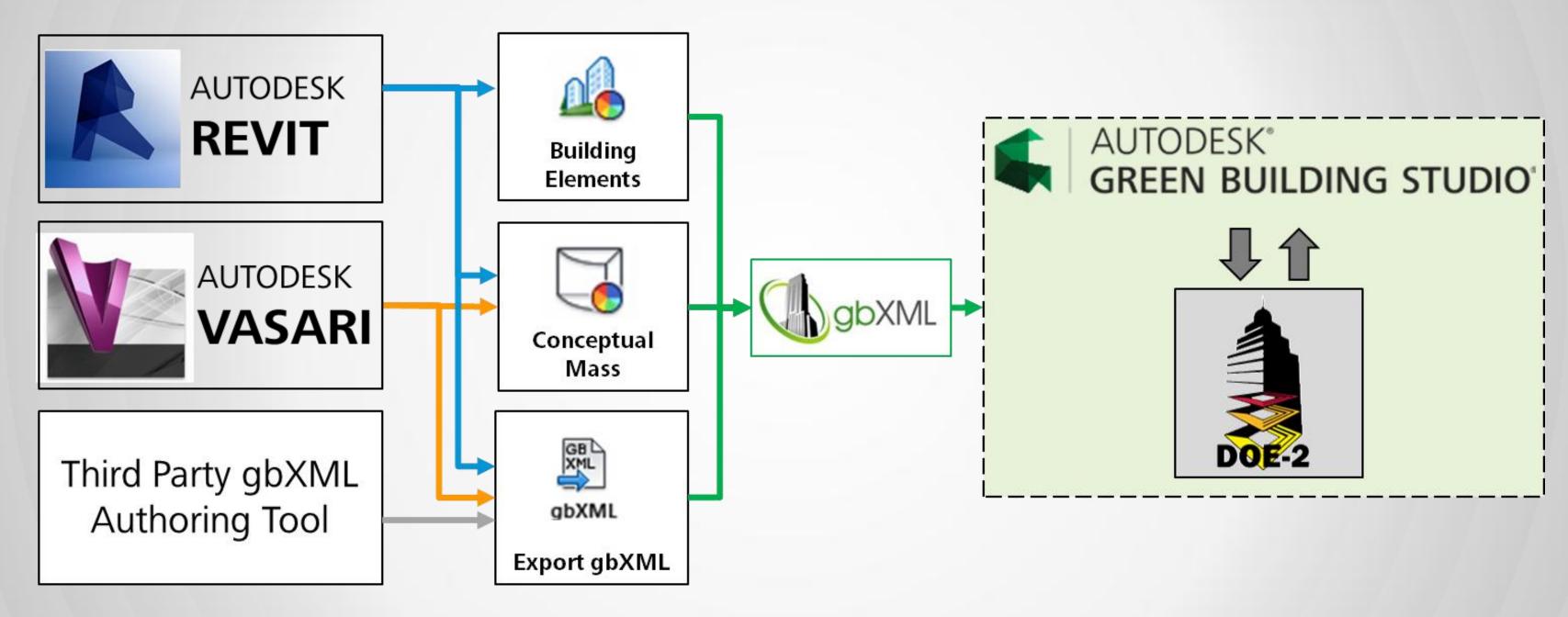


Whole Building Energy Analysis Green Building Studio: Analysis engine, DOE-2

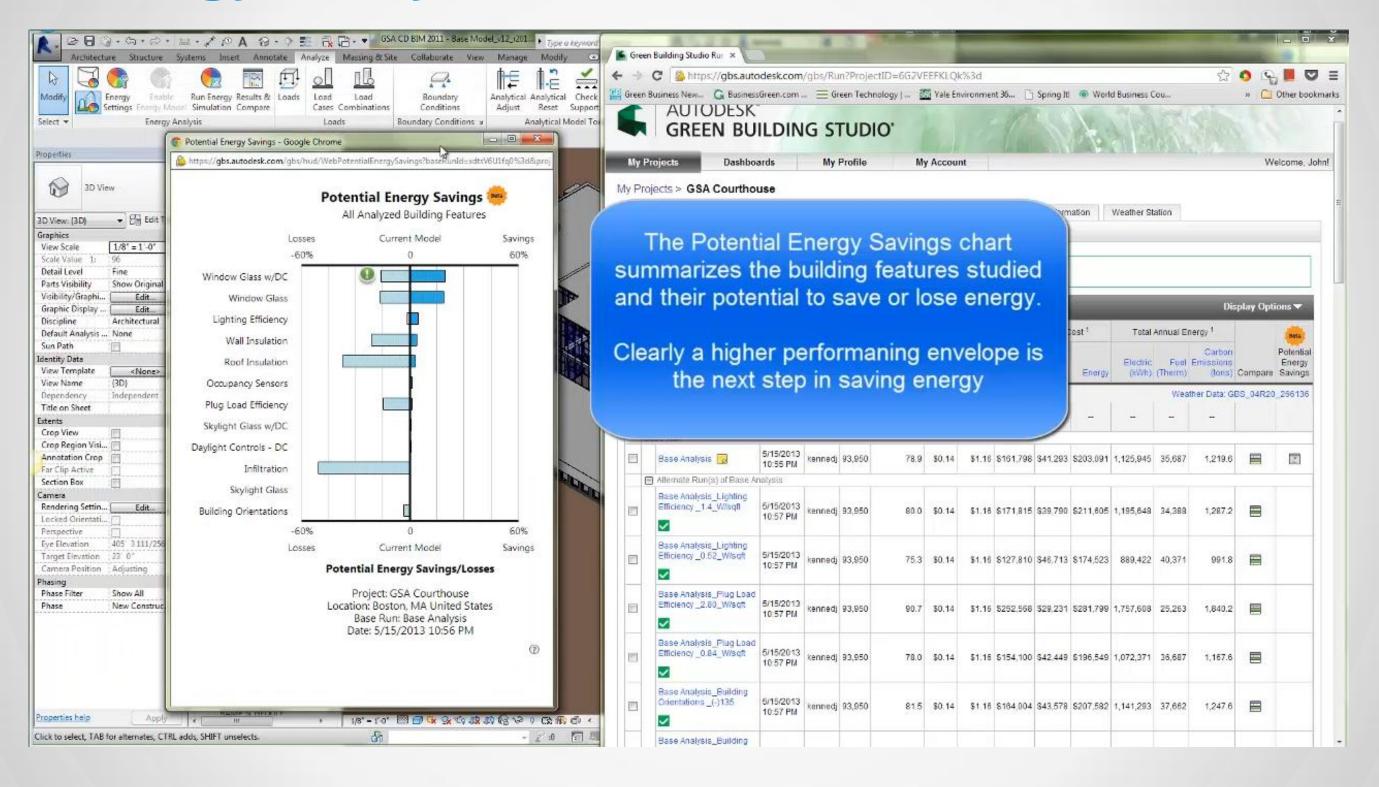




