KQED
education network

Is a Green Economy the Key to Job Growth?

Employment Trends and Opportunities for ESL Learners

OBJECTIVES

At the end of this session, students will be able to:

- Understand the connection between carbon emissions and climate change.
- Understand the concept of renewable energy sources.
- Define "renewable" and "nonrenewable" resources.
- Identify fields of industry that are becoming green.
- Recognize the vocabulary of solar energy.
- Distinguish between solar, hydro, geothermal, wind, and biomass power.
- Identify green job training courses on college websites.
- Relate information about the green economy to their local community.

TARGET GROUP

Intermediate to high-level ESL students (level 6)
(For the purpose of this lesson, the target group levels range from 1 through 8, with the following guidelines: 1 = beginning, 5 = intermediate, 8 = advanced.)

LENGTH

Three class periods of approximately 90 minutes each

OVERVIEW

In this lesson, students learn about the connection between climate change and the economy. The lesson explores how moving toward renewable energy sources to reduce carbon emissions will create different types of jobs—green jobs. Students are encouraged to think through what those jobs will be and how the green economy may present them with training and career opportunities. The lesson focuses on language acquisition for English language learners specifically with regard to vocabulary and grammatical structure pertaining to the green economy.

DAY ONE ACTIVITIES

1. Class Discussion Opener

Begin by introducing to students the two big problems that face the United States right now: climate change and unemployment. Starting with climate change, show students the following graphs, which illustrate how the increase in global temperature coincides with the increase in carbon emissions:
http://www.pbs.org/wgbh/warming/etc/graphs.html
http://www.nrs.fs.fed.us/niacs/local-resources/images/nasa_graph.gif

Make sure that students understand the connection between global temperature and the increase in carbon emissions.

Write ***climate change*** in a bubble on the board with arrows around the bubble pointing inward, and ask the class: What causes climate change? Invite them to identify factors involved.

Write ***unemployment*** in a bubble on the board with arrows around it pointing inward and ask students: What causes unemployment?

Introduce unemployment as a key issue and direct students to the graph **Overall Job Loss v Green Job Growth in the USA**, available at http://uw.kqed.org/youdecide/polls/greenjobs.php. Enter the You Decide site and click on the Facts tab for the graph that tracks the number of jobs lost in the United States in 2009 compared with the number of green jobs created.

Then show students this graph, **Potential New Green Jobs in the U.S. (2018–38)**. What are these new jobs that are being created?

MATERIALS

Graphs illustrating climate change and the link to carbon emissions
http://www.pbs.org/wgbh/warming/etc/graphs.html
http://www.nrs.fs.fed.us/niacs/local-resources/images/nasa_graph.gif

You Decide: Is a Green Economy the Key to Job Growth? at
http://uw.kqed.org/youdecide/polls/greenjobs.php

Clue into Climate: Energy Sources at
http://www.kqed.org/education/educators/clue-into-climate/renewable-energy.jsp
Transcript at
http://www.kqed.org/assets/pdf/education/educators/energy-sources-f

Map of California community colleges that offer programs in green jobs training at
www.kqed.org/green-jobs

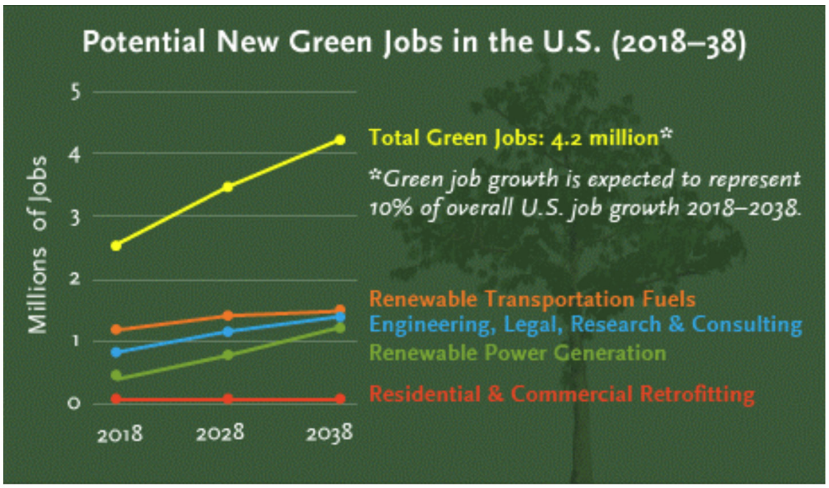
Photovoltaic class, Laney College, Oakland, California, at
http://www.youtube.com/watch?v=Wx1Nn0dGw0g

