Performance-Based Sustainable Design
Thinking Through Autodesk BPA Education

Stephanie Egger & Adam Menter

Autodesk Sustainability Education

@ecoworkshop

Model courtesy of DesignGroup and the National Audubon Society

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…

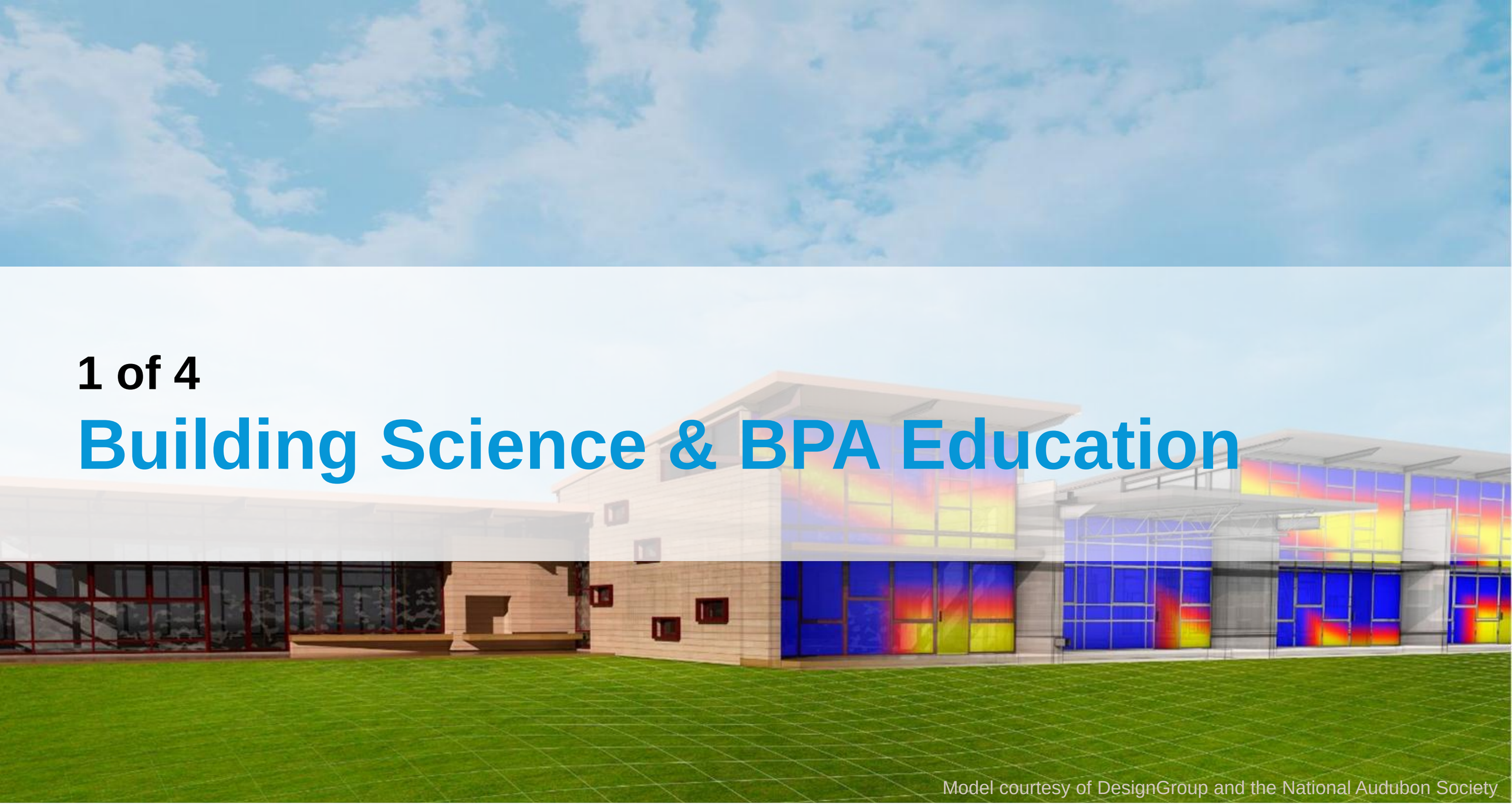
- Students?
- Educators?
- Professionals?

Agenda

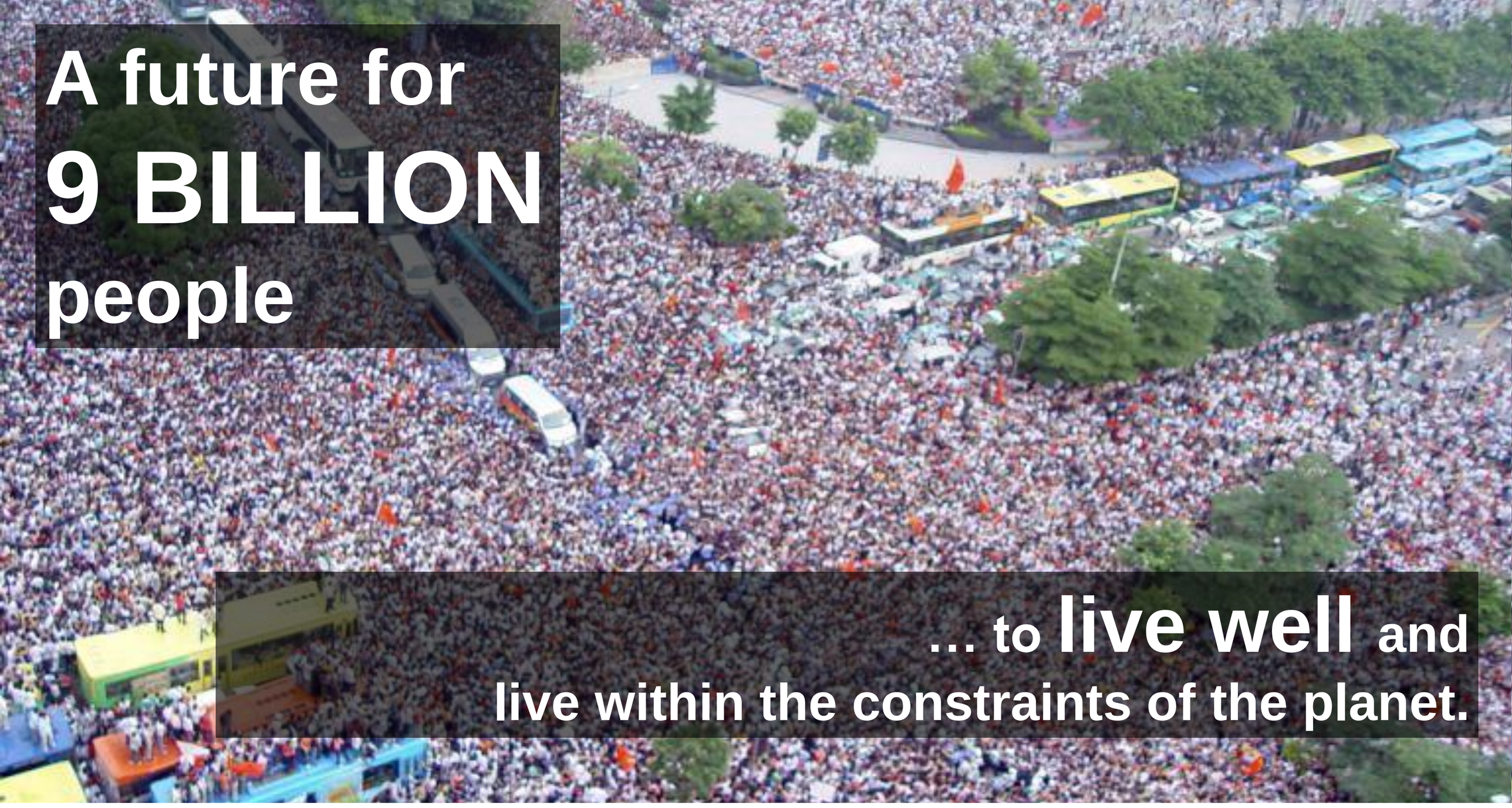
1. Importance of building science & BPA education
2. Using Autodesk tools in BPA education
3. Autodesk BPA education programs
4. Discussion