Autodesk Whole Building Energy Analysis

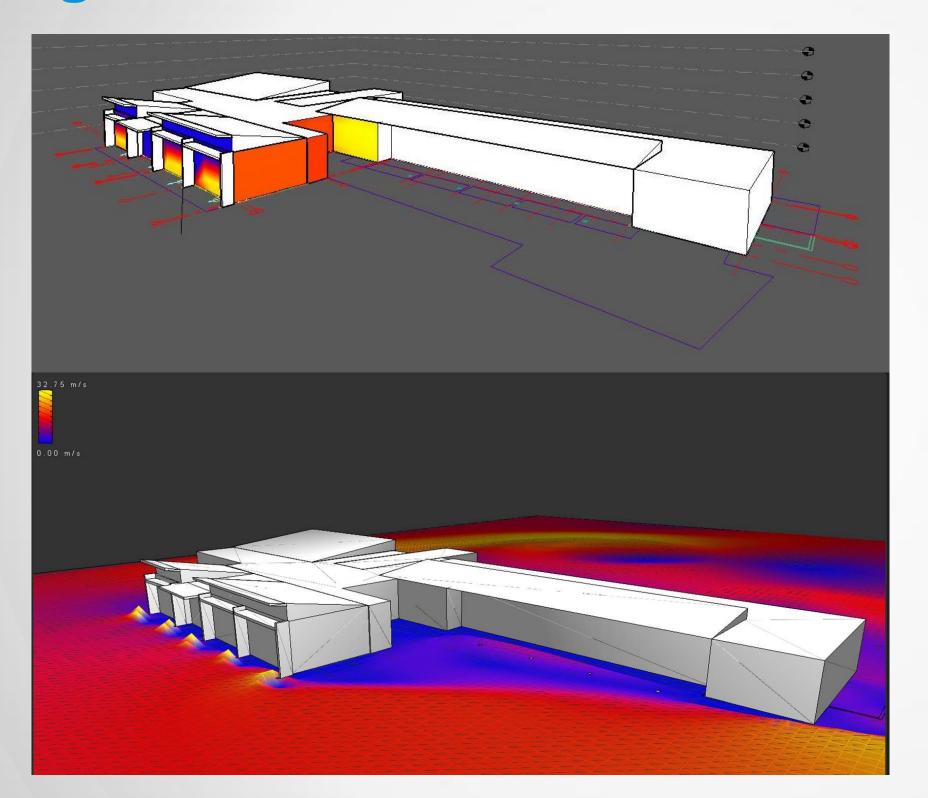


New Energy Analysis Features in Revit





Design Studies

