An Introduction to Green Jobs

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This training will cover:

- An introduction to the environmental problem
- What are “green jobs”?
- What projects and jobs are considered green
- Sources of alternative energy
- Green construction
- Green building materials
- Green jobs and worker health and safety
- Conducting Green Job Hazard Analysis
- How will the Operating Engineers fit in?

After completing this module you will be able to:

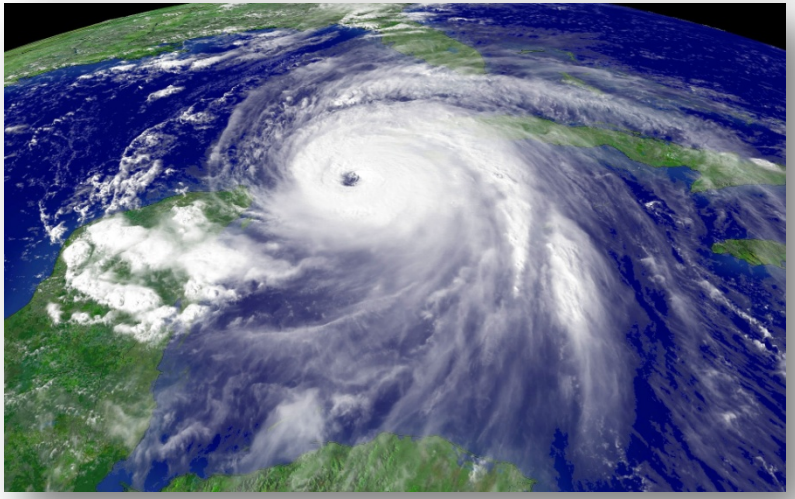
- Give two examples of why we must start doing things in a green way
- Provide the definition of a green job
- Define Green construction
- Give two examples of green building materials
- Discuss how green jobs affect worker health and safety
- Conduct a Green Job Hazard Analysis
- List five green projects that will involve Operating Engineers

What does “green” mean?

When something is green, it means it is environmentally friendly

Are there environmental issues that could use some attention?

Climate Change: Severe Weather



Is there a problem with garbage?

Can a society have sustainable growth?

To attempt to curb the rising environmental issues...

Ride the green wave!

The exploding economic activity in the "environmentally sustainable" sector (i.e., the green economy)

Source: Ella Baker Center for Human Rights: http://ellabakercenter.org

What are green jobs?

A footing is created for the Solar Highway in Oregon, courtesy of Oregon DOT

A paid position providing environmentally-friendly products or services; term suggests high standards regarding fair wages, equal opportunity and healthy working conditions; employer may be a private business, government, non-profit or cooperative

- Ella Baker Center for Human Rights

Green collar is a good thing

However, we need more than green jobs, we need a green economy!

- **Markets based on green energy, goods and services**
- **Green becomes a new way of sustainable living**
- **Protects us and the environment**
- **Creates sustainable, living wage jobs**

Factors driving green job growth

- Economic conditions
- Technological advances
- Public policy
- Clean Energy Program
- Federal Economic Stimulus
- Workforce strengths, geography, and infrastructure are also important drivers

Good jobs have:

- Living wages
- Health benefits
- Meaningful work
- Occupational mobility
- High levels of job satisfaction
- Not able to be exported
- Attractive to young workers
- Low barriers to entry

Green jobs satisfy these requirements!

A few examples of green jobs

- Car and truck mechanic jobs, jobs related to bio-diesel, vegetable oil and other alternative fuels
- Energy retrofits to increase energy efficiency and conservation
- Hauling and reuse of construction and demolition materials and debris
- Green building/construction

- Pinderhughes, 2006

Green jobs (cont.)

- Hazardous materials cleanup
- Sustainable landscaping
- Water retrofits to increase water efficiency and conservation
- Non-toxic household cleaning in residential and commercial buildings
- Parks and open space maintenance and expansion

- Pinderhughes, 2006

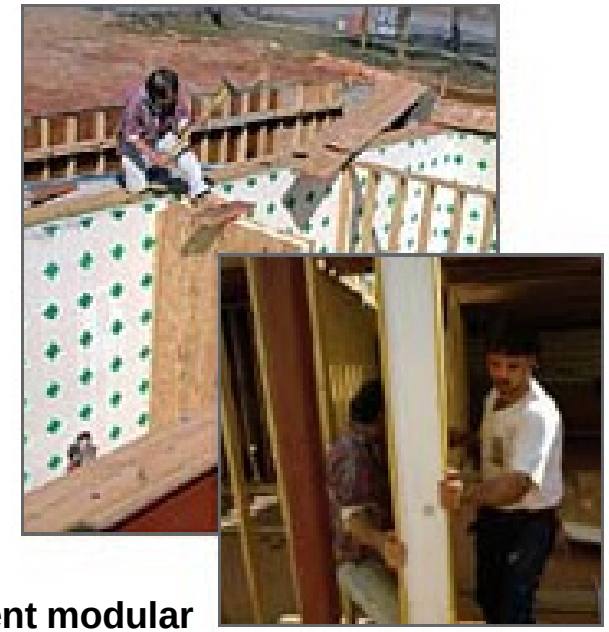
Green jobs (cont'd.)

- **Recycling**
- **Alternative energy installation and maintenance**
- **Tree cutting and pruning**
- **Green waste composting on a large scale**

- Pinderhughes, 2006

Green Industries

- Utilities
- Business services
- Personal services
- Construction
- Public Sector/Government
- Biotechnology
- Trucking
- Waste management
- Recreational



Energy efficient modular walls, courtesy DOE

What is building green or green construction?

- **The process of designing, constructing, operating, and maintaining buildings and landscapes that produce healthier indoor and outdoor environments**
- **Certification for building green:**
  - **U.S. Green Building Council (USGBC)**
- **Leadership in Energy and Environmental Design™ (LEED)**

What is building green or green construction ?

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- Leadership in Energy and Environmental Design™ (LEED)

NOTE: certified green building does not mean it is safe work!

Major components of LEED

- Integrated design
- Sustainable sites
- Water efficiency
- Energy and atmosphere
- Materials and resources
- Indoor air quality

What is a green building?

A high performance facility that reduces water, energy and resource consumption; lowers operational costs, improves indoor air quality, and mitigates negative environmental impacts.

Examples of DOE model green buildings, courtesy DOE

Why should we build green?

Because it makes sense for the economy, public health and the environment – Green DC initiative

Example of passive and active solar use , courtesy DOE

The costs of building

- 40% of raw materials consumed globally are used by the building construction industry
- U.S. building construction:
  - Uses 68% of total electricity consumption
  - Creates 38% of carbon dioxide emissions
  - Uses 12% of potable water
  - Creates 272 million tons of construction and demolition waste annually