1 of 4

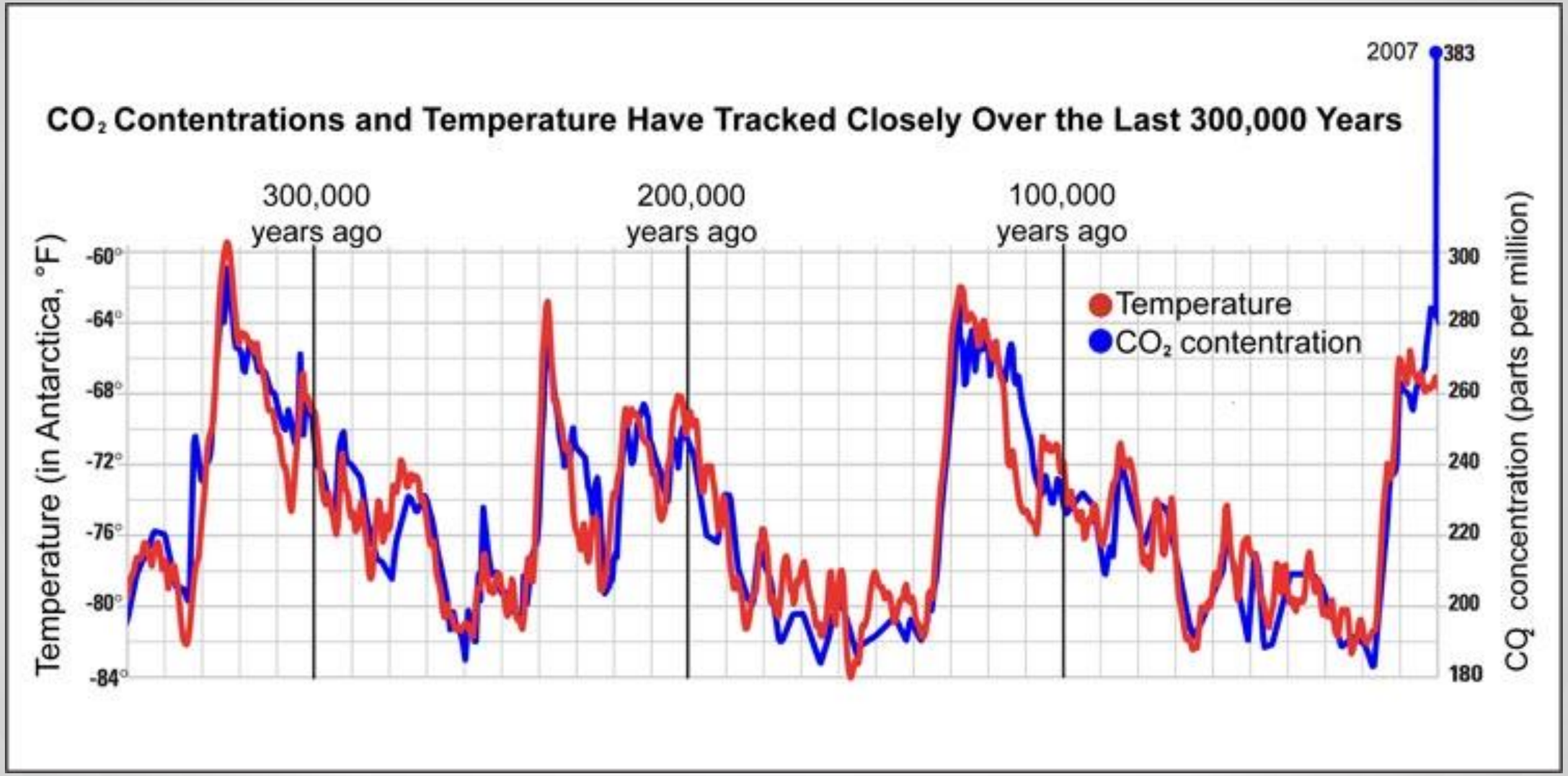
Building Science & BPA Education



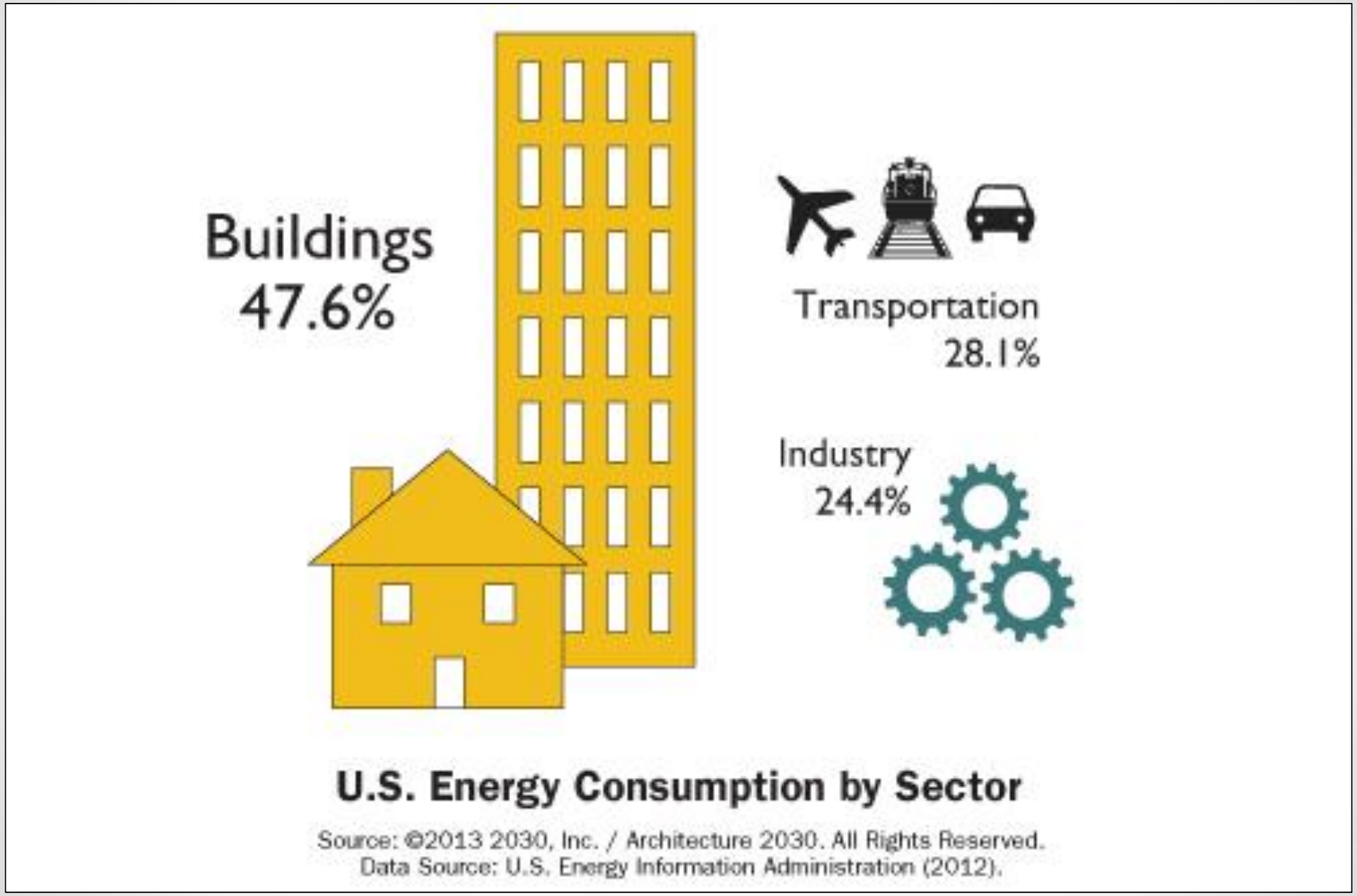
Model courtesy of DesignGroup and the National Audubon Society


A future for
9 BILLION
people
... to live well and
live within the constraints of the planet.

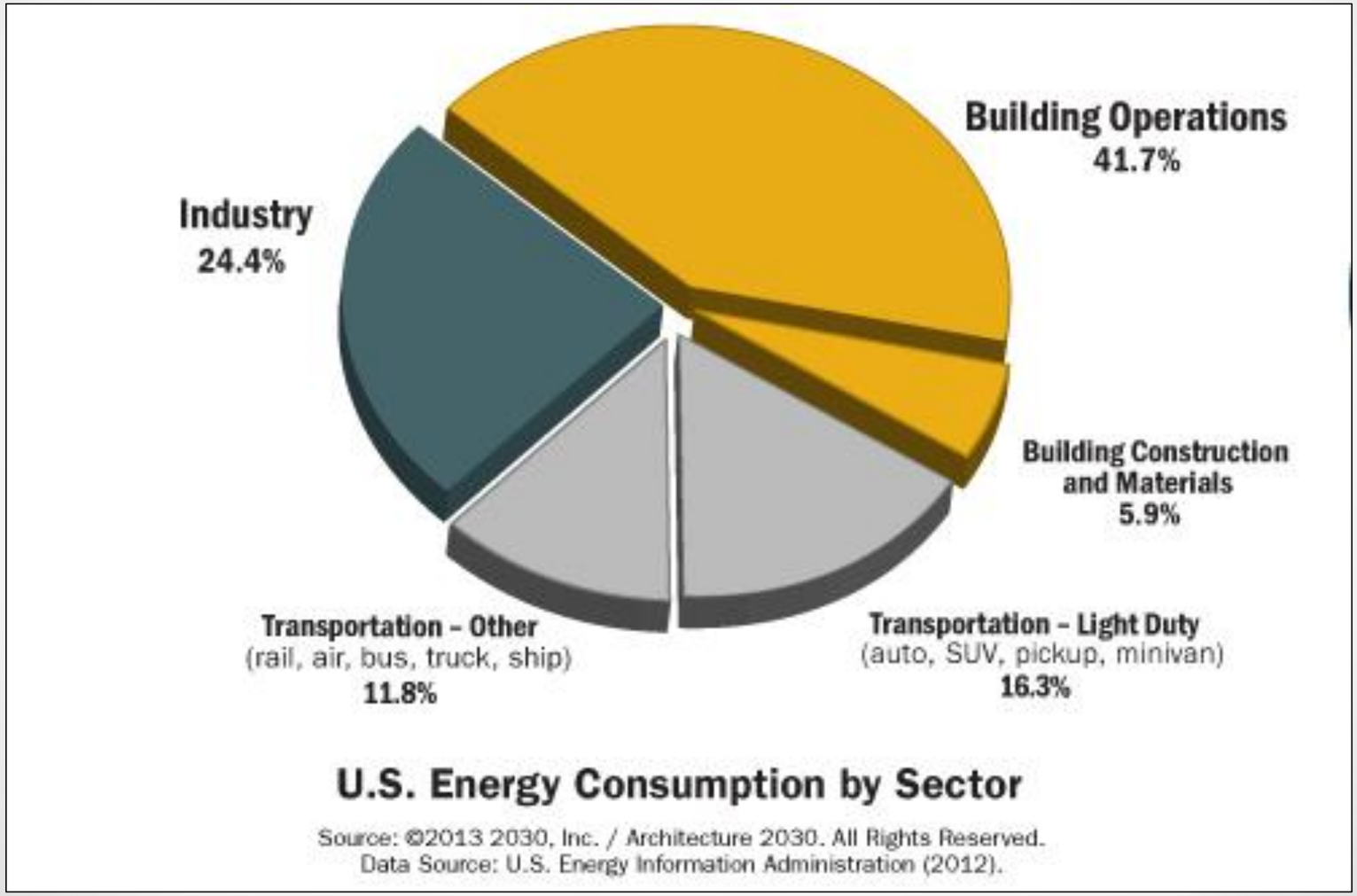
Climate Change is Happening



Buildings are the largest driver of energy use



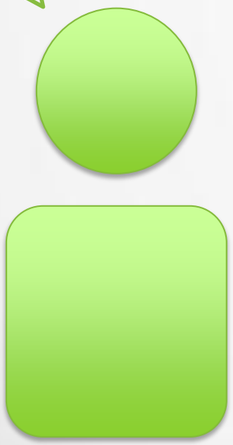
Operational energy use is the largest factor in a building's energy use



…so let’s make sure we can design efficient buildings…

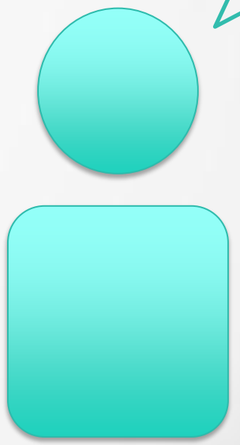
How **will you measure** the performance of your “sustainable design”?