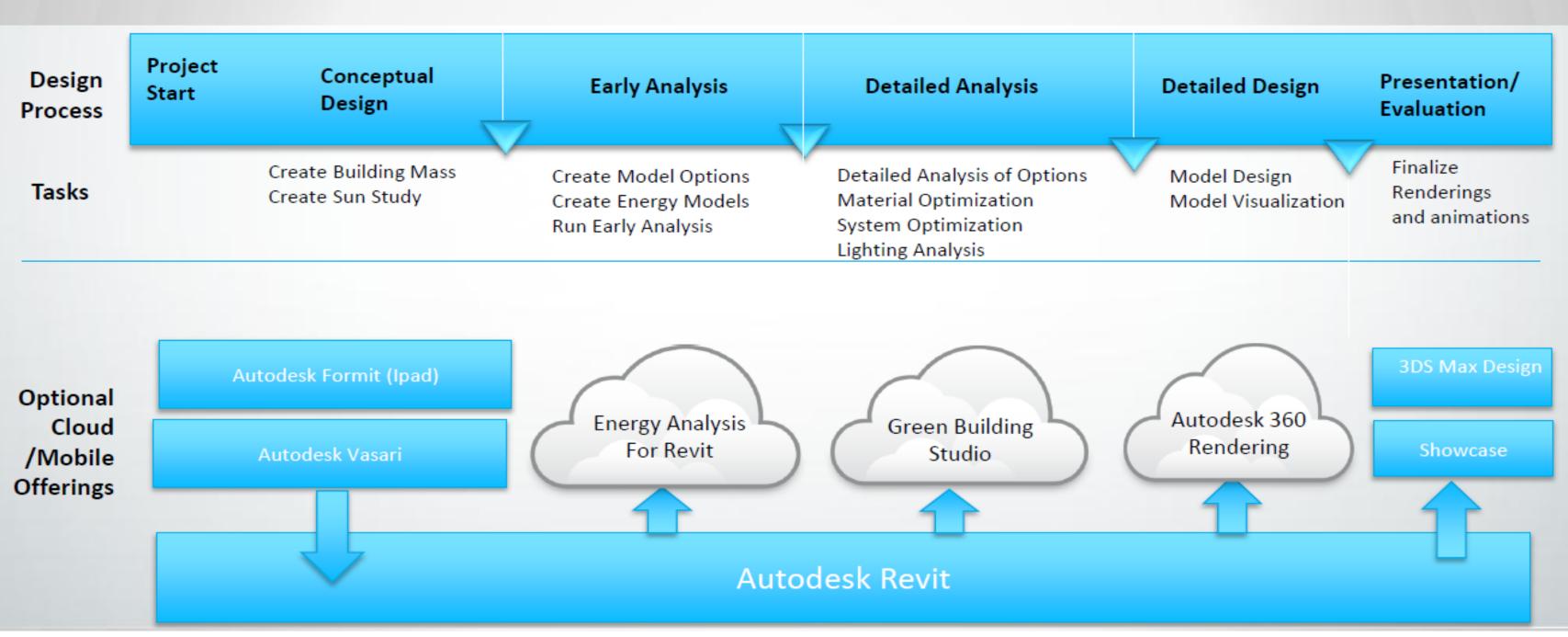


Solar Radiation

Airflow



Recommended BIM Workflow for Architecture Students

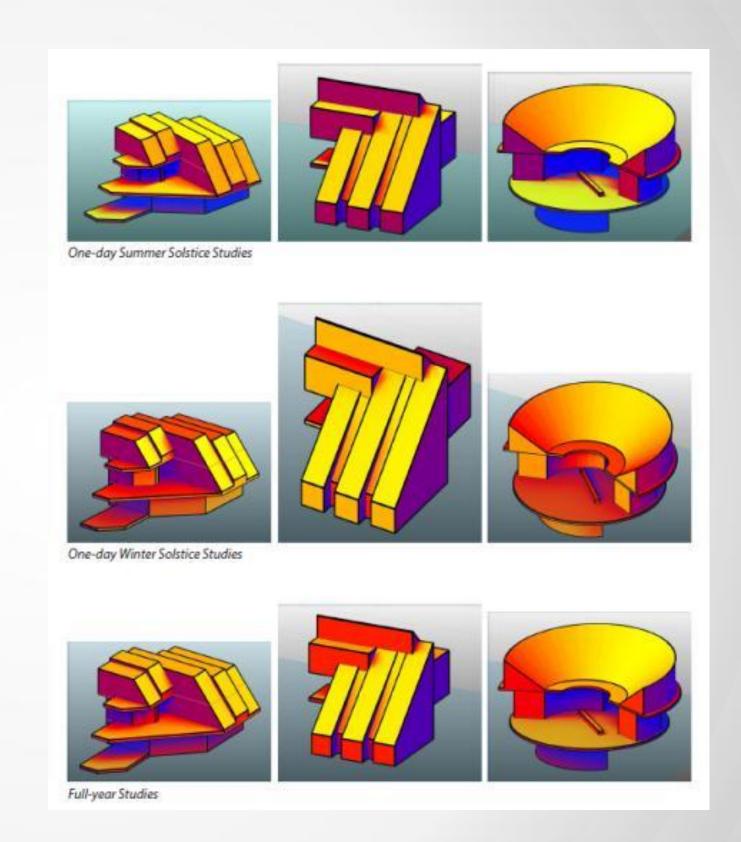




AUTODESK.

