OUR VISION

We as a committee have created this guide as a resource for students, schools, and communities at large to address sustainable practices. We cover many different topics such as recycling, building practices, and sustainability-focused organizations. Additionally, these topics are analyzed through three different lenses: school/chapter, community, and individual. Our hope is that AIAS members will use this manual to enhance their projects and everyday lives with sustainable practices that are fun and easy to implement.

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**RECYCLING**

**STUDIO / CHAPTER**

**HAVE A STUDIO GARAGE SALE**
- Collect unwanted modeling materials and equipment from students and graduates at the end of each semester
- Make sure to designate collection locations and times in studio, and ADVERTISE!!!
- Sort the collected items and price them
- Host the garage sale at the beginning of the year or semester and make sure to advertise to incoming students!

**CREATE SEPARATE RECYCLING STREAMS**
- Schools should have separate recycling streams in studio to separate between:
  - Plactics - Paper
  - Cardboard / Chipboard - Organic Waste
  - Metals - Wood
- Chapters can design / decorate these separate disposal containers during a GA of FBD charrette for chapter bonding!

**DESIGNATE A MATERIALS ROOM**
- Many schools have a designated space where all unwanted materials can be donated for communal use
- This is especially important for younger students as they are not as experienced with buying the RIGHT amount of materials

**COMMUNITY**

**FIND OR START A REUSE PROGRAM**
- Find supply stores that sell recycled supplies from student donations in the area
- This can benefits students with lower incomes as well as community recycling efforts
- If you can’t find a program like this, speak with your store about starting one, or create one at your school!

**DONATE TO LOCAL SCHOOLS**
- Donate supplies to schools in your local area
- These donations can support underfunded arts programs and can foster children’s interest in design
- Chapters can also use this as an opportunity for community outreach and foster connections with high school chapters

**INDIVIDUAL**

**LAYOUT YOUR LASERCUTTING SHEETS WITH CARE**
- Make sure your lasercutting sheets are laid out to minimize edge waste

**CHECK YOUR MACHINES**
- Check lasercutters for a clean lense that is properly focused
- Make sure the laser cut through your material all the way before removing it from the bed
- Check 3D printer settings to make sure the temperature and flow are calibrated to avoid mistakes and wasted plastics
MATERIALS

BUYING SMART

CALCULATE WHAT YOU NEED
- Try to avoid overbuying materials
- Plan out the type and amount of materials you will need in advance, don’t wait until you are in the store!
- Know the dimensions of your model and of the materials you plan to buy
- Find material dimensions, colors, and shapes online or through a quick phone call
- Offer to help younger students with less experience to plan out their modeling needs

RESOURCE POOLING
- Buying materials with friends can help create a resource pool
- This means using up the materials in the pool before replenishing supplies
- Resource pools help diversify material options and to split costs between friends
- You can also carpool to buy materials, or take turns

FIND A LOCAL SUPPLIER
- Check if any of the materials you need can be sources from a local supplier, especially when woodworking
- This can help support small businesses and reinforces sustainable practices

NON-RECYCLABLES

COMMON MATERIALS THAT CANNOT BE RECYCLED
- REMEMBER: There is a difference between recycling and reuse! Most of these can be reused!
  - MDF
  - Foam
  - Finished, painted, or stained wood
  - Acrylic plastic sheets
  - Coated trace papers
  - Textiles
  - Any material with large quantities of adhesives, including hot glue, tacky glue, industrial glue and tape
  - Any material with large quantities of paint applied to it (pen and marker are usually OK)

ADHESIVES

USING LESS
- Glue and common adhesives cannot be recycled
- Consuming less adhesive is the best way to conserve this material
- Make sure to always recap your glue, as most glues contain water which will evaporate and render your glue useless
- Try to buy the smallest size available for super glues, as they dry out faster than other adhesives

WOODWORKING ALTERNATIVES
- See if you can use mechanical fasteners like screws and nails when working with wood
- Screws can be reused, while nails can be melted down and repurposed when recycled
INTEGRATING SUSTAINABLE BUILDING PRACTICES INTO YOUR DESIGN
- Look for ways to respect the site you are building on
- Choose your materials based on sustainability ratings
- Look at the types of labor that would be required for material sourcing and building the actual design
- Actively incorporate passive strategies for heating, cooling, ventilation, and daylighting
- In advanced studios, assess different types of HVAC systems that can be used

REFERENCES / WEBSITES
- AIA 2030 Challenge
- http://www.2030palette.org/
- https://core-studio.gitbook.io/beacon/
- OKALA Ratings
- MIT Sustainable Design Lab

HELPFUL TOOLS / PLUG-INS
- Climate Consultant
- LadyBug - Rhino
- DIVA - Rhino
- HoneyBee - Rhino
- Insight - Revit
- Sefaira - plugin for Revit and Rhino

HIGHLIGHTING HEALTHY PRACTICES
- Schools can encourage biking or the use of public transport through discounts for students and professors
- Schools can use social media to highlight sustainable practices and student projects that incorporate them
- Studio lights can be placed on a timer or manual switch to encourage students to use individual LED desk lamps
- Computer labs should be checked for all monitors and computers to be turned off after use
- Architecture schools can advocate for renewable energy sources to run the campus
- Schools can at plants and greenergy to studio spaces to increase oxygen supply and brighten the students’ environment
- Sponsoring visits to firms that champion sustainable design can show visible value to students

INTERDISCIPLINARY LEARNING
- Schools can create interdisciplinary challenges between departments, clubs, and students
- Collaboration between different majors on projects can expand common knowledge on sustainability between students
- Teaching sustainability can be shared between all professors
- Regularly updating projects and teaching methods can ensure sustainability practices are being taught
**WHAT ARE SUSTAINABLE BUILDING METHODS?**
Sustainable building methods are methods for design that are incorporated into buildings in an effort to make them more sustainable. Some common Sustainable Building Methods include: incorporation of the natural environment into design, orientation of the building, materials used in construction, and technology incorporated into designs. The following are a small selection of ways to incorporate sustainable building methods into your designs and, as always, research should be conducted to ensure that any building method is used appropriately.