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



Uhh….

Look! It has a green roof!



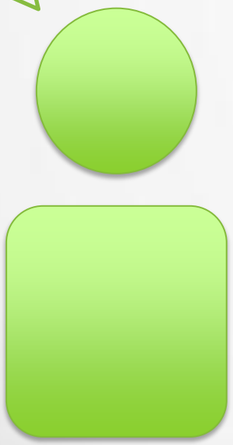
“The Architecture Student”

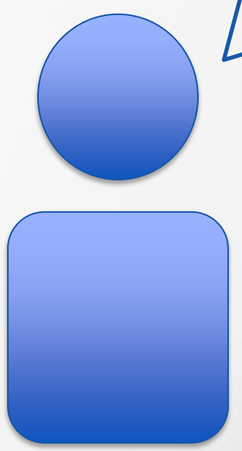
You're learning all of this great stuff about **heat transfer and thermodynamics**. Do you know how you'll apply that?

Like cars or airplanes?

Have you ever thought about a **career in buildings?**

No. That's for civil engineers, right?

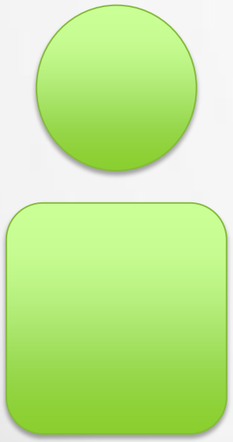




"The Mechanical Engineering Student"

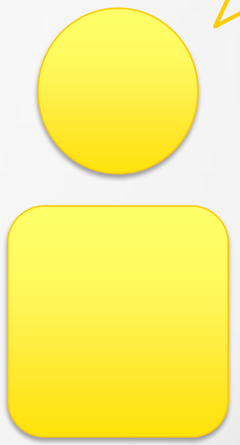
I can’t find new graduates that know how to design stuff that works anymore.

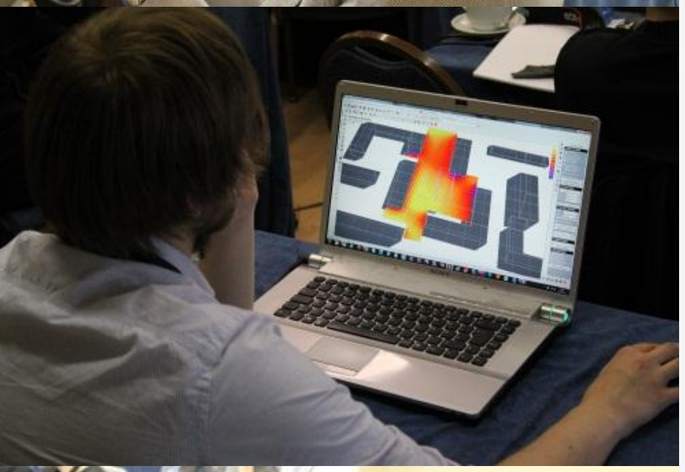
Where should I look?



“The Employer”

Europe?





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.

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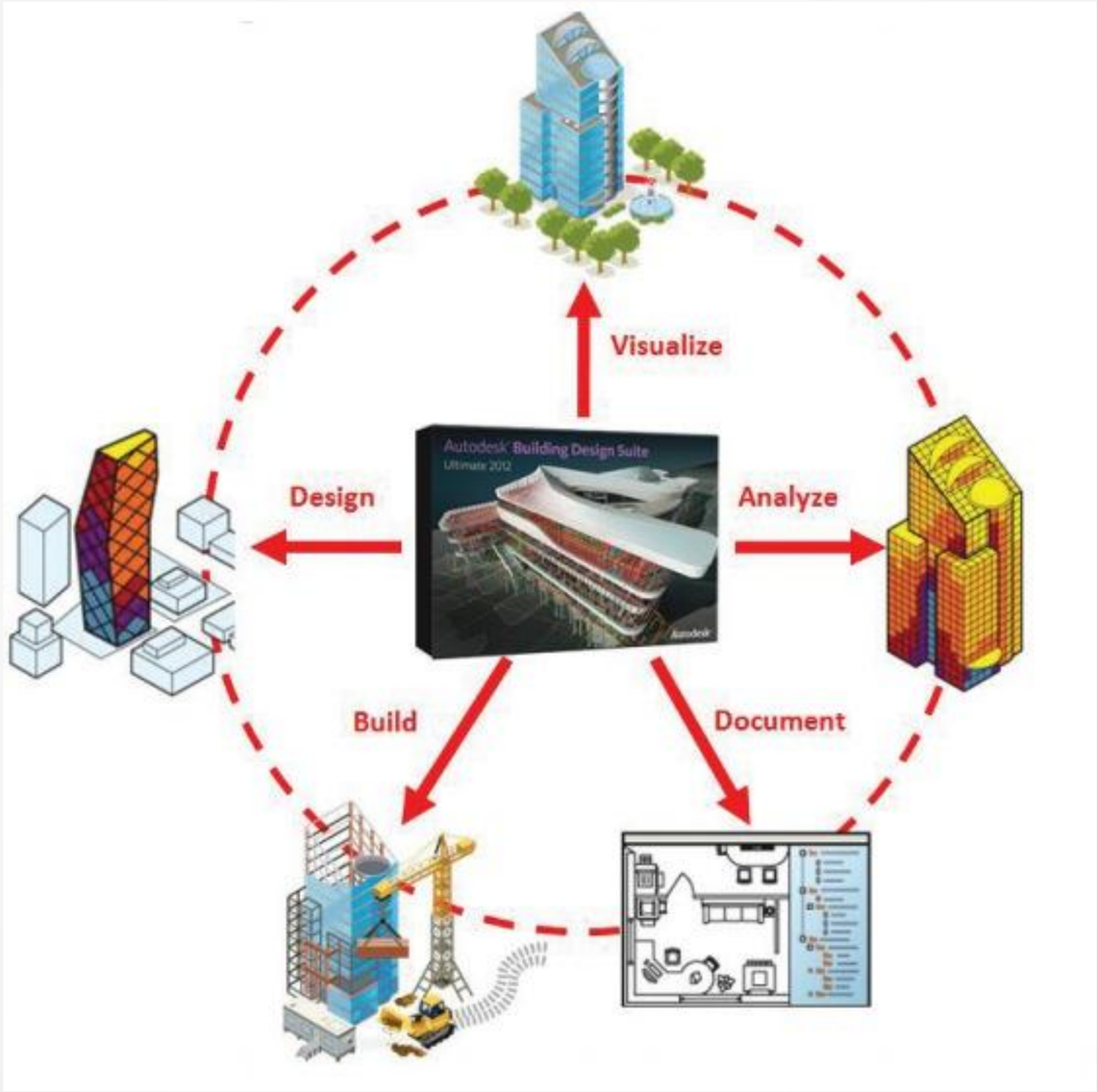
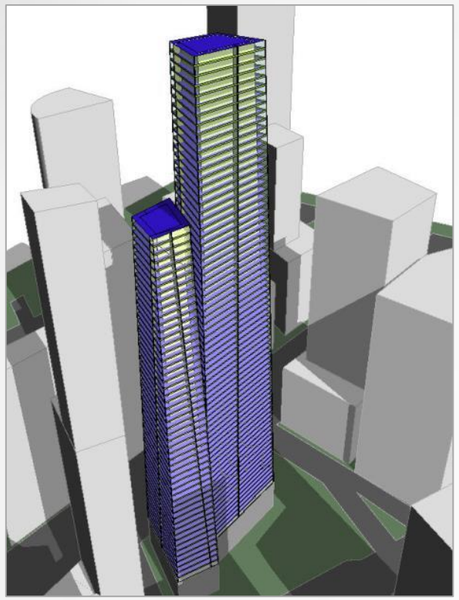
Autodesk BPA Tools

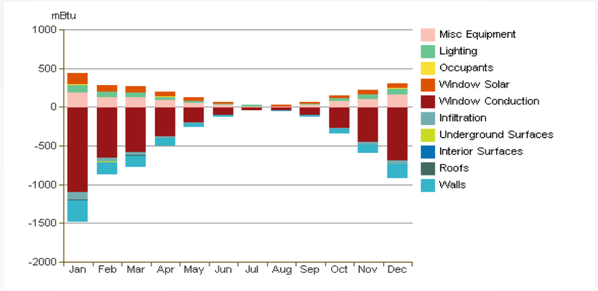
Model courtesy of DesignGroup and the National Audubon Society