Source: The Guide to Green Buildings

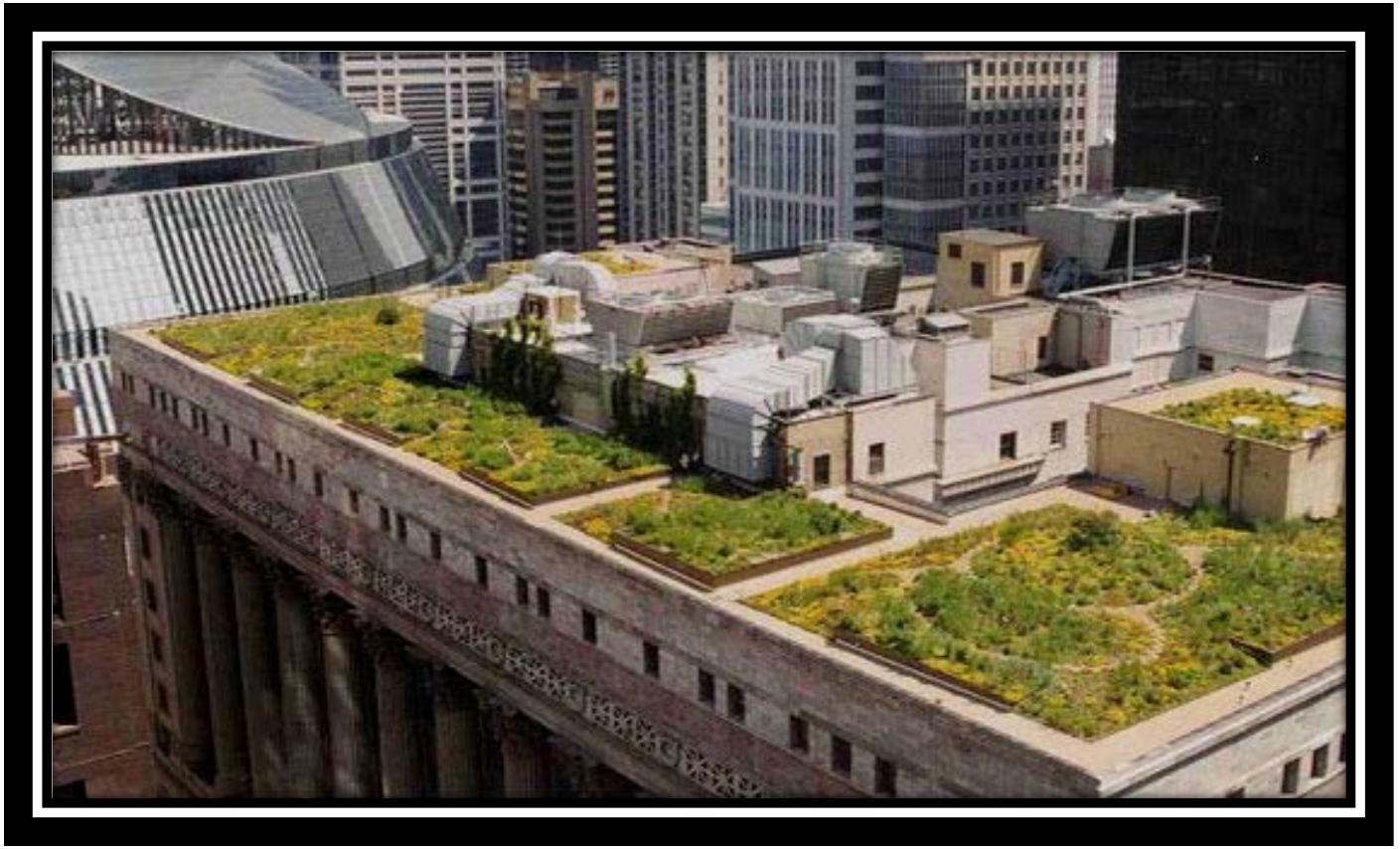
Examples of green construction projects

Wind turbine

Rooftop rain garden

Modular, insulated wall units

Green roofs have many advantages

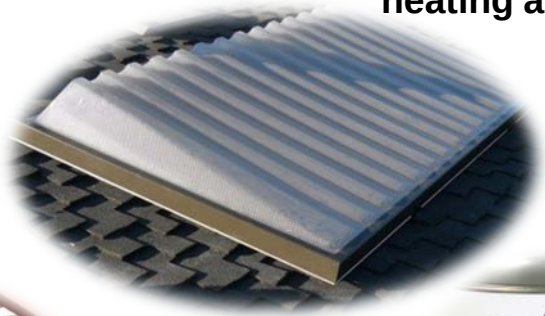


A green roof in Chicago, courtesy of the City of Chicago

Can you name some green building materials?

Reused lumber

Passive solar heating and light



Recycled hard materials

Rainwater catch basins

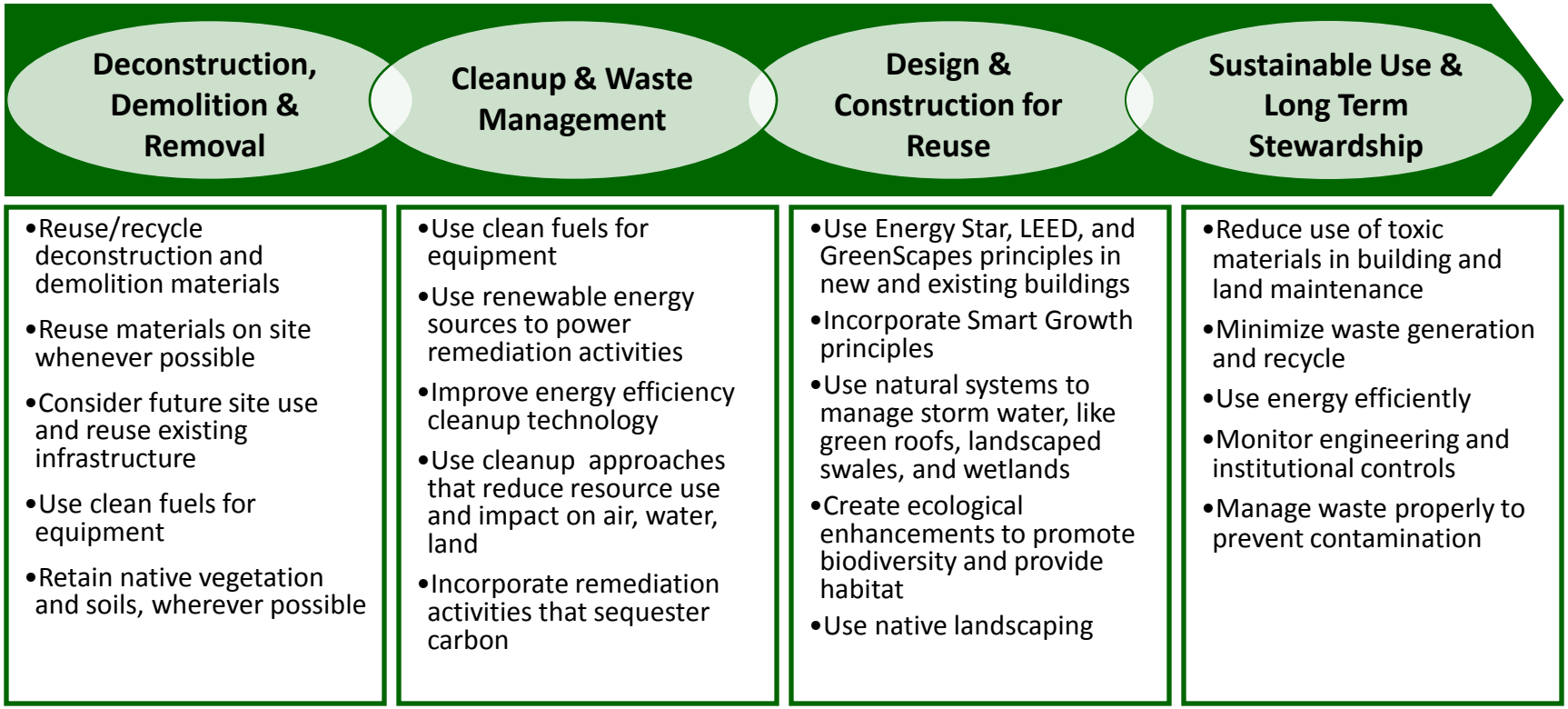
Low VOC, green paint

Materials with low toxicity

Recycled pavers and bricks

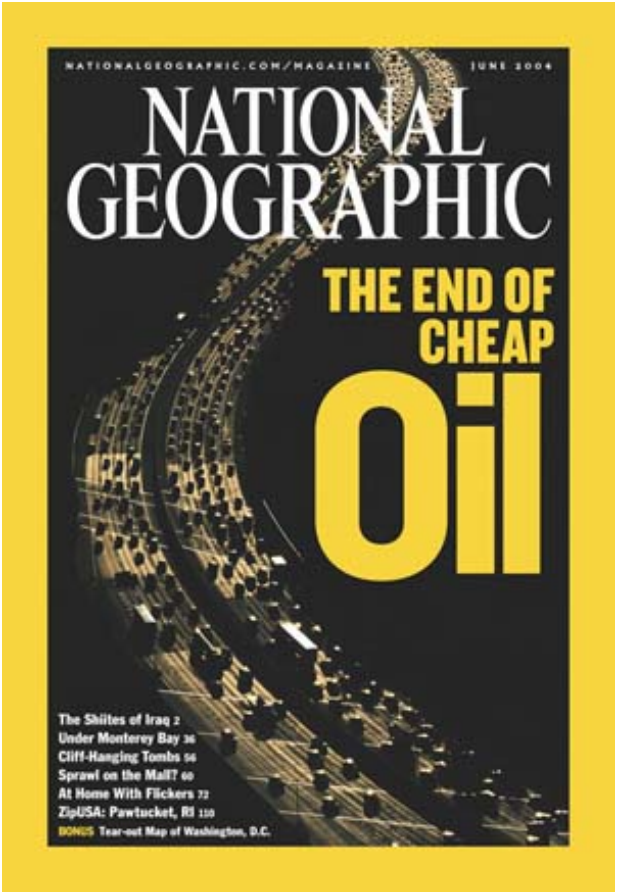
Recycled surfaces

Sustainable Revitalization



How long will our energy last?

- It depends on what type of energy you are talking about
- Non-renewable sources will run out
- Renewable sources will last forever
- “Peak Oil”



What are green energy jobs?