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**BIOMIMETIC PRACTICES**
- Biomimicry is the analysis of natural processes, especially in regards to materials, structure, and systems
- This knowledge can then be applied to the design of buildings to “mimic” nature

**GREEN ROOFS**
- Green Roofs are roofs that host vegetative life
- They can be Extensive, Semi-Intensive, Intensive, Bespoke, and Sloped
- These different roof types range on a few scales:
  - Growing medium thickness  - Accessibility
  - Maintenance  - Types of greenery able to grow

**GREEN WALLS**
- Green Walls are similar to Green Roofs in growing medium thickness and structure
- They are different as they can be used inside and are more adaptable in nature as they can be smaller in scale

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**PASSIVE VENTILATION**
- This technique allows a building to heat and cool with limited use of mechanical means

**SHADING METHODS**
- Providing shade to the openings of a structure (louvres, overhangs, etc.) can prohibit some light from entering a building

**TROMBE WALLS**
- The consist of an outer glass skin and an inner skin made of a thermal mass material.
- Light enters through the outer skin and heats up inner skin so that heat is released gradually into the building

**MATERIALS AND TECHNOLOGY**
- Masonry and concrete can be useful for thermal mass, fire resistance, and reuse for new designs
- Glass must be properly insulated and shaded with attention to new technologies like gas filled windows
- Steel can be continuously recycled for structural supports like rebar
- Wood is a renewable material, however safe forestry practices must be a factor when choosing the type
GEOTHERMAL ENERGY
- This is a closed loop system that includes coils underground that transfer or absorb heat from the earth’s crust for energy
- Seasonally, heat can be dispersed through the ground to make a building cooler, or heat can be absorbed to heat a building

SOLAR ENERGY
- Takes two forms: Photovoltaic Cells (PV) and Concentrated Solar Thermal Power (CSP)
- PV works better in climates with steady light but lower heat
- CSP works better in climates with severe heat and could prove more viable in the future with climate change
- Solar energy use has doubled seven times globally since 2000
- An incentive for consumers to invest in solar energy is Net Metering
- Net Metering allows for electricity produced by consumers’ rooftop panels to be fed back into the grid
- Websites like Google Sunroof and PVWatts calculator can help consumers and designers see energy savings by using solar
- Hopefully PV can be incorporated into design more frequently in coming years

WIND ENERGY
- Wind is a plentiful, clean resource around the world
- Onshore wind and offshore wind energy are both used however, offshore wind energy is stronger and more consistent
- Wind turbines work by converting wind energy into electricity
- Storage for electricity is a rapidly growing research area
- China is the current world leader in wind power
- For every doubling of windspeed, the amount of energy produced is cubed
- Wind power is a largely bipartisan issue as the wind corridor in the United States resides in majority Republican States

HYDROPOWER
- Hydropower currently produces more electricity than nuclear energy
- It contributes 16% of electricity globally


OTHER CLEAN ENERGY / POWER OPTIONS
- Wave Energy
- Tidal Energy
- River Energy
- Kinetic Energy
- Battery Power
- Biomass Energy
- Biofuel
- Agriculture production with aquaponic system
## Advocacy and Leaders

### Groups and Challenges
- USGBC
- Living Building Challenge
- International WELL Building
- Green Building Initiative

### How to Promote Groups Like This
- Host classes and workshops
- These can be at community centers or school based for credit
- Invite representatives from different organizations to present at your school
- Invite groups for panel discussions

### Getting Certified / Sustainable Credentials
- People can gain certifications from certain organizations like LEED
- To become LEED certified you must take the LEED Green Associate Exam
- This is a one hundred question exam on energy efficiency and sustainability
- If you pass you are granted LEED certification which you can then put on your resume

### Study Tips
- Recommended study time for this exam is 20 hours minimum to fully understand the rating system
- There are many study guides available online

### LEED Basics
- The LEED rating system is split into 5 main categories:
  - Building Design and Construction
  - Operations and maintenance
  - Neighborhood development
  - Interior design and construction
  - Homes
- LEED certified buildings must meet prerequisites and choose from 110 credits points to reach a desired certification level
- There are four levels of LEED building:
  - Certified (40-49)
  - Gold (60-79)
  - Silver (50-59)
  - Platinum (80+)

### Leading Designers in Sustainable Design
- HOK
- Foster + Partners
- Bjarke Ingels Group
- Gensler
- The Living
- ZGF
- Jones Studio
- Stantec
- Studio Gang
- Doris Sung of DO | SU Studio Architecture
- EYP Architecture & Engineering
- Tom Jacobs of Krueck+Sexton Architects