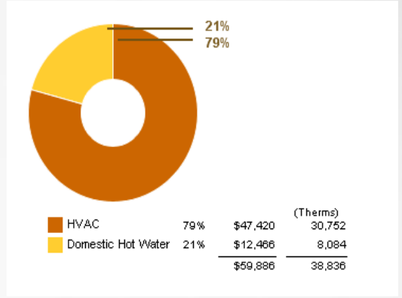
Building Information Modeling

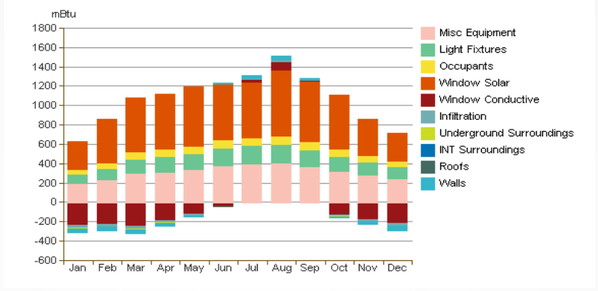


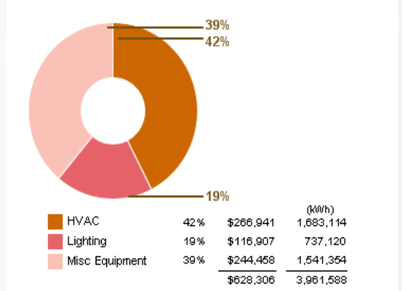
Revit & Vasari

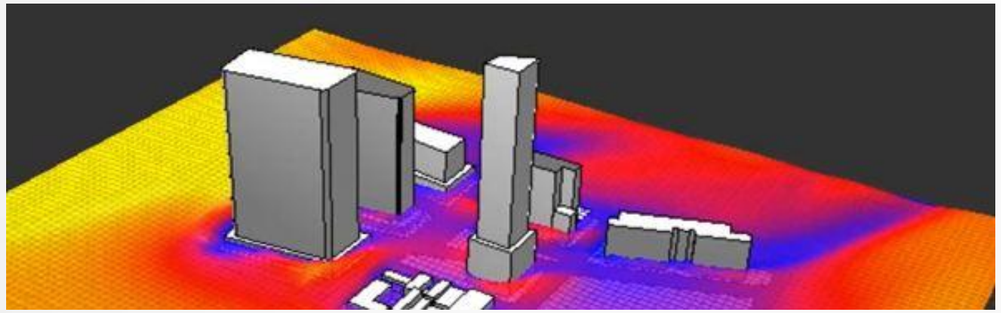


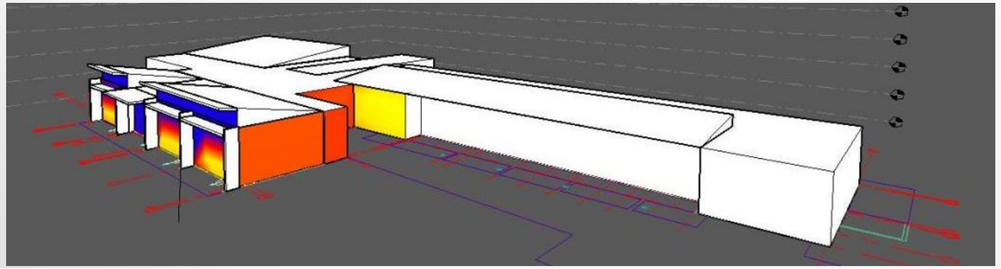


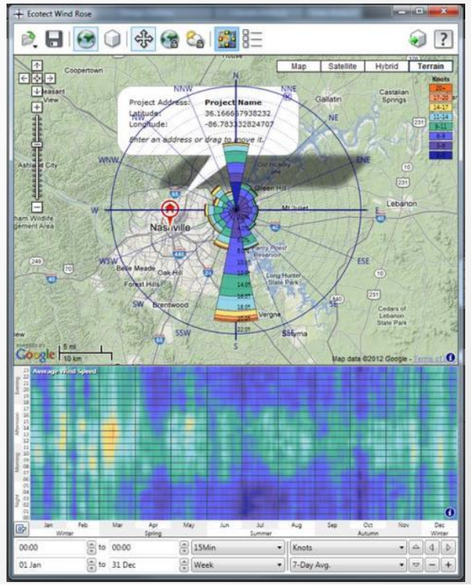








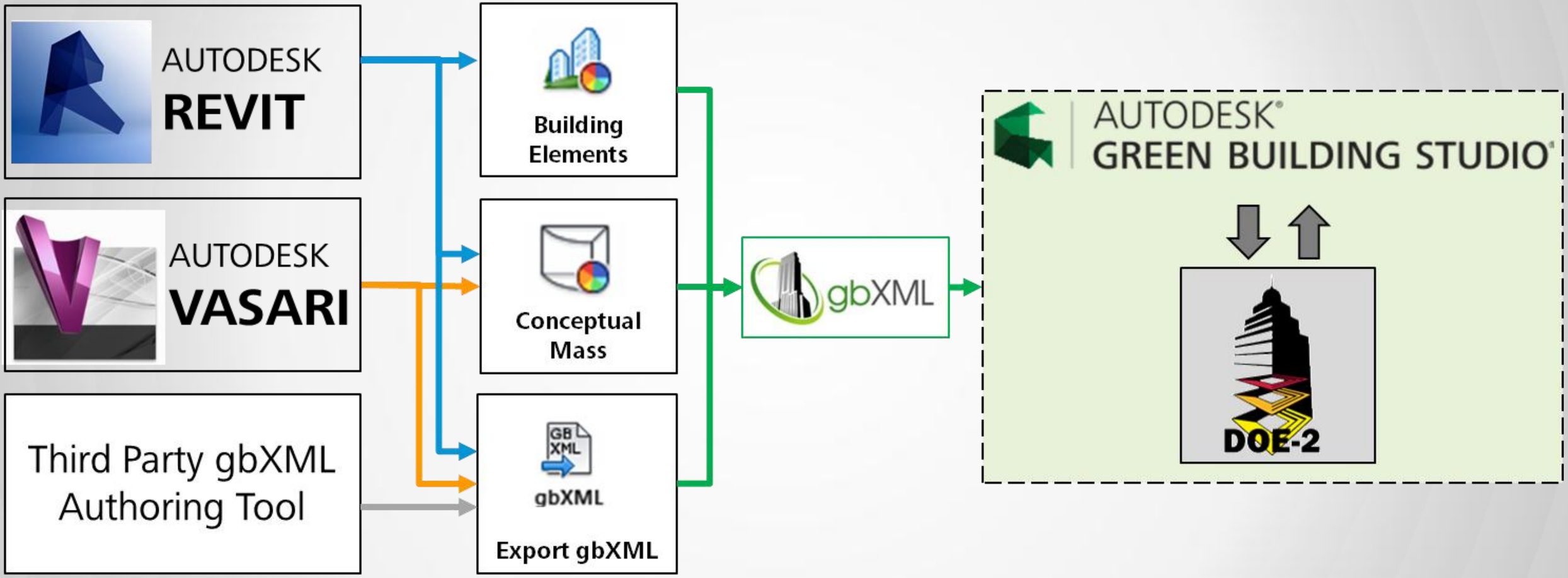




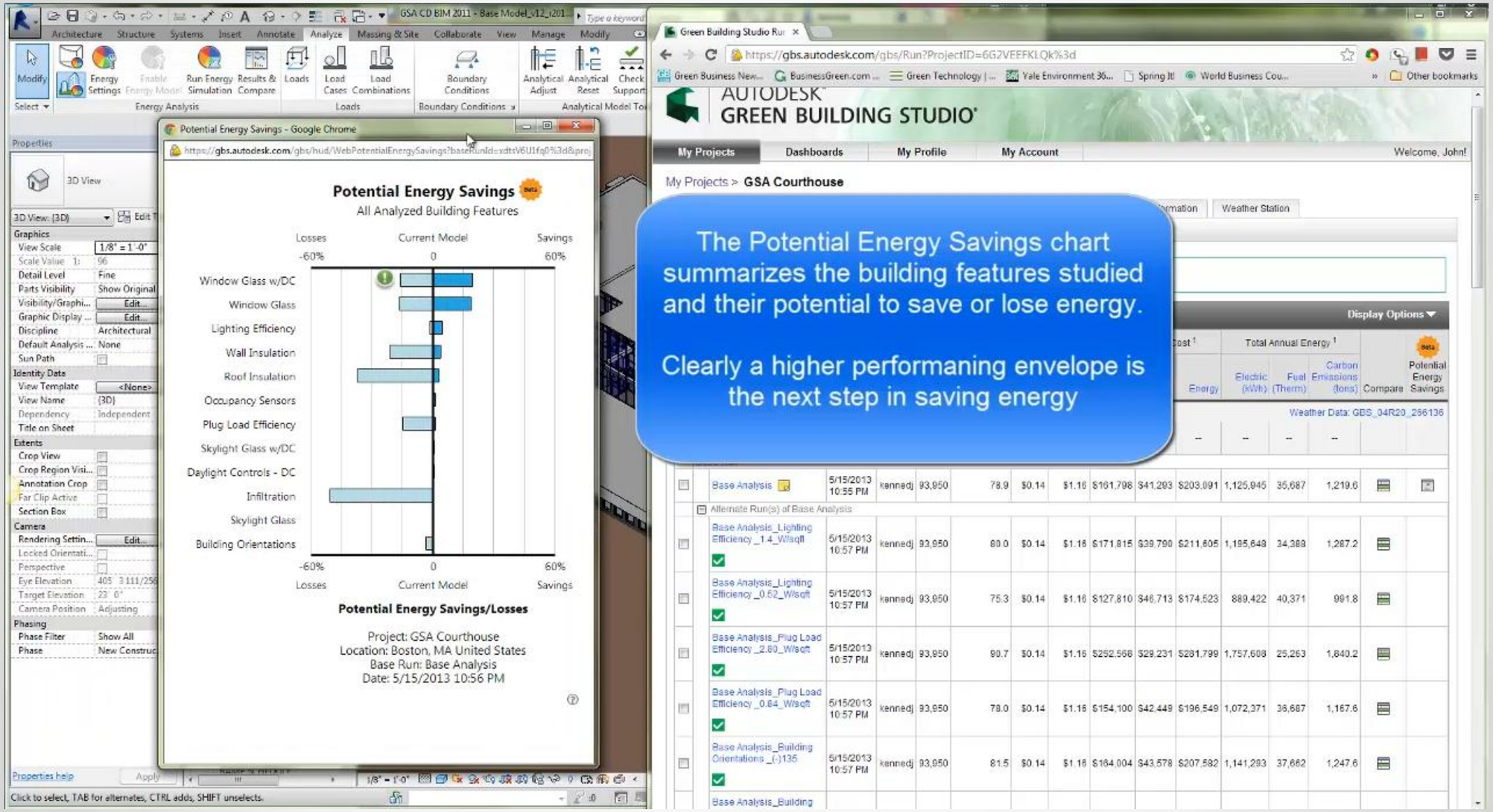
Whole Building Energy Analysis

Green Building Studio: Analysis engine, DOE-2

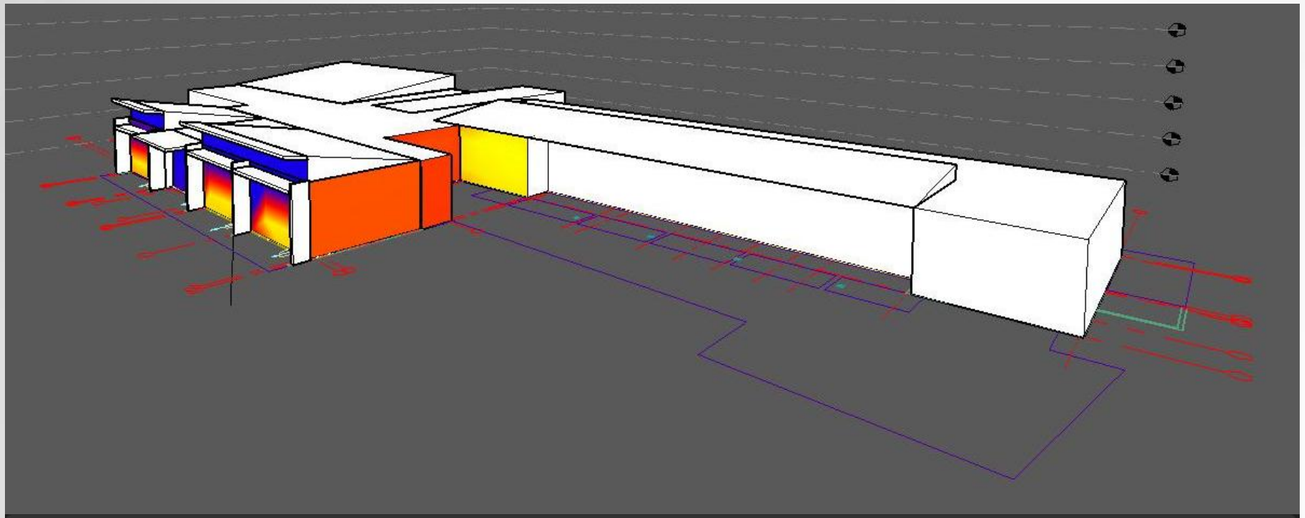
Autodesk **Whole Building Energy Analysis**