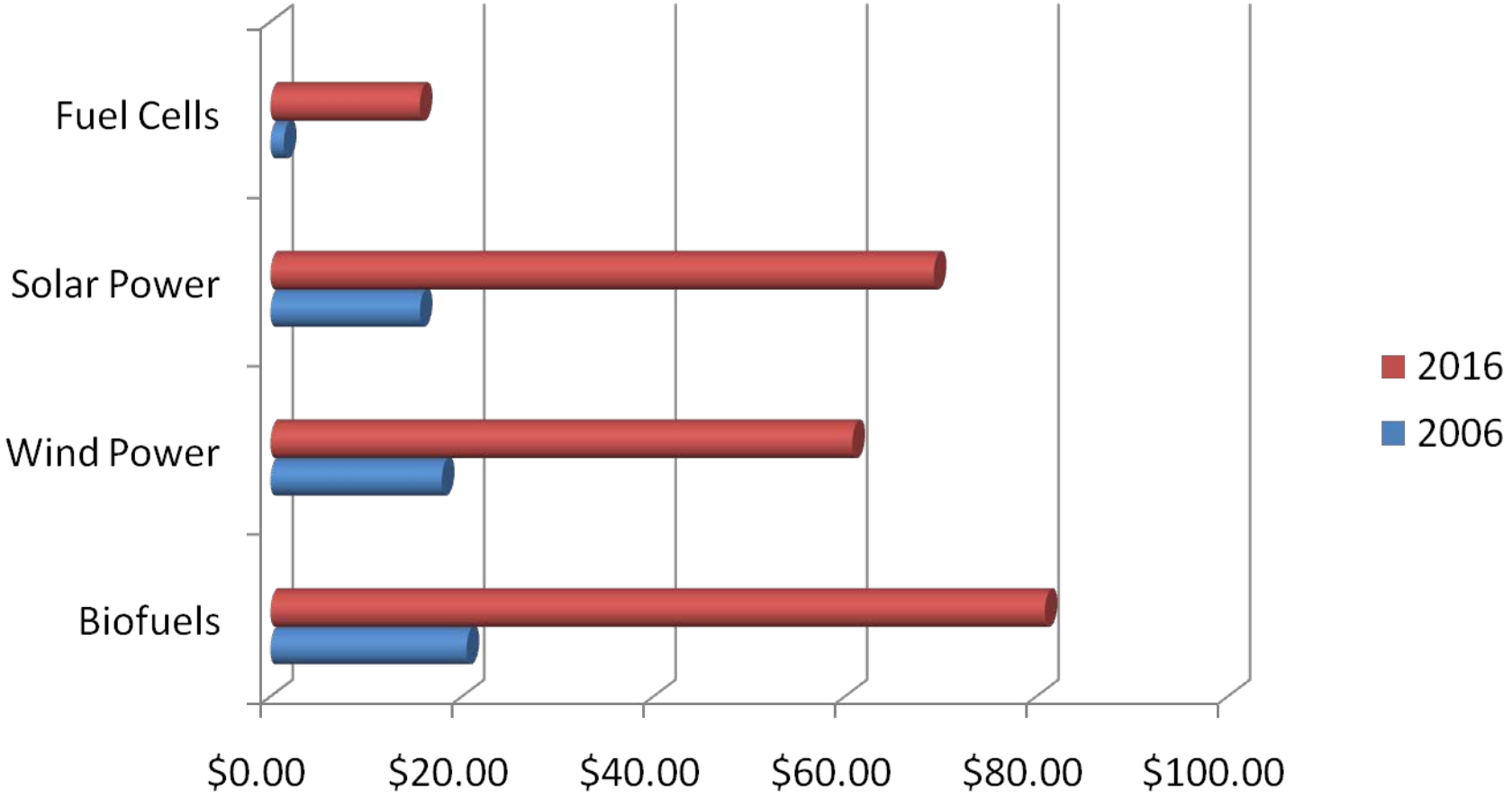
- They reduce energy use and lower carbon emissions
- Traditional jobs with a “green layer” of skills and knowledge
- Jobs in middle-skill construction, or related occupations
- Jobs in energy efficiency

- Green energy jobs examples
  - Energy auditor/Rater
  - Air sealer
  - HVAC technician
  - Electrician
  - Solar power installer
  - Wind turbine technician
  - Energy engineers
  - Research scientist

Can you name some alternative energy sources?

- Wind power
- Geothermal
- Hydro power
- Solar power
- Biofuels
- Fuel cells

Renewable energy projected growth ($Billions) 2006:2016



Source: Clean Edge 2007

Wind Power

Geothermal Power

Geothermal at work, courtesy DOE

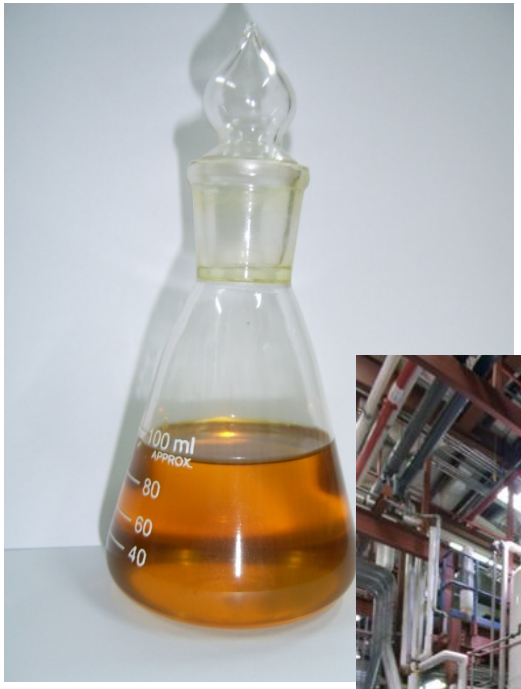
Hydro Power

Workers prepared to install a hydrokinetic turbine on the Mississippi River below the dam at Hastings in December, 2008. The turbine captures energy from the flow of the water, courtesy of Hydro Green Energy.

Solar Power

Solar highway installation in Oregon, courtesy of Oregon DOT

Biofuels


100 ml
APPROX.
80
60
40


Propel
E85 / Biodiesel
Regular 289
Plus 305
V-Power 315
Gasoline
Food Mart
FlexFuel E85 .85
Biodiesel B5 2.89
Propel

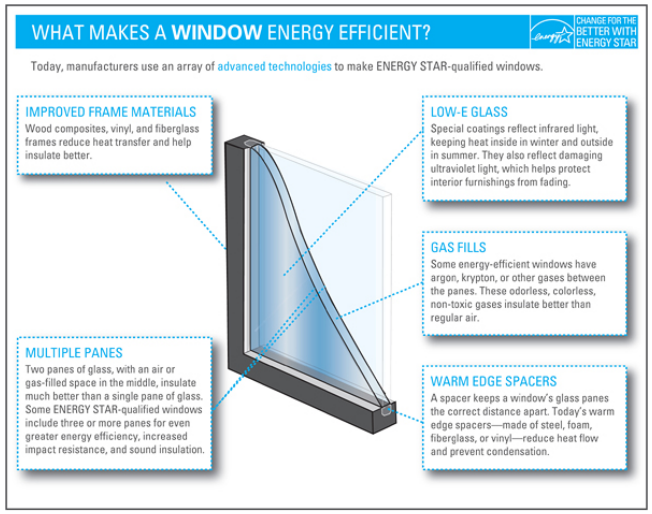
What should we do before installing high tech energy systems?

Before installing high tech energy systems we should make sure it is not wasted

Have you heard of weatherization and energy efficiency?

Weatherization of buildings

Weatherization is a method of insulating buildings from the outside climate including construction of new buildings and renovation of old buildings



DOE's weatherization components

- National Energy Audit Tool
- Insulation
- Blower doors
- Air sealing
- Windows
- Heating
- Water heaters
- Air conditioning and warm climate weatherization measures
- Electrical appliances and weatherization base load measures

Weatherization worker, courtesy VT.gov

Energy Efficiency-Energy Star

An international standard for energy efficient consumer products. First created as a United States government program in 1992. Devices carrying the Energy Star logo save 20%-30% on average.

Green Remediation

The practice of considering environmental impacts of remediation activities at every stage of the remediation process in order to maximize the net environmental benefit of a cleanup.

What is a green cleanup?

The practice of considering all environmental effects of a cleanup during each phase of the process, and incorporating strategies to maximize the net environmental benefit of the cleanup.