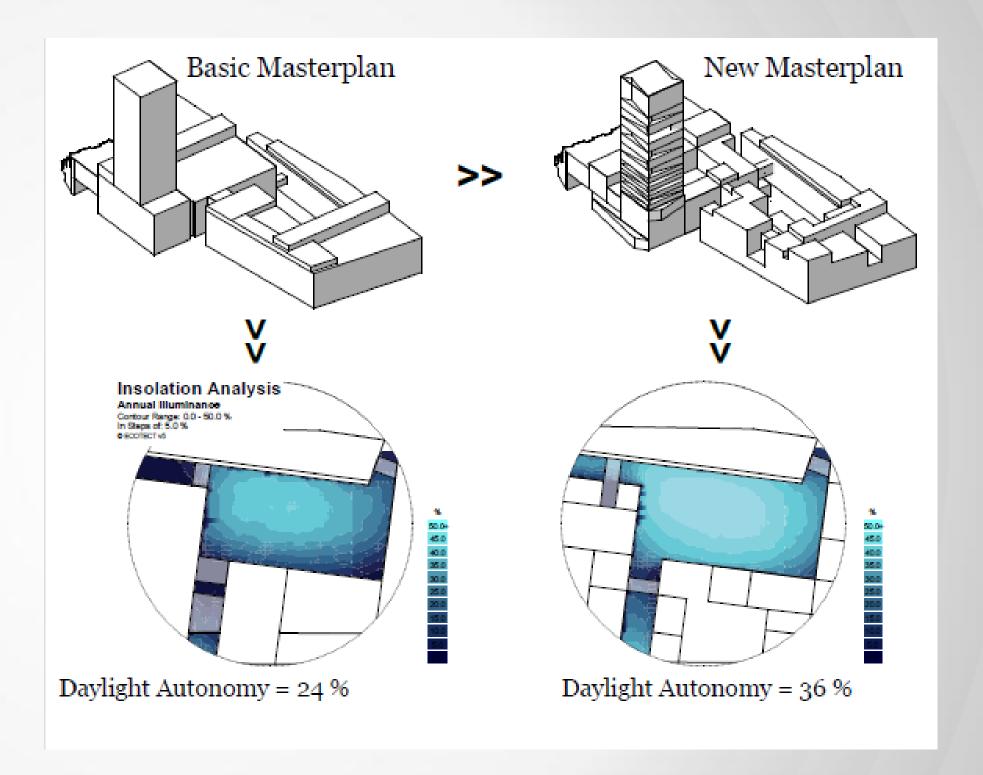
It's not the tools you've got.

It's how you use them.





Use analysis data to support design decisions





We've got the tools for analysis.

But we need to make sure we use them right.