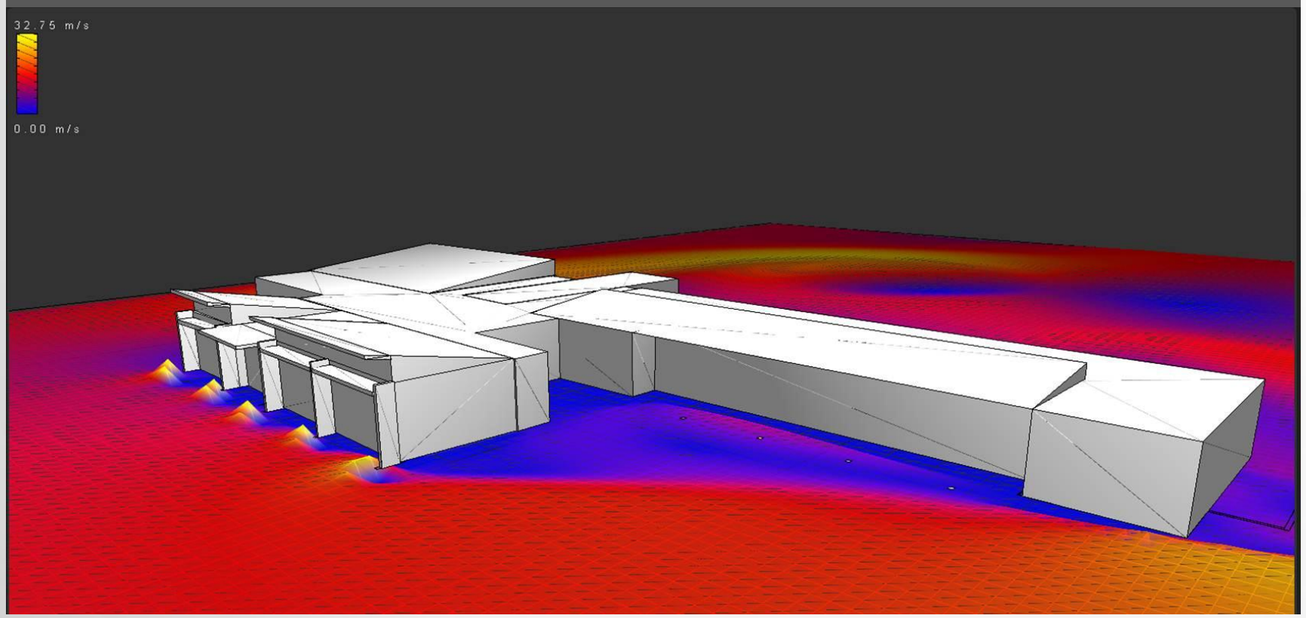
New Energy Analysis Features in Revit



Design Studies

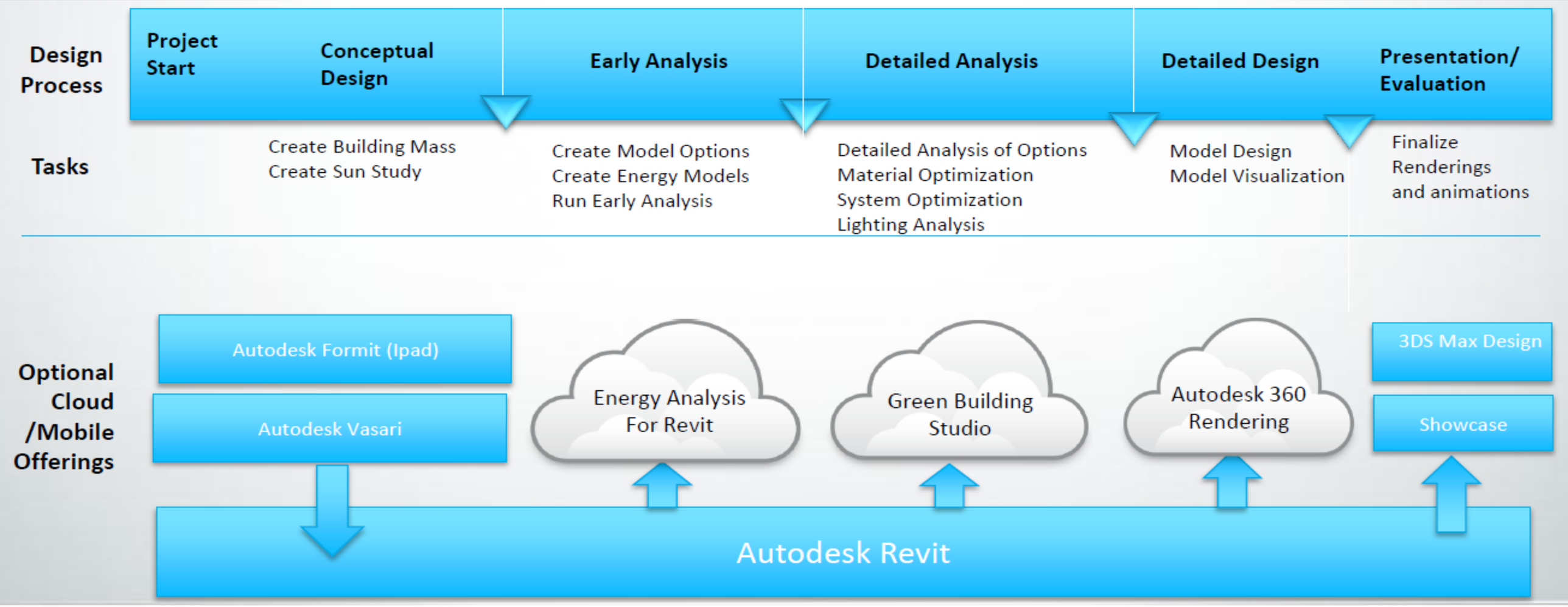


Solar Radiation



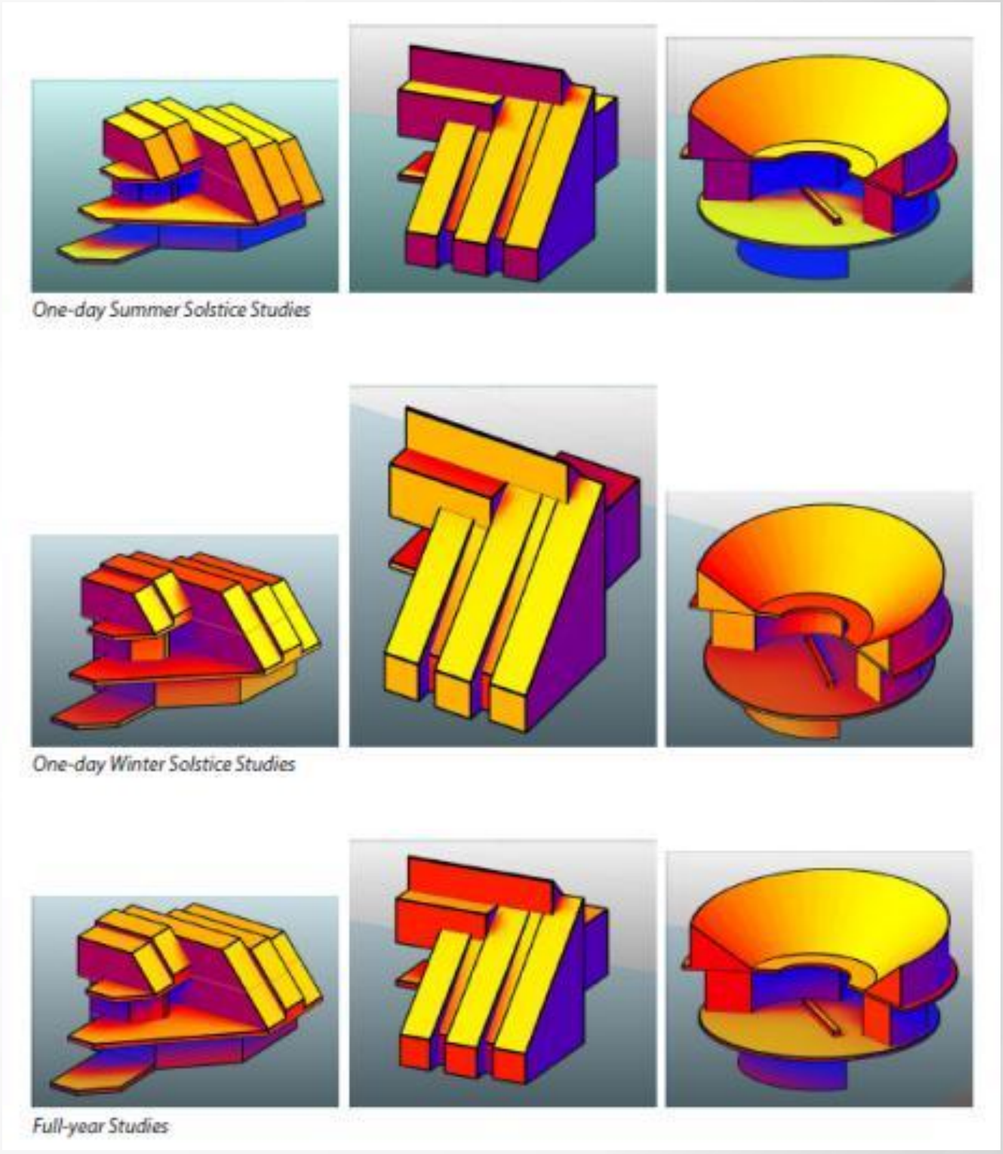
Airflow

Recommended BIM Workflow for Architecture Students

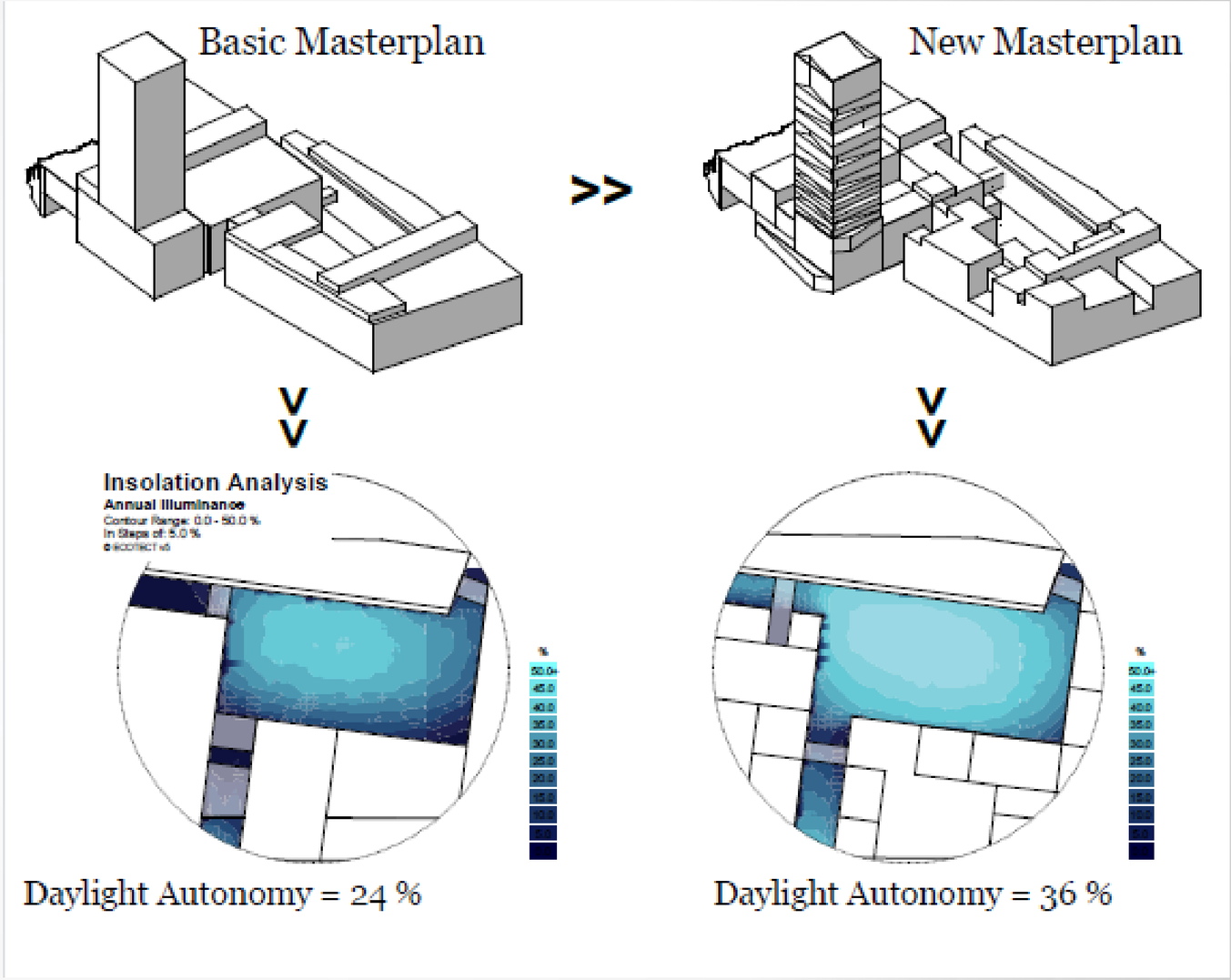


It’s not the tools you’ve got.