Opportunities to increase sustainability in site cleanups

- **Apply to all cleanup programs**
- **Employ throughout site investigation, design, construction, operation, and monitoring phases**
- **Involve best management practices for core elements**

-Source, EPA

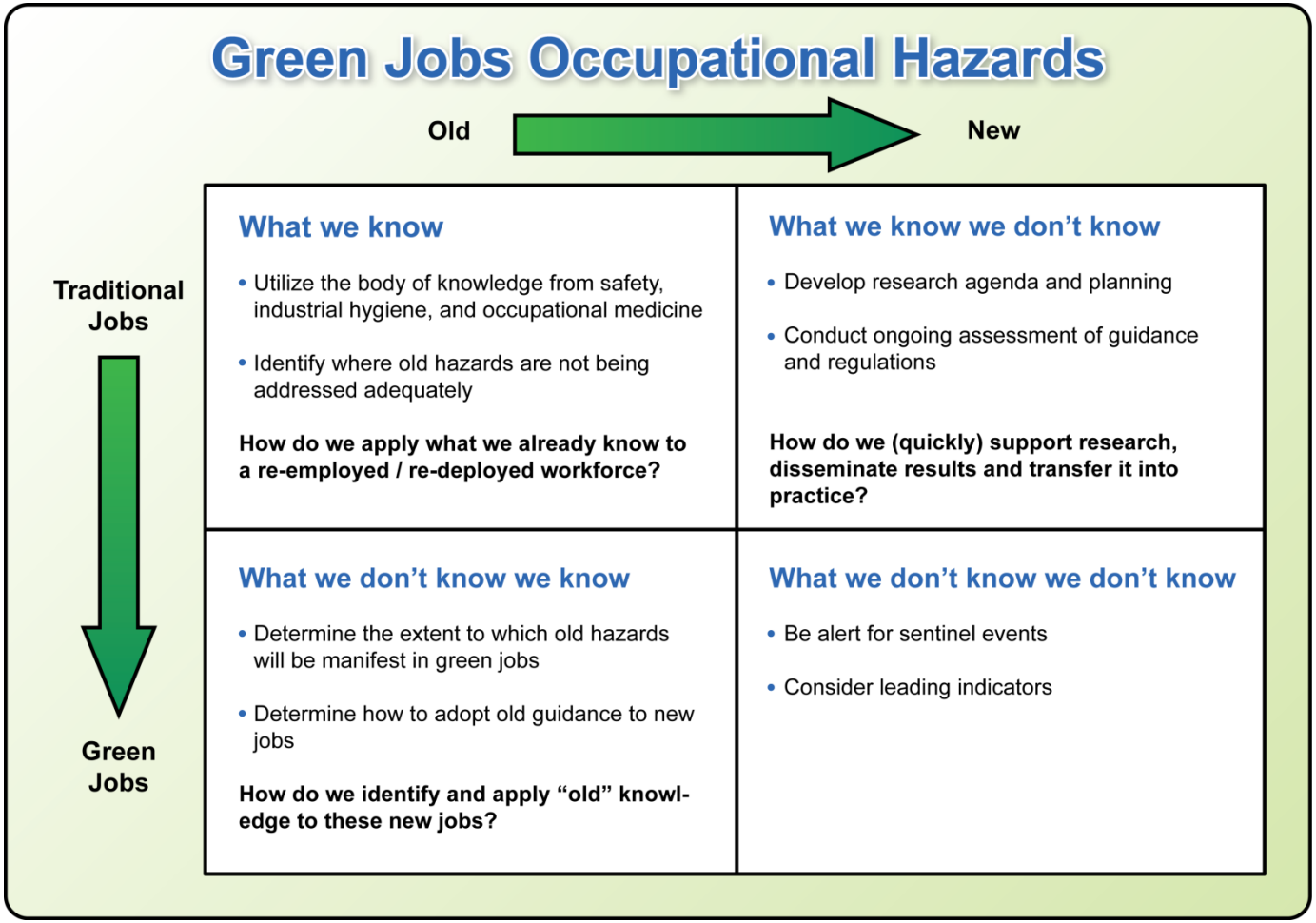
EPA's green cleanup goals

- **Minimize ancillary impacts such as CO_2**
- **Minimize total energy use and promote use of renewable energy**
- **Preserve natural resources**
- **Maximize the recycling of material**
- **Maximize reuse options for land**

Do you think Green = Safe?

This 2,300sf high-rise green roof is part of a modern building construct. A crane was used to lift the soil and gravel onto three floors, courtesy DCGreenworks.org

Inherently, a green job is no safer than a job in a traditional task that involves similar conditions or demands…-NIOSH



Operating Engineers evaluated the safety of DOE cleanup technologies

- Evaluated over 150 technologies
- Produced several guidance documents
- Created Technology Safety Data Sheets for each technology

Dry ice blaster for radiation cleanup

IUOE learned that new “greener” technologies could have old hazards

En-vac Robotic Blasting System

What hazards does this robotic blasting technology pose?

The IUOE also learned that workers needed more safety information

TECHNOLOGY SAFETY DATA SHEETS
Company Name
Technology Name

SECTION 1: TECHNOLOGY IDENTITY

Manufacturer's Name and Address:	**Emergency Contact:**
	Name:
	Phone: **Fax:**
	Information Contact:
	Name:
	Phone: **Fax:**
	Date Prepared:
Other Names:	**Signature of Preparer:**
	Phone: **Fax**

SECTION 6: ASSOCIATED HEALTH HAZARDS

Probability of Occurrence of Hazard:

1. Hazard may be present but not expected over background level
2. Some level of hazard above background level
3. High hazard level
4. Potential for imminent danger to life and health

Green jobs still require construction and potential use of chemicals

More green roofing from DCGreenworks.org

Fiber-cement materials—green and potentially hazardous to workers

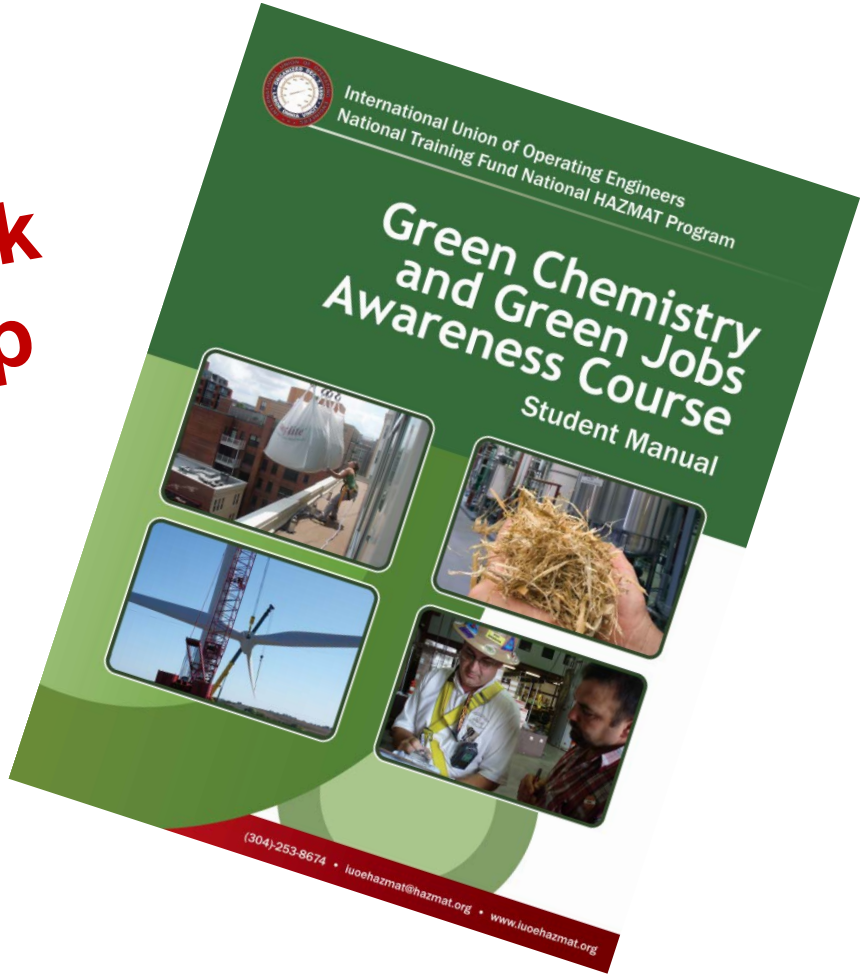
- **Hardiplank [10-50%] crystalline silica**
- **Weatherboard [45-55%] crystalline silica**

Hardiplank siding material

***WISHA inspection data*: 5 of 7 workers using circular saws outdoors on fiber-cement siding were exposed above ACGIH-TLV for silica**

Matt Gillen, MS, CIH, Pietra Check, MPH and Christine Branche, PhD of NIOSH have developed six steps describing how to go green safely

Lets look these up in your books!