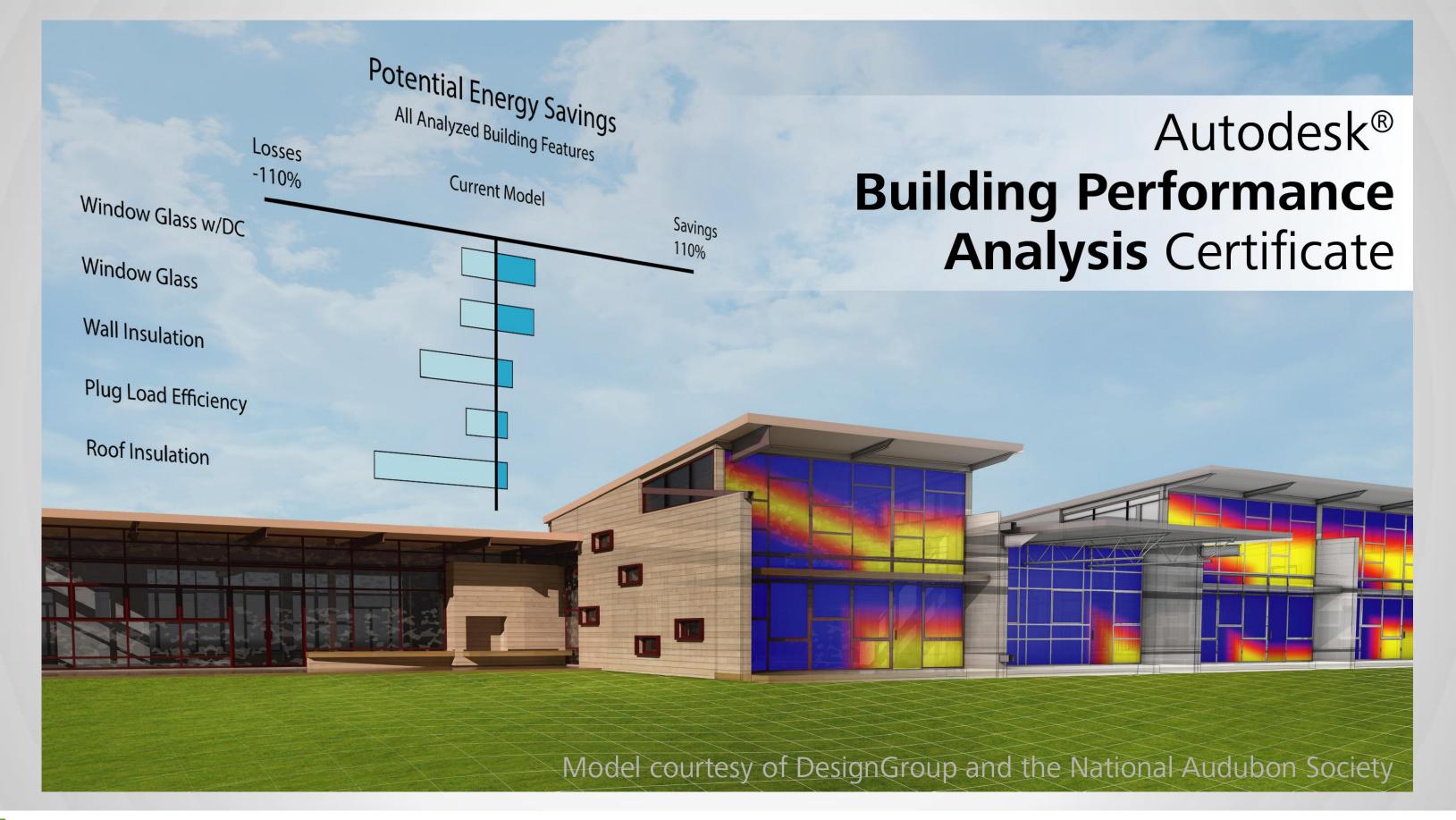
Our goal is to make it accessible to learn the skills required to drive an industry-wide transition to performance-based sustainable design.



Programs include...

- Building Performance Analysis Certificate
- Building Performance Analysis CEUs
- Design Competitions
- Excellence in Analysis Awards
- Academic Research Partnerships



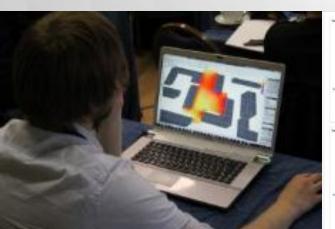




Autodesk[®] **Building Performance Analysis** Certificate Program

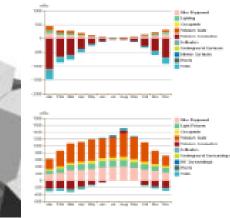
Online educational program that teaches building science fundamentals using Autodesk building performance analysis tools.

- ✓ Acquire new job skills
- ✓ Learn new tools
- ✓ Improve their designs
- ✓ Apply to their projects
- ✓ Supplement coursework

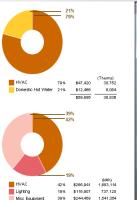


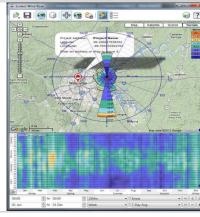














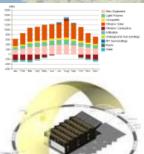


Topics Enable Holistic Analysis



Introduction

Climate & Weather Analysis



Energy Literacy & Building Loads

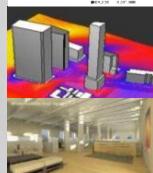
Sun and Shadow Studies



Solar Radiation Analysis



Whole Building Energy Analysis



Wind and Airflow Analysis

Daylighting



Structured with a clear course outline

ENERGY LITERACY & BUILDING LOADS TIME: ~10' TIME: ~90' TIME: ~20' CONCEPTUAL **HEAT TRANSFER & BUILDING ENERGY** INTRODUCTION **SYNTHESIS BUILDING ENVELOPE** & THERMAL LOADS **ENERGY ANALYSIS GUIDING QUESTIONS: GUIDING QUESTIONS: GUIDING QUESTIONS: OVERVIEW: KEY TAKEAWAYS: LEARNING GOALS:** In this unit you'll be introduced to . Understand heat transfer What properties dictate . How does your building . What are the most influential . External loads can be best basic Vasari function and learn basics and how energy flows how heat is transferred through program dictate your energy factors that affect a building's managed by the decisions you how to prepare your conceptual within buildings. the walls vs. the windows? overall energy use? make in the conceptual design mass model for energy simulation. phase. Internal loads are 2. Use Autodesk Vasari to 2. Besides heat passing 2. What energy loads do you 2. What should you consider dictated by the building type and produce and understand directly through the walls and have the most control over? when massing your building? program, and how you manage energy load charts. windows, how else does them with passive strategies and Quick start energy analysis 3. When can energy loads 3. How does the way you energy flow? active equipment will play a 3. Use Autodesk Vasari to be helpful to passive design? allocate space in a building 2. Energy analysis video bigger role in the later design 3. How does humidity relate complete a conceptual energu affect your building's energy phases. analysis and compare different to heat transfer? 3. Energy settings video use? design options. 2. Conceptual energy analysis CONTENT: 4. Setting locations is a valuable tool for providing 4. Make informed decisions CONTENT: CONTENT: . Energy load video insight into what drives your 5. Vasari reference data about how to reduce energy building's energy use. Conduct . Measuring building energy use . Heat transfer video use through building massing, 2. Building program & schedule them early and often to study 6. Analysis results overview orientation, and constructions. 2. Building massing how changes influence your 2. Building envelope 3. Thermal loads energy use. 7. **SOFTWARE**: Thermal loads in Building orientation 3. Heat energy flows in buildings Vasari 4. Equipment & lighting loads CONTENT: 3. Try to keep energy 4. Energy analysis results fundamentals in mind throughout . Audubon Case Studu 4. Glazing properties 5. QUIZ: Energy loads the rest of the design process as