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.

3 of 4

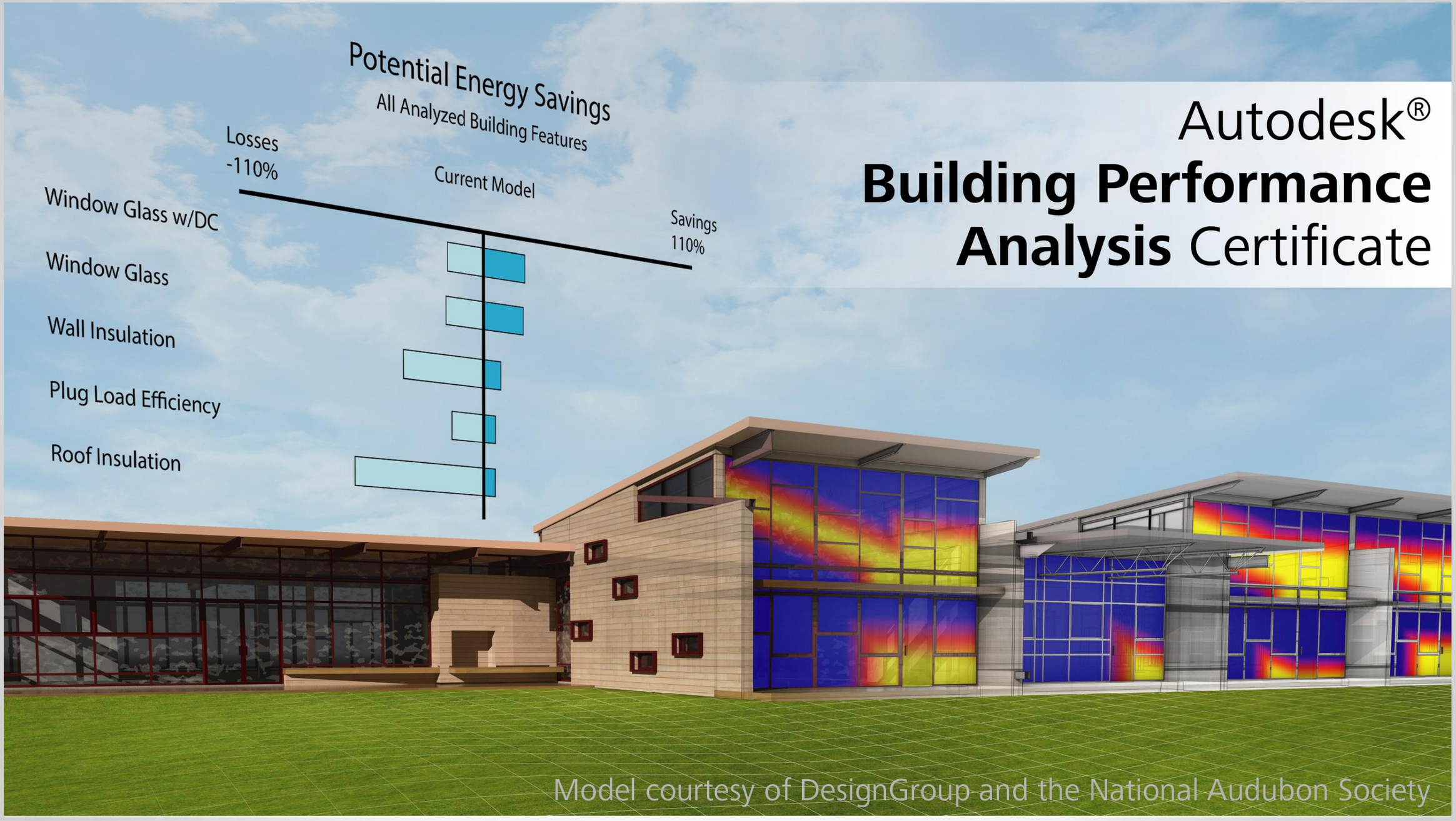
Autodesk BPA Education

Model courtesy of DesignGroup and the National Audubon Society

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

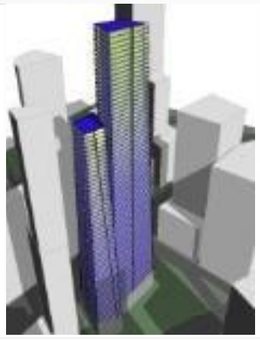
Model courtesy of DesignGroup and the National Audubon Society