Here is a green job: is it safe?

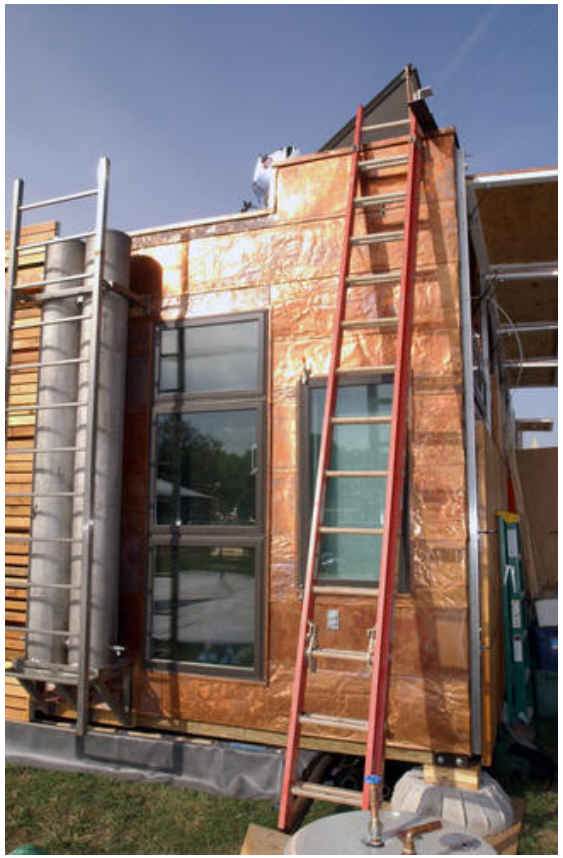
Any safety issues here?

How about hazards here?

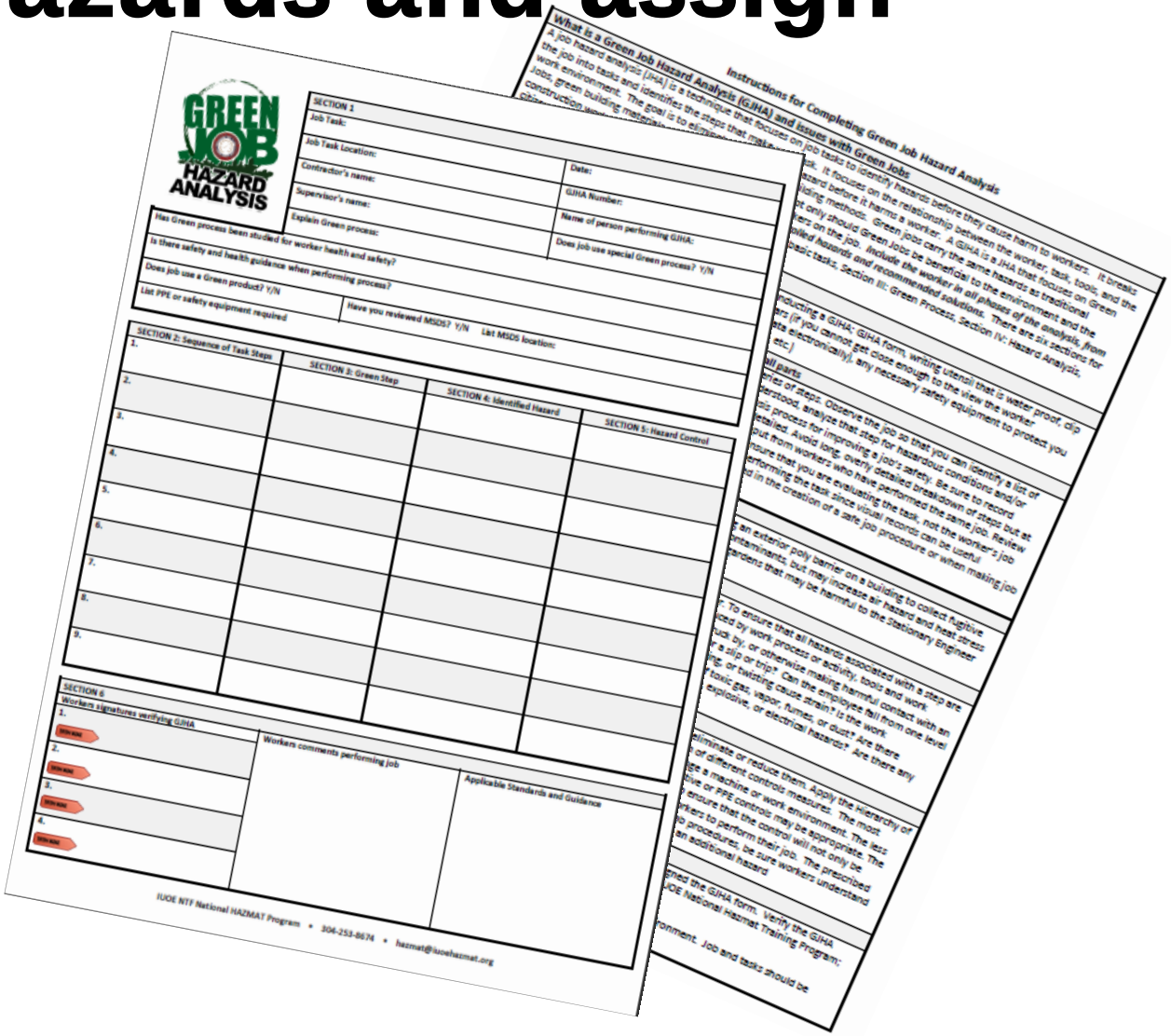
Wind turbine installation, courtesy DOE

Any issues here?

Lets do one more!



Job Hazard Analysis will help us identify hazards and assign controls



What is a Job Hazard Analysis?

- **A job hazard analysis (JHA) is a technique that focuses on job tasks as a way to identify hazards before they occur**
- **It focuses on the relationship between the worker, the task, the tools, and the work environment**
- **After uncontrolled hazards are identified, take action to eliminate them or reduce risk!**

What can a JHA do?

- Identify and prioritize hazards
- Control hazards
- Train workers
- Worker involvement
- Required for VPP

What's a GJHA?

- **"Green" Job Hazard Analysis**
- **Designed to focus on green jobs or "green" tasks or steps involved in a traditional job**
- **May be used for both green or traditional jobs**

The “short” guide to conducting a JHA

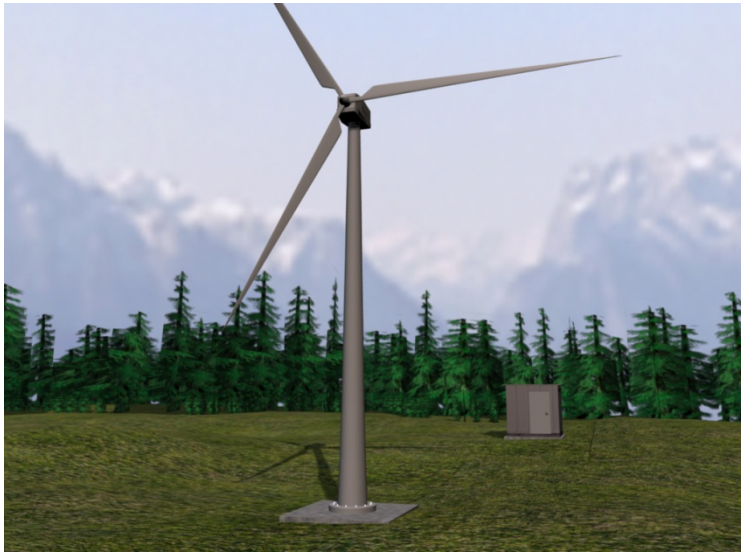
- **Involve workers!**
- **Review past data**
- **Prioritize jobs**
- **Break jobs into tasks**
- **Break tasks into steps**
- **Indentify hazards associated with each step**
- **Assign controls for each hazard**
- **Develop safe job procedure**