5. Massing & Orientation

6. QUIZ: Building energy use7. SOFTWARE: Orientation

Interpretation

analysis in Vasari

they are the basis for

CONTENT:

. QUIZ: Synthesis

energy efficient building.

understanding how to design an

Outline of one module...

6. QUIZ: Heat Transfer

5. Thermal mass



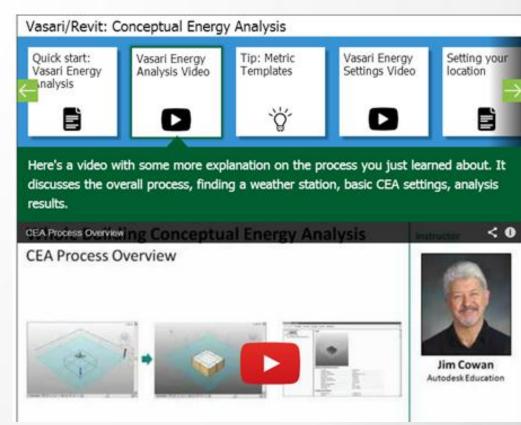
Course Delivery

Case studies

Fundamental articles

- Software playlists
- Quizzes
- Software exercises







Time Investment & Support

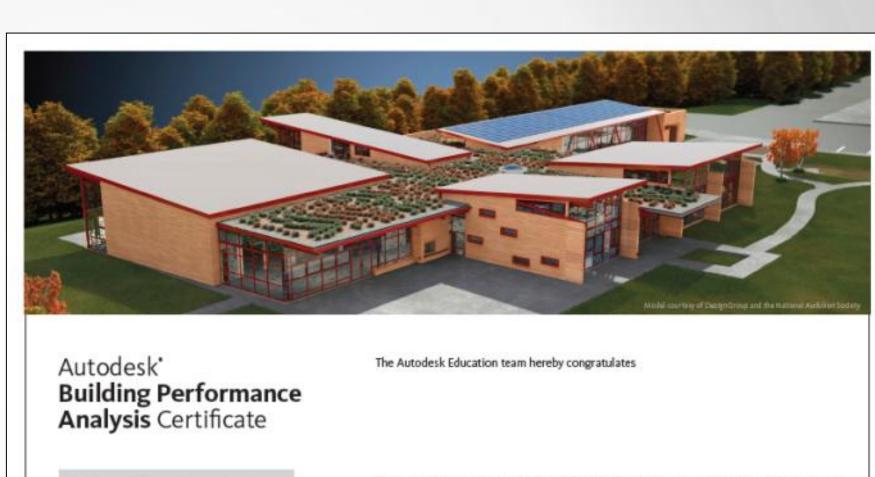
About 25 hours

Depends on experience

Registration open

Support is available





Topics covered: climate analysis, sun and shadow studies, energy loads, energy analysis, wind analysis, solar loads, daylighting Softmare covered: Autodesk' Ecotect' Analysis,

Autodesk

Autodesk is a registered trademarks or trademarks of Autodesk, Inc. In the USA and/or other countries. All other brand names, product names, or trademarks belong to their respective holders. © 2015 Autodesk, Inc. All rights reserved. for successfully completing the Autodesk® Building Performance Analysis Certificate program.

The recipient is now better prepared to apply building science concepts in the creation of high-performance buildings and put that knowledge into practice with Autodesk® software.

ate

President, Chief Executive Officer

Carl Bass



And students actually want to learn...

"We don't have a class on these programs. I really appreciated this course because I could learn it on my own time!"

Megan Henry
Architecture Student
Philadelphia University





Can be completed...