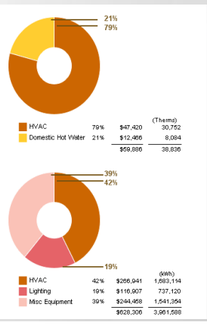
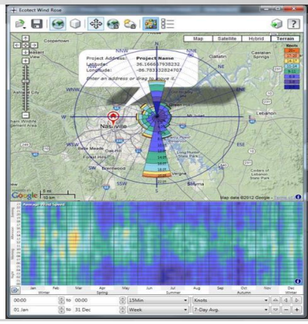
Autodesk®
Building Performance Analysis Certificate Program

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

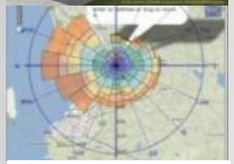




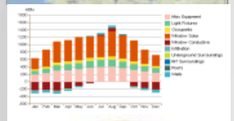




Topics Enable Holistic Analysis

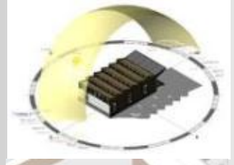
Introduction



Climate & Weather Analysis

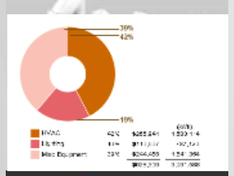


Energy Literacy & Building Loads

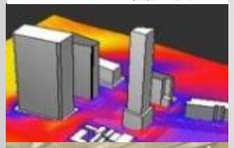


Sun and Shadow Studies

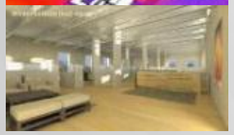
Solar Radiation Analysis



Whole Building Energy Analysis



Wind and Airflow Analysis



Daylighting

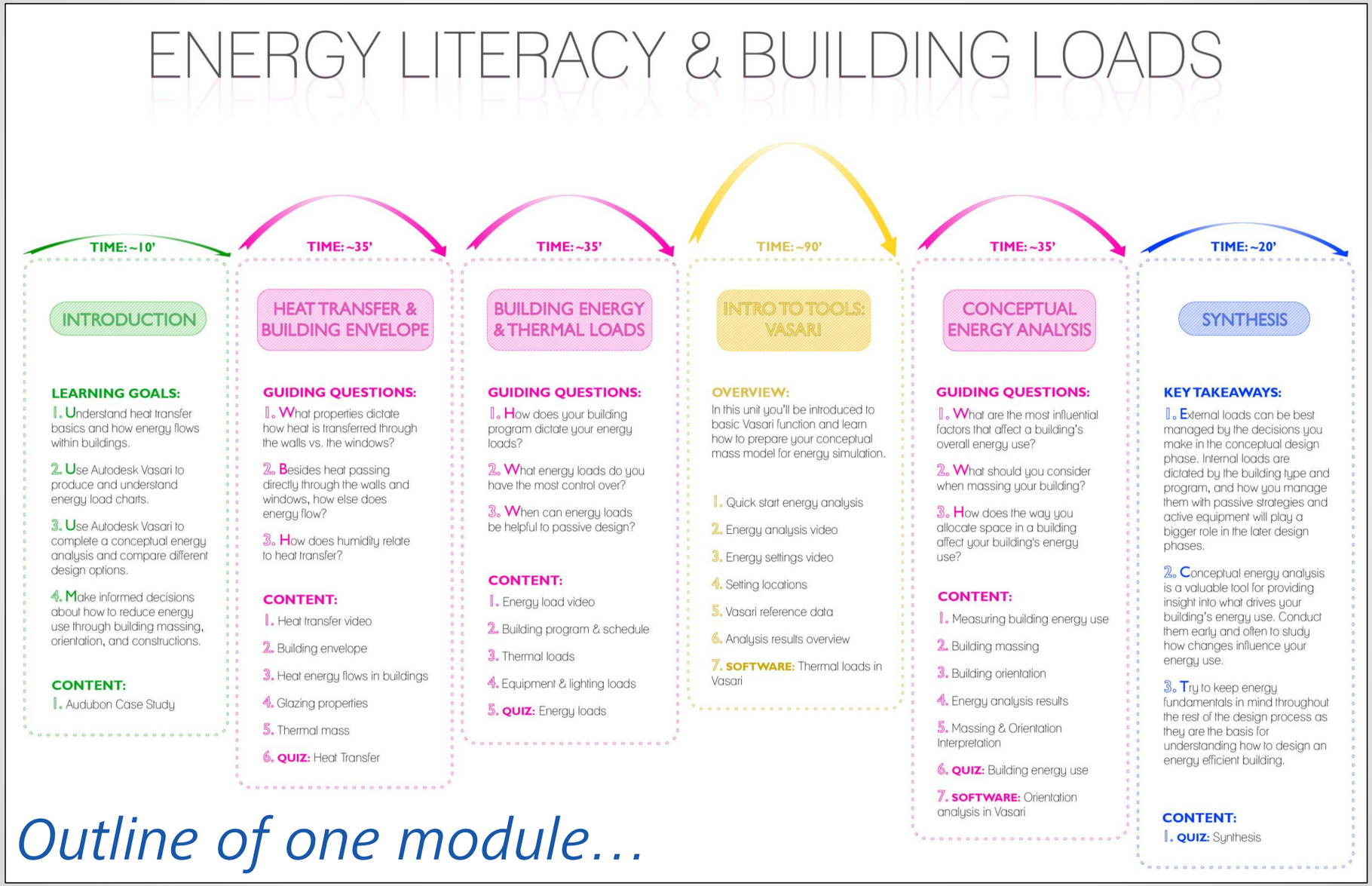
Software Covered

AUTODESK
REVIT

AUTODESK
VASARI

AUTODESK®
GREEN BUILDING STUDIO®

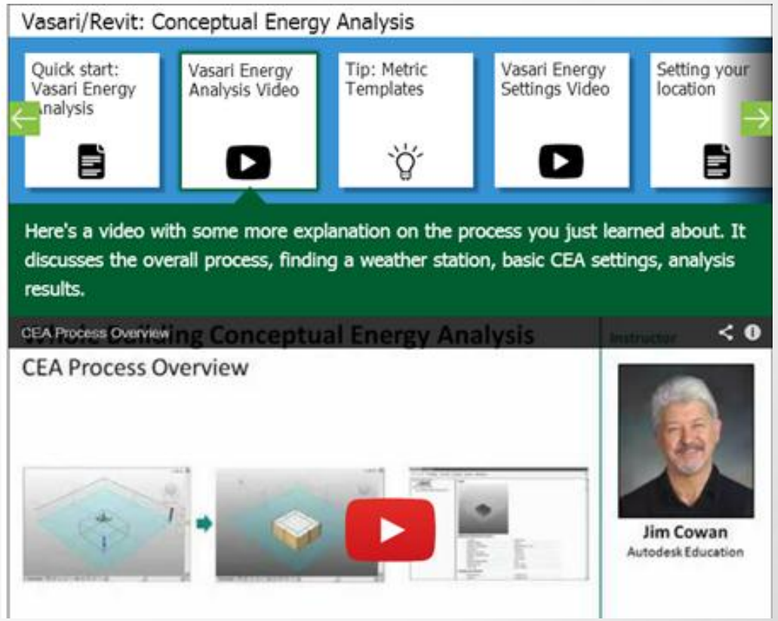
Structured with a clear course outline



Outline of one module…

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

Autodesk®
Building Performance Analysis Certificate

The Autodesk Education team hereby congratulates

Topics covered: climate analysis, sun and shadow studies, energy loads, energy analysis, wind analysis, solar loads, daylighting
Software covered: Autodesk® Ecotect® Analysis, Autodesk® Vasari

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.

Autodesk

Date

Carl Bass
President, Chief Executive Officer

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…

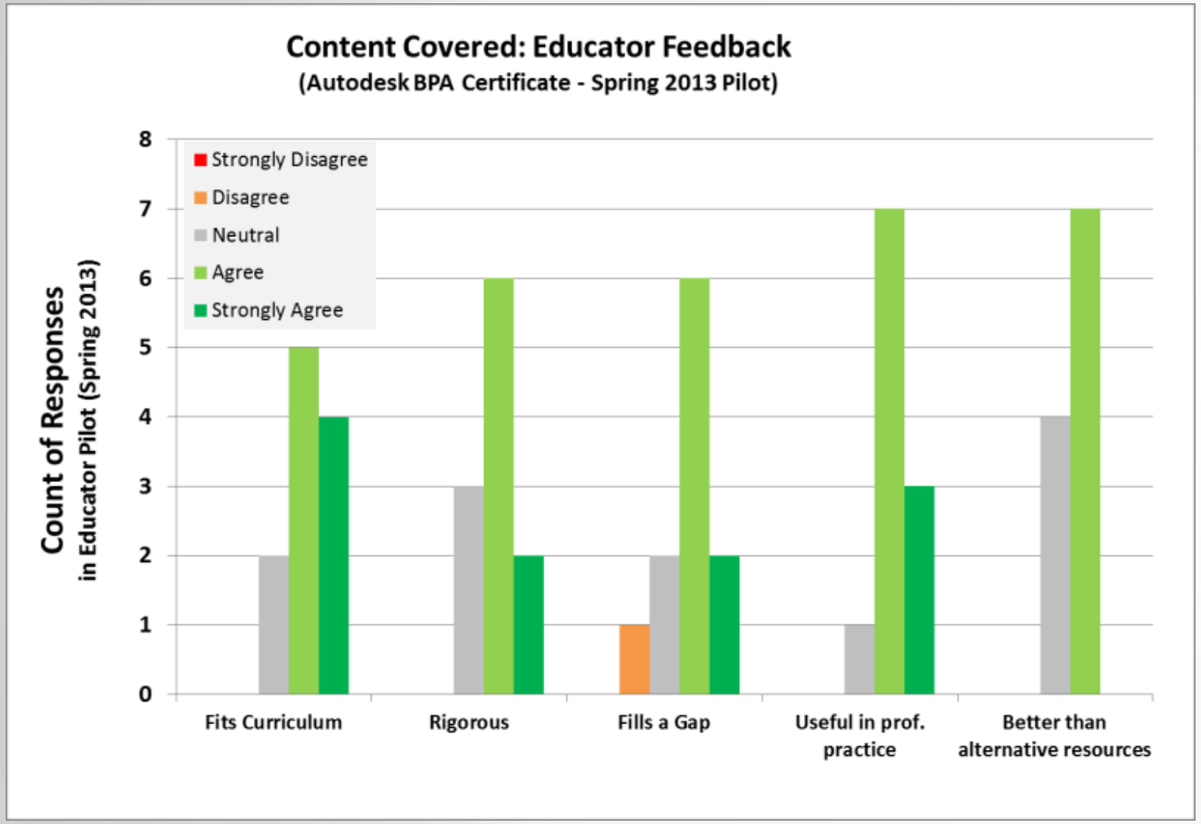
- As an add-on to
  - Sustainable design courses/ studios
  - BIM courses
  - Studio projects
- As an independent study course
- On a student's own time