Let’s practice: change a ceiling light bulb 10 feet up with a step ladder

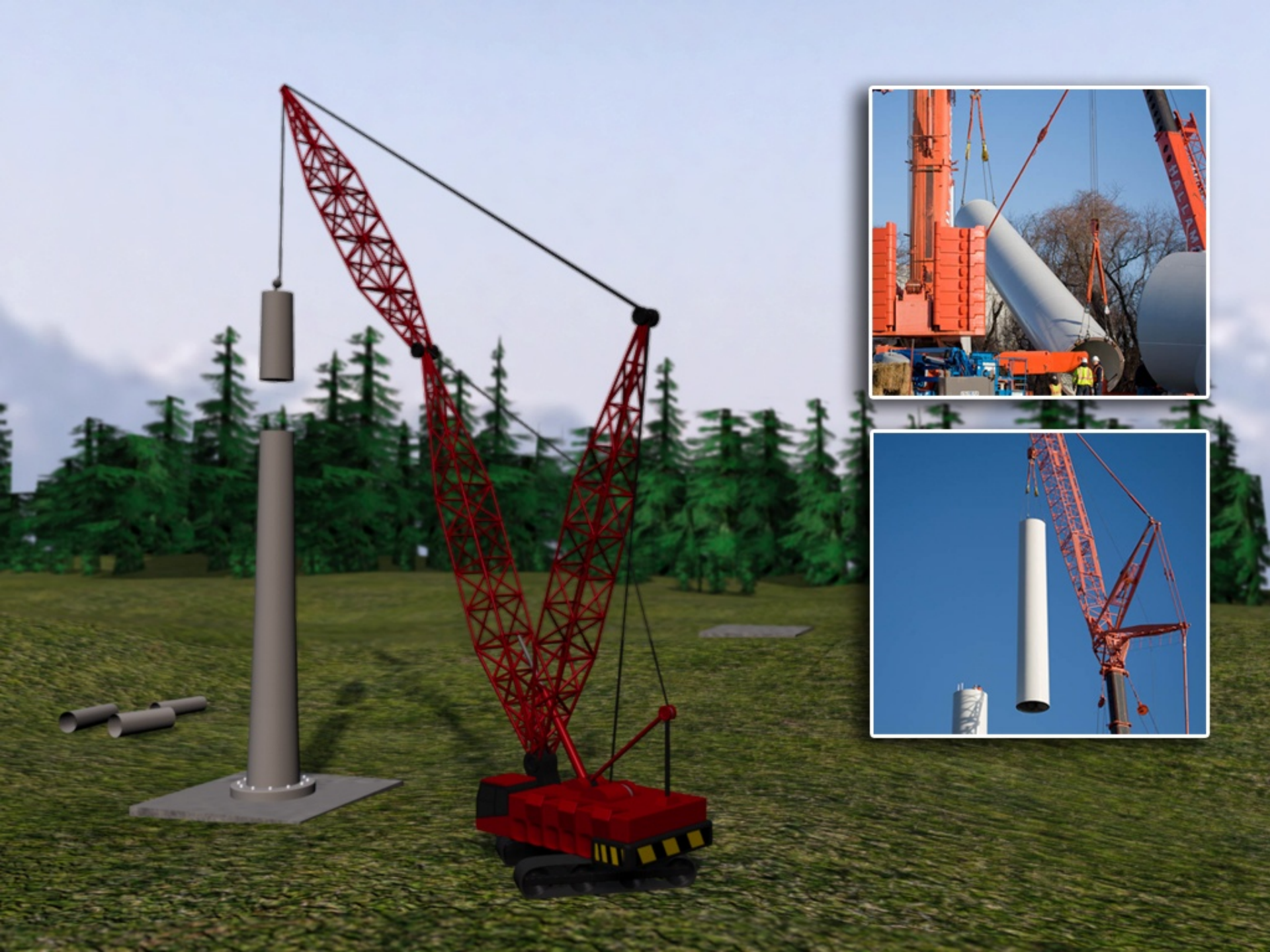
Use the Hierarchy of Controls!