- As an add-on to
 - Sustainable design courses/ studios
 - BIM courses
 - Studio projects
- As an independent study course
- On a student's own time



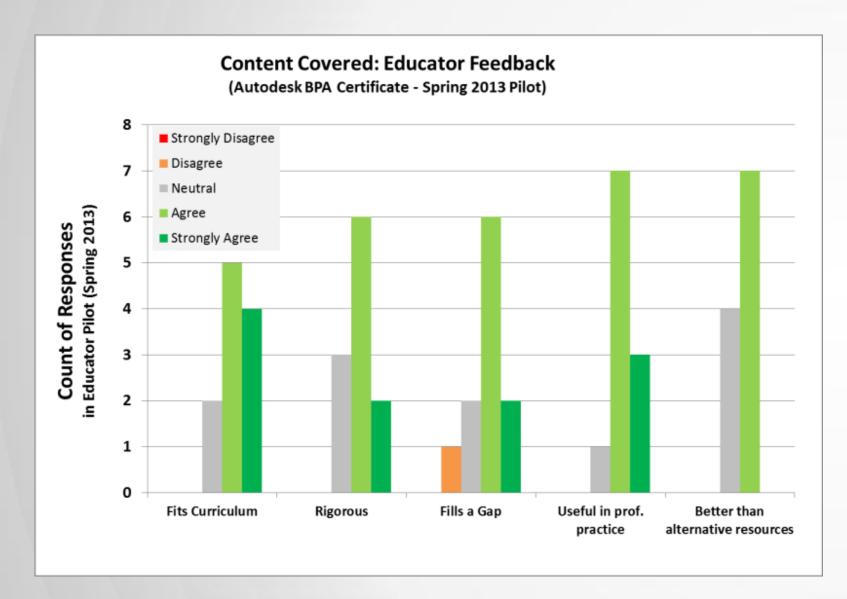
Tips we've heard from other educators

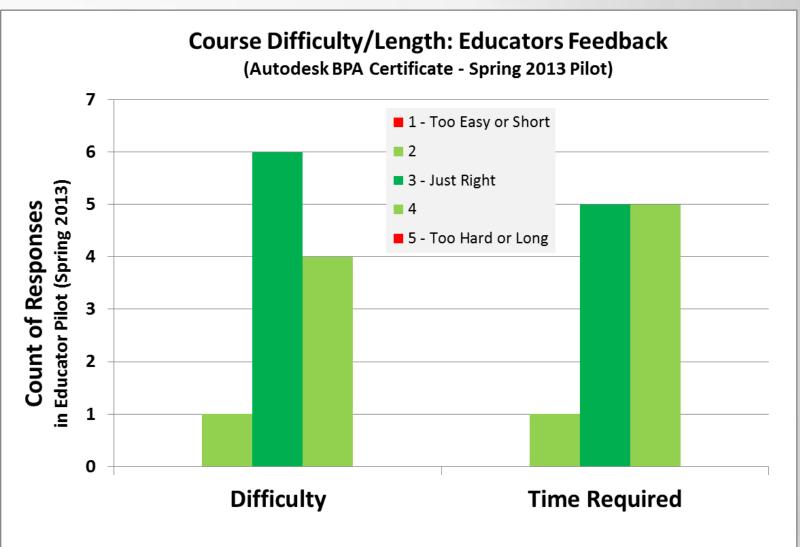
- Give students enough time to finish before finals (don't set it up to overlap)
- Suggest or require progress throughout the semester (students will procrastinate otherwise)
- Be available to help students, but don't hesitate to send them to us

Has been piloted by over 700 students and 20 educators



Outcomes Tracked & Reported Transparently







Continuous Collaboration

Co-design with students and educators

- One focus now is making it even more collaborative and scalable
 - BPA mentors enable one to few to many relationships?
 - Crowd-sourcing examples



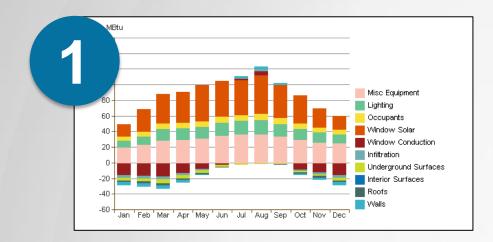




5,131 users currently enrolled-25% are professionals

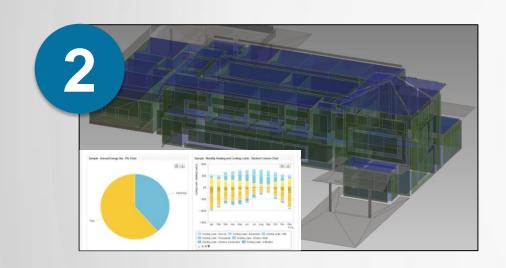


BPA CEU Courses: Sign up now for the pilot!