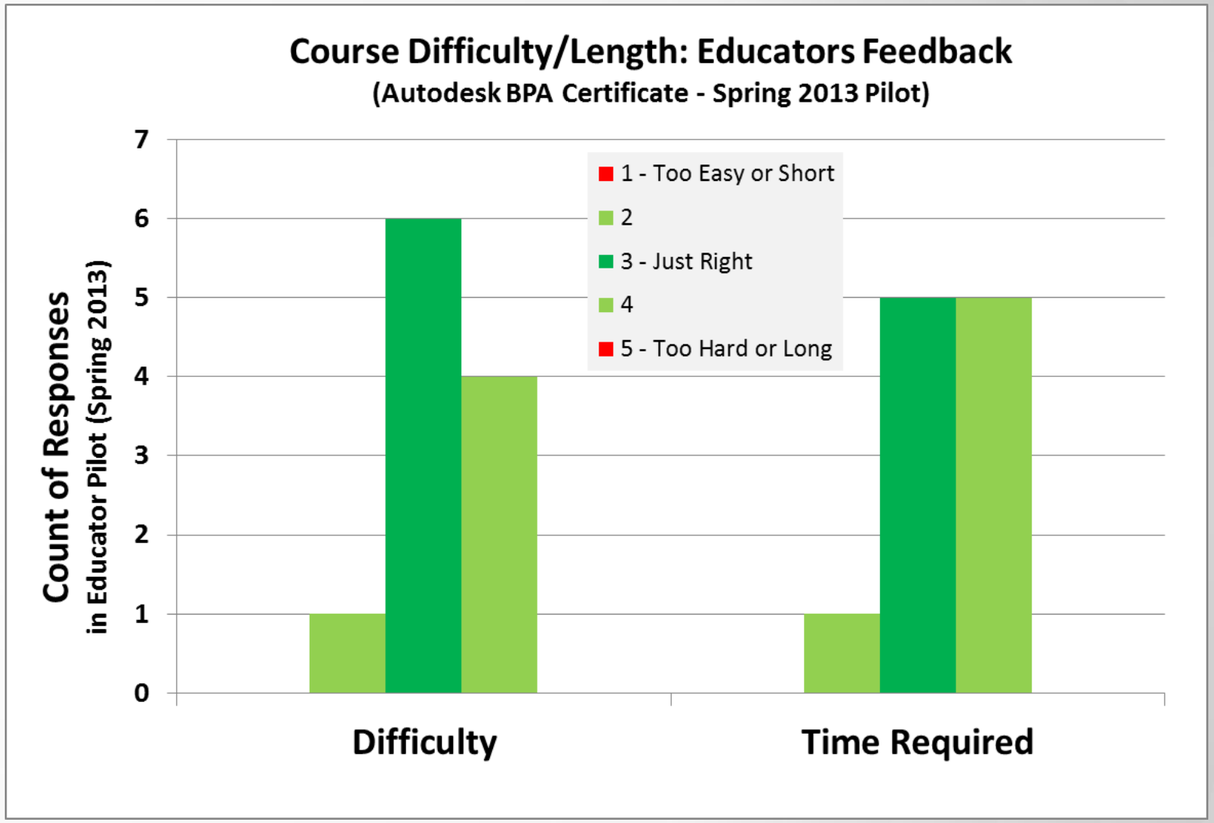
Tips we've heard from other educators

- 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

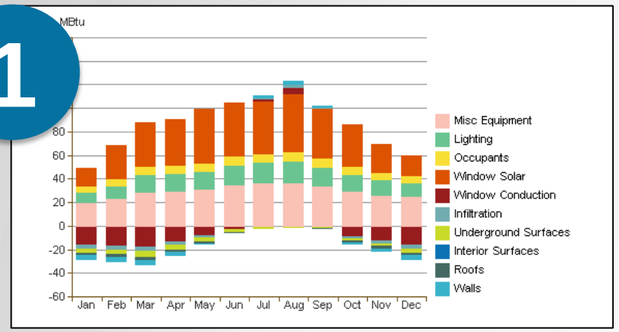
- One focus now is making it even more collaborative and scalable
  - BPA mentors enable one to few to many relationships?
  - Crowd-sourcing examples

5,131 users currently enrolled-

25% are professionals

BPA CEU Courses: Sign up now for the pilot!

1

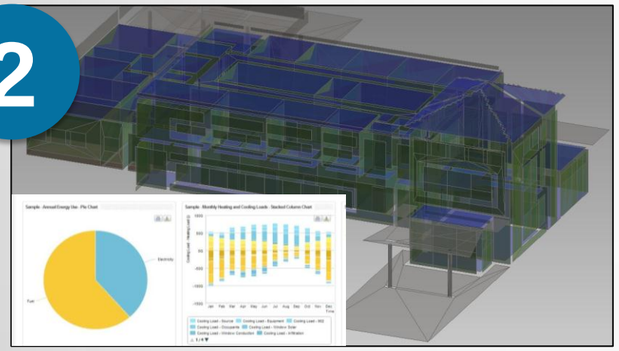


Energy Literacy & Building Loads

Conceptual Energy Analysis in Vasari

3.5 CEUs

2

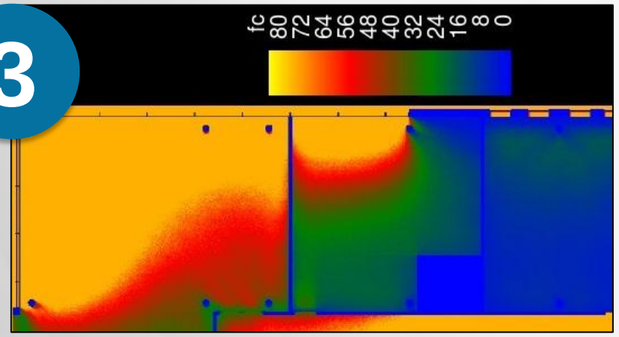


Whole Building Energy Analysis

Whole Building Energy Analysis in Revit & GBS

4.5 CEUs

3



Daylight Analysis

Illuminance simulations for Revit models

3.5 USGBC / 4.0 AIA LUs

BPA Design Competition: Transformation 2030

Partners

architecture 2030

2030 PALETTE®

AIAS

AUTODESK.

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**

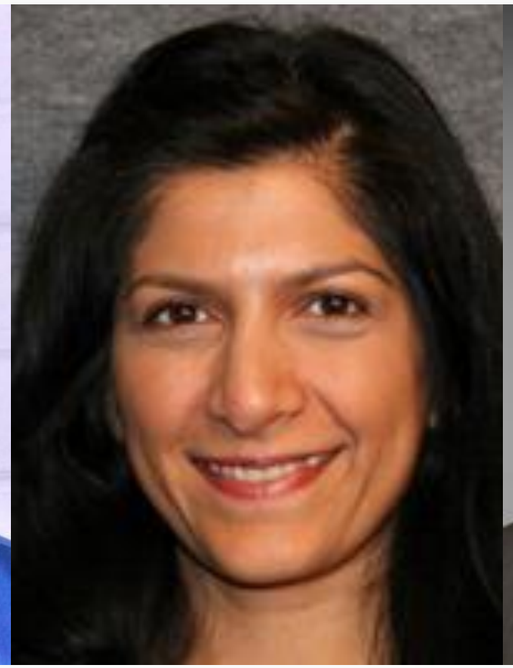
Perkins Eastman

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

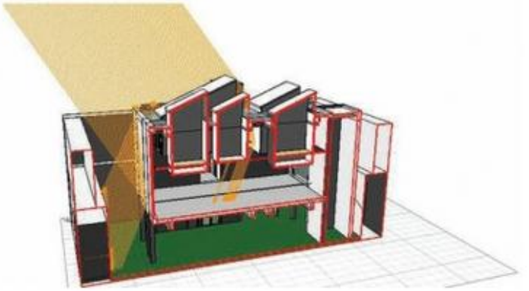
Other programs

- Excellence in Analysis Awards
- Academic Research Partnerships
- Community of Practice

Daniel Temple

PhytoGenesis
University of Idaho

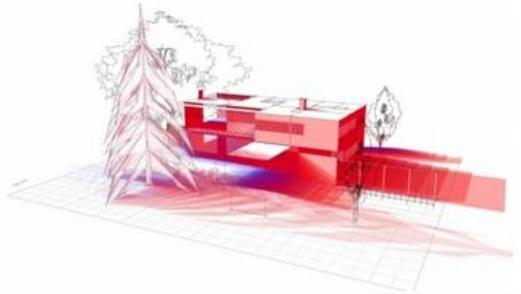
This mixed-use structure seeks to be energy independent, deal with its own waste water and grows much of its own food. Daniel did an energy balance to compare building loads with on-site renewable energy potential.



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.

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Discussion

Model courtesy of DesignGroup and the National Audubon Society

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