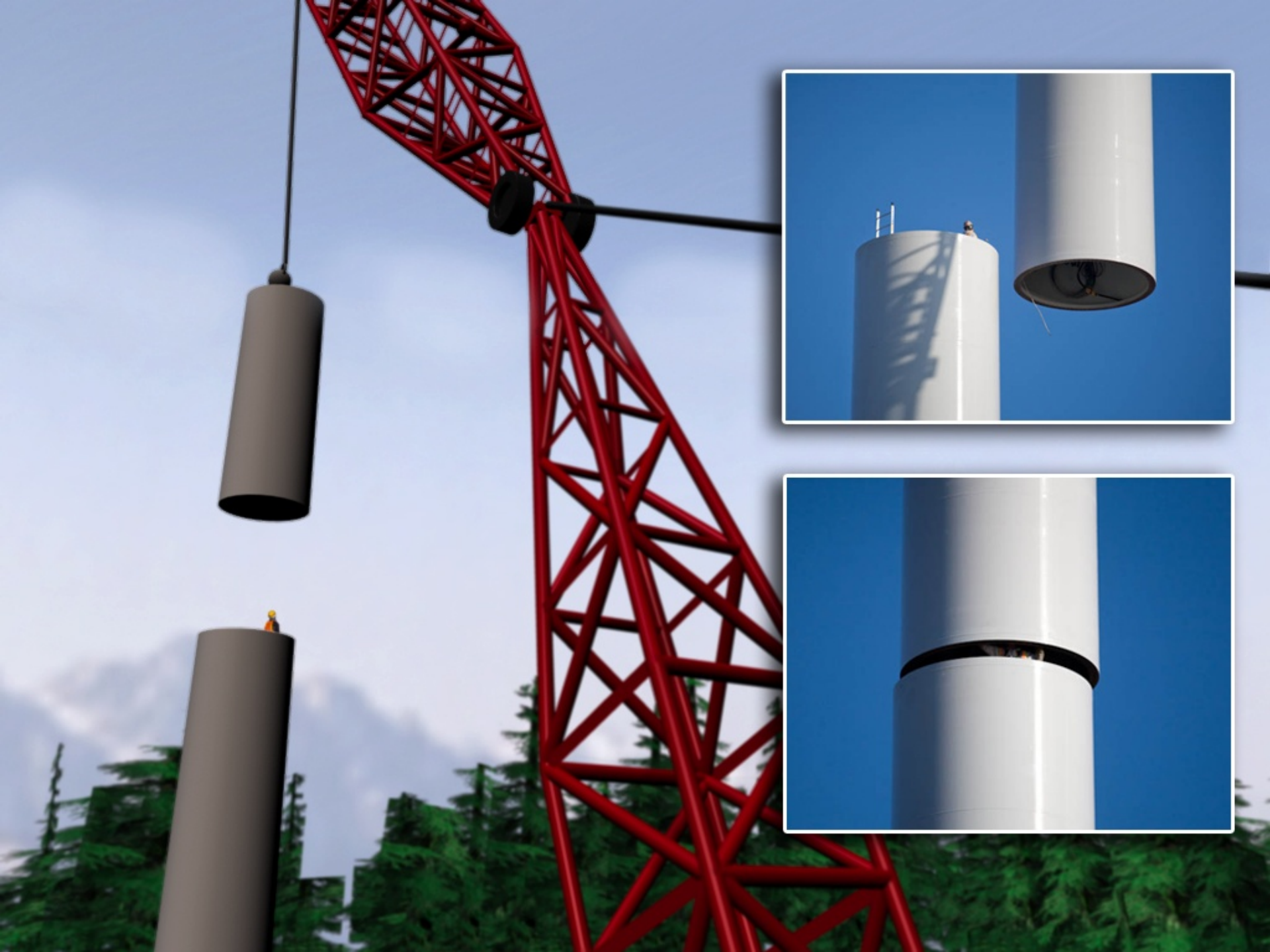
Activity: perform GJHAs

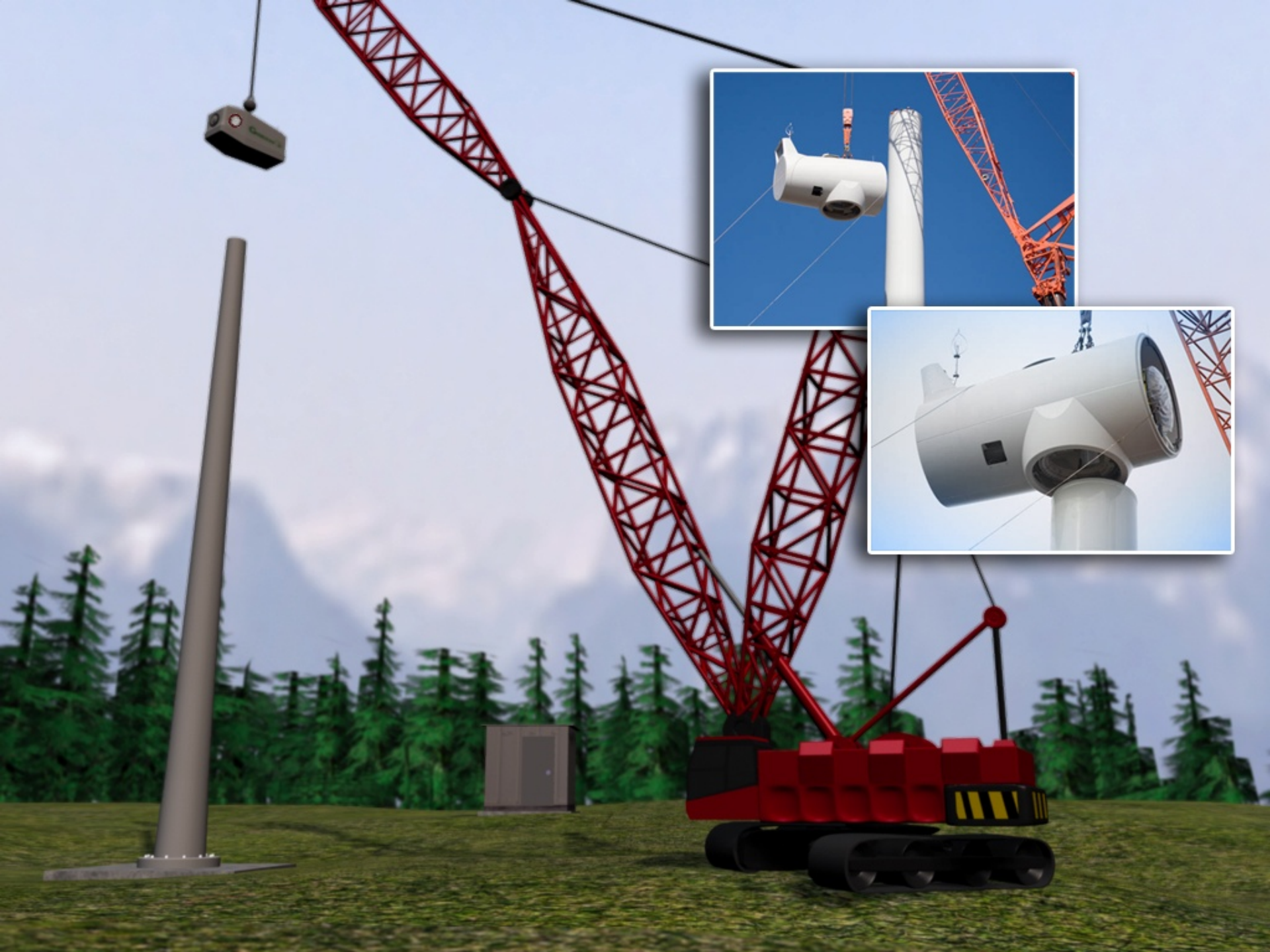
- **Conduct GJHA on wind turbine installation or**
- **Conduct GJHA on green roof installation**