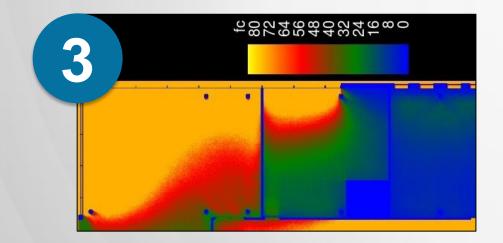
Energy Literacy & Building Loads

Conceptual Energy Analysis in Vasari 3.5 CEUs



Whole Building Energy Analysis

Whole Building Energy Analysis in Revit & GBS 4.5 CEUs



Daylight Analysis

Illuminance simulations for Revit models 3.5 USGBC / 4.0 AIA LUs





BPA Design Competition: Transformation 2030

Partners









Majora Carter Group

Prizes

- Grand Prize
 - Summer 2014 5-8 week paid internship at Perkins Eastman



- Or, \$7500 cash award
- 2nd place- \$5000
- 3rd- **\$3000**
- 4th- **\$1500**
- Faculty sponsorship award \$500



BPA Design Competition: Transformation 2030

Judges





Ed Mazria Architecture 2030

John Kennedy **Autodesk**

Amy Patel HOK

Scott Shiamberg Perkins Eastman

Juliane Wolf Studio Gang

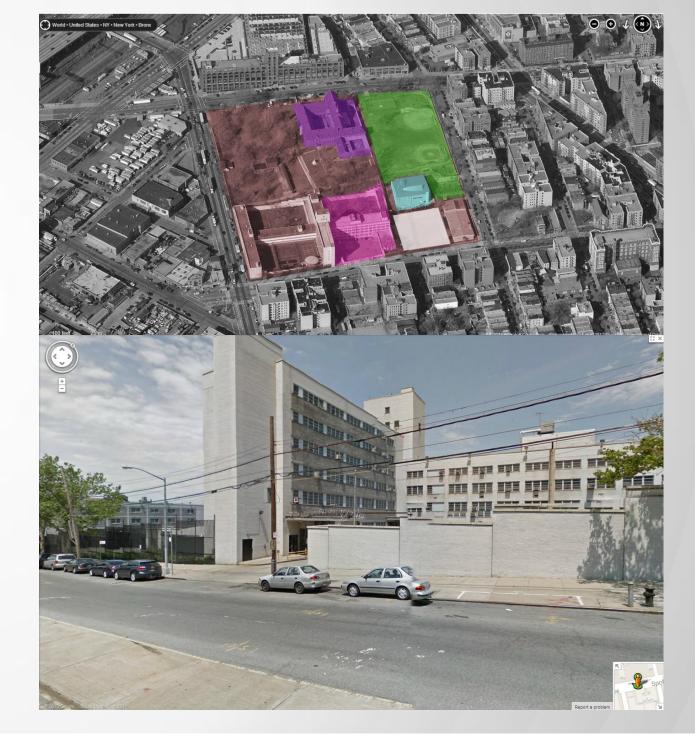


BPA Design Competition: Transformation 2030

Site

Mixed use development in the South Bronx of NYC. Site of former juvenile detention center.

Focus on healthy living, neighborhood revitalization, and wealth generation. Focus on BPA.





Timeline

- February 1, 2014 Registration Deadline
- April 20, 2014 Submission Deadline
- May 9, 2014 Winners announced

Must complete the BPA Certificate to enter the competition



Other programs

Excellence in Analysis Awards

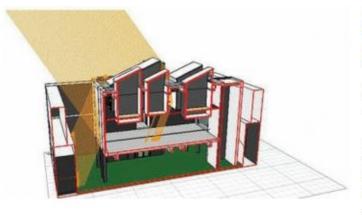
- Academic Research Partnerships
- Community of Practice



Daniel Temple

PhytoGenesis University of Idaho

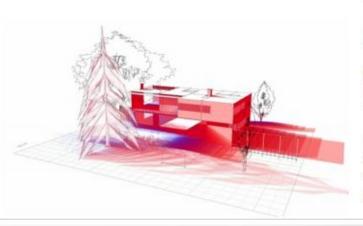
This mixed-use structure seeks to be energy independent, deal with its own waste water and grows much of its own food. Daniel did an energy balance to compare building loads with on-site renewable energy potential.



Ramina Farajzadeh Deroee

Hanging Boxes University of Virginia

This assembly space seeks to illuminate meeting rooms with daylight, but is surrounded by 35-foot- high walls. Analysis in Ecotect and Radiance helped Ramina validate lighting strategies and light levels.



L Carl Fiocchi

Sustaining Modernity: An Analysis of the Gropius House

University of Massachusetts-Amherst

This project used Ecotect to create a digital facsimile of a Modernist icon; studying the effectiveness of the passive strategies used in the Gropius House.



Community of Practice... What is it?

- A place to share questions & answers
- A place to connect academia and industry
- A place to share work with peers

- LEED User
- Rhino forums
- BIM Storm—weed out the best



Next Steps

- Participate in a program
 - sustainabilityworkshop.autodesk.com/engage
- Let us know what you think

Spread the word!



LAST WORDS

We plan to keep a spirit of continuous improvement and openness.

Be in touch and help us improve.