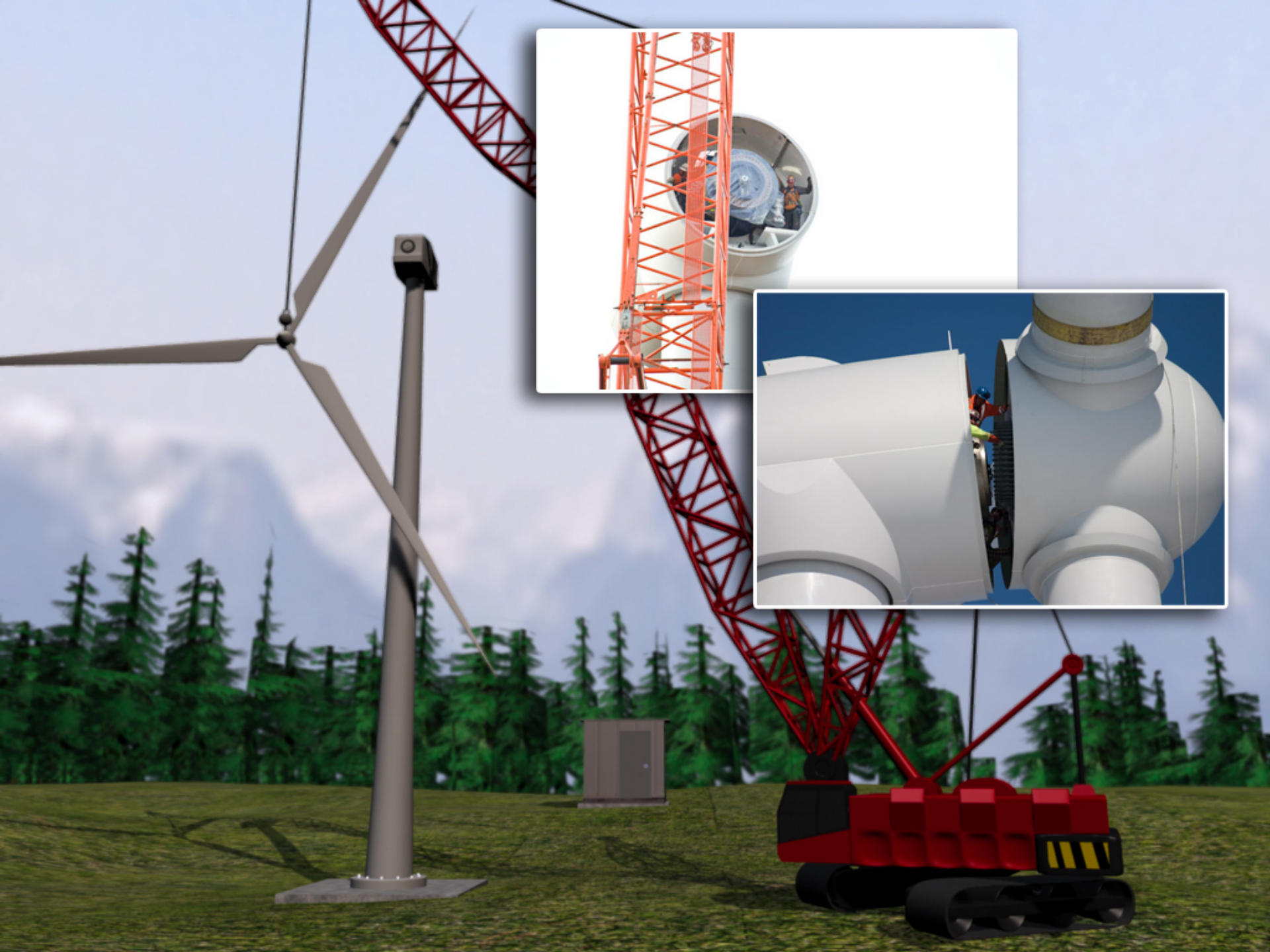


Wind turbine
GJHA

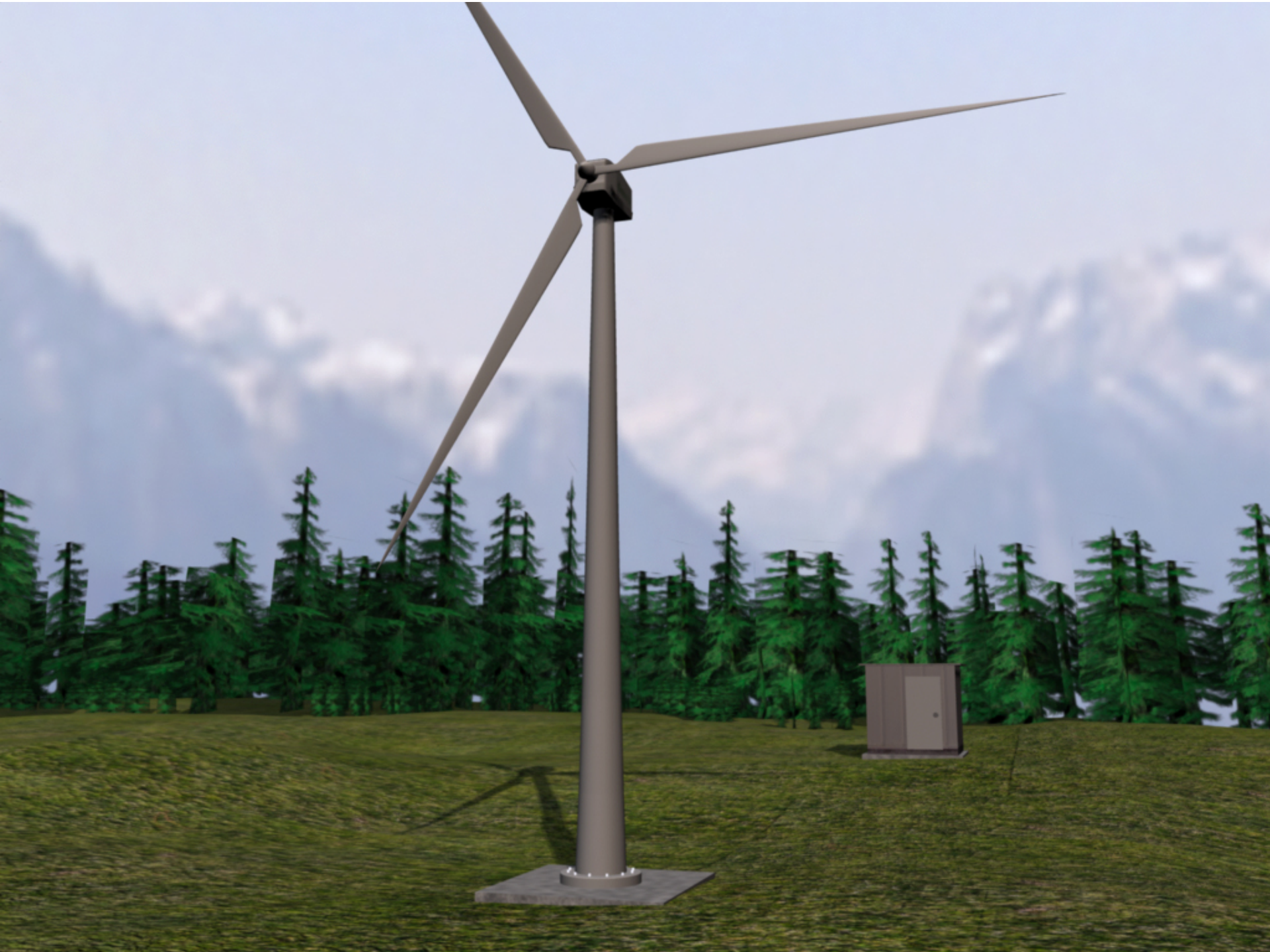




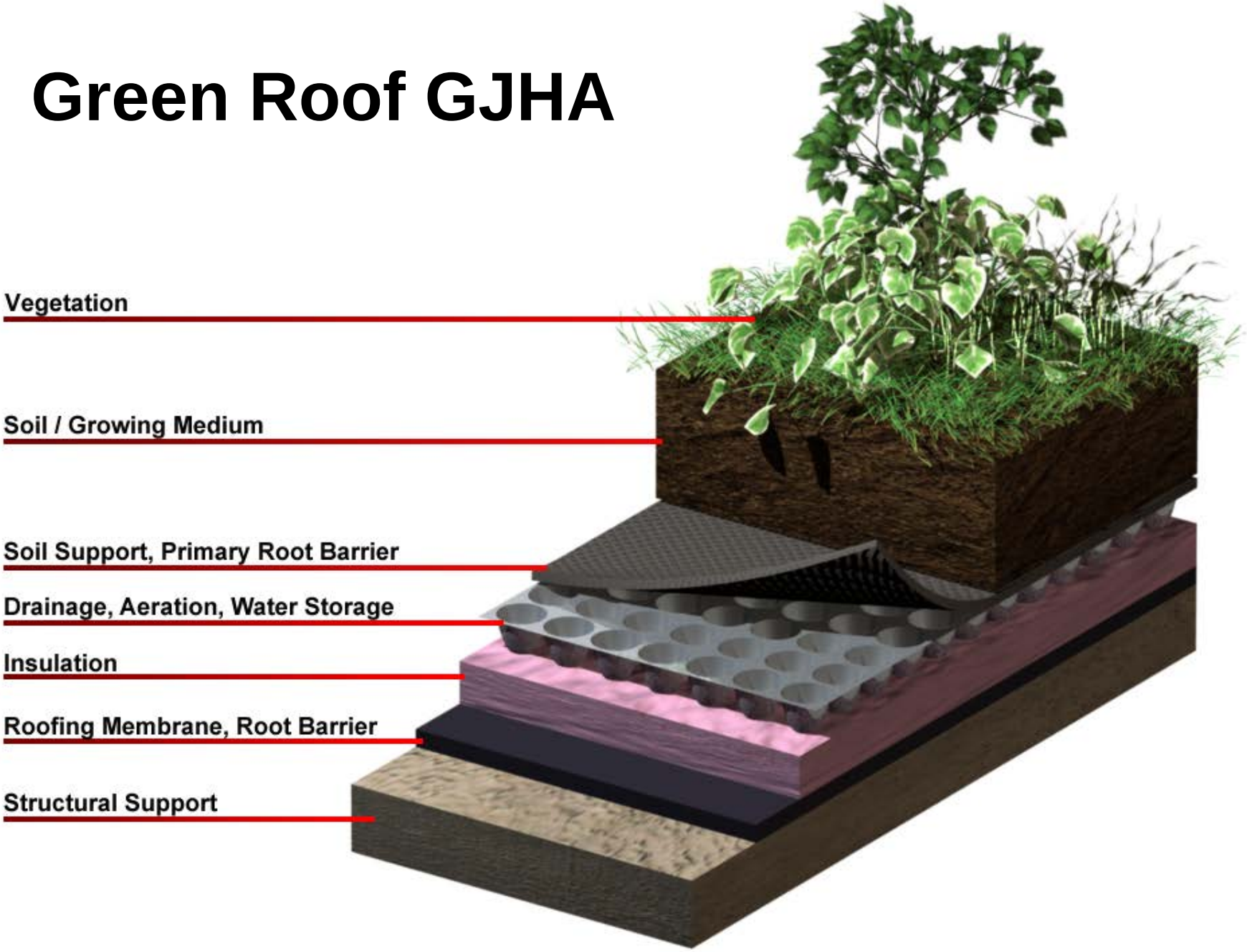





GREEN



Green Roof GJHA



Let’s look at a case study: Green DC

- DC Green Construction effort could produce over 169,000 jobs between 2009 and 2018
- Real estate development and public sector real estate and capital projects are required to follow the DC Green Building Act
- Some voluntary private sector initiatives

The Green Building Act of 2006 phases in green building in DC. It requires:

- **Commercial buildings to be certified, using the LEED™ Green Building Rating System**
- **Residential buildings to meet Green Communities standards**
- **Launches a green building incentive program, a Green Building Fund and a Green Building Advisory Council**

Who will get these green jobs?

- **37% of the green job opportunities require little to no preparation**
- **42% of the green jobs will require a moderate level of preparation**
  - **Some will require an Associate's degree**
  - **A few will require a Bachelor's degree or higher**

Green DC top 10 highest demanded jobs

- Carpenters
- Construction laborers
- First-line supervisors/managers of construction trades and extraction workers
- Construction managers
- **Operating Engineers and other construction equipment operators**
- Plumbers, pipefitters and steamfitters
- Roofers
- Electricians
- Cement masons and concrete finishers
- Painters, construction and maintenance

The Stimulus Money

- **The $789 billion economic-recovery bill includes roughly $62.2 billion for direct spending on green initiatives!**
- **So where is the money?**

States are not spending the money

Selection of current weatherization progress as reported by US DOE OAS-RA-10-04 report			
State	Units Planned	Units Completed	% Units Completed
New York	45,400	280	0.62%
Texas	33,908	0	0.00%
Ohio	32,180	6,814	21.17%
Pennsylvania	29,554	378	1.28%
Michigan	33,410	385	1.15%
Illinois	26,933	331	1.23%
California	43,400	12	0.03%
Florida	19,090	312	1.63%
Wisconsin	20,678	772	3.73%
North Carolina	22,203	197	0.89%

Where does the IUOE fit in?

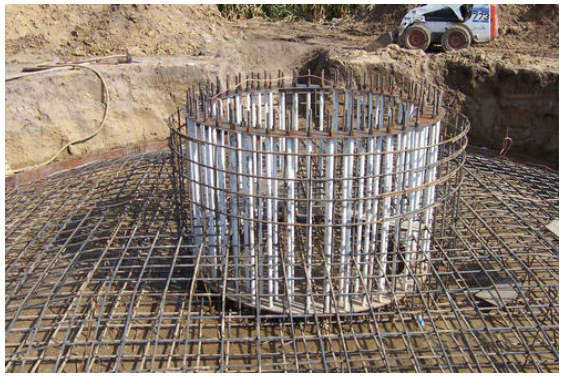
- **For many green construction projects, IUOE members (H&P and Stationary) will be required. Can you list some?**
- **The only barrier will be to become familiar with the new green construction building methods, materials and processes**

Where does the IUOE fit in ?

Talk to your Local business managers about getting involved with green jobs!

Don’t forget about health and safety!

- Green collar work has new, unique health and safety challenges
- Green does not necessarily mean safe or healthy for the worker
- Find the facts before you go green!



From start to finish, wind turbine installation is a long process, courtesy DOE

Any Comments or Questions?

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