Laney College green jobs programs at
http://elaney.org/wp/green/ogjc/

YouTube video on **How Solar Power Works: Introduction to Photovoltaics** at
http://www.youtube.com/watch?v=2mCTSV2f36A&NR=1

New Energy Workforce (NEW) Initiative community college training program at
http://www.labormarketinfo.edd.ca.gov/contentpub/GreenDigest/CA-New-Energy-Colleges.pdf

Appendix 1. Student Community Assessment Grid: Is the Green Economy Present in Our Community? adapted from the Green-Collar Jobs Campaign Teaching Tools at
http://www.ellabakercenter.org/downloads/rtf/RTF_Activity1.pdf



Make the connection between the two problems of **climate change** and **unemployment** and guide students toward an understanding that an industry that creates jobs and helps reduce climate change could help solve both of these problems. These jobs are known as ***green jobs***.

2. Group Brainstorm

Ask students to work in groups of three or four and appoint one member of the group to record the group's suggestions. They should respond to the following:

1. List green jobs you have heard of.
2. List old jobs that can be changed to become **greener.**
3. Describe how a job can be changed to make it better for the air, water, the environment, and animals? Give examples.

3. Report to the Class

Invite each group to report back. Make a list on the board of different industries that may have jobs that are now green: construction; organic gardening and agriculture; housekeeping without petrochemicals; paper, metal, and glass recycling; hybrid and electric auto manufacturing; repair of hybrid and electric cars; architecture and design; solar panel installation; making and installing wind turbines; and any others they came up with.

4. "Renewable" and "Nonrenewable" Resources

Write **energy industry** on the board. The energy industry is important to the economy because we use so much electricity. We use a lot of fuel to generate (make) electricity for our homes. We don't use fuel only in our cars. Most of this nation's electricity now comes from **coal**. Is that a **renewable** source?

The adjective "renew*able*" describes materials that we can make again or quickly grow again. Ask students to work in pairs to separate these resources into two groups: **renewable** and **nonrenewable**.

coal	wind	cow dung
water	gasoline	bamboo
wood	sun	vegetable oil
uranium		

RENEWABLE	NONRENEWABLE

5. Comprehension Activity

Stream the video clip from **Clue into Climate: Energy Sources** at http://www.kqed.org/education/educators/clue-into-climate/renewable-energy.jsp (video length: 1:16). Allow students 10 minutes to free-write their reactions to this clip.

6. Vocabulary Exercise

The excerpt that follows is from **Clue into Climate Change**, Strand 4 (video transcript at http://www.kqed.org/assets/pdf/education/educators/energy-sources-transcripts.pdf):

Our homes, businesses and schools use **vast** amounts of electricity. But how is this electricity **generated**? Where does it come from? Some sources are renewable, others depend on the burning of **fossil fuels**.

In the United States, 71% of the electricity generated comes from the burning of **coal** and **natural gas**. In California, this number is a bit lower at 64%. Nationwide, only 3% of our electricity comes from renewable energy sources.

In California, 11% of the electricity comes from renewables, including wind, **solar**, **biomass** and **geothermal**. **Hydroelectric** power makes up just 6% of the national electricity output, while in California, about 11% of the state's electricity comes from large hydro.

An understanding of where our electricity comes from can help us make informed decisions about the production of energy. Reducing our **reliance** on fossil fuels and increasing the amount of electricity generated by renewables is a **critical** element in the overall reduction of **greenhouse gases** and the **mitigation** of climate change.

7. Vocabulary Matching Exercise from the video / reading on Energy Sources

Ask students to work in pairs to match each word with one definition on the right side.

___fossil fuels	a. energy from the sun
___vast	b. very important
___to generate	c. dependence, to depend on something
___renewable	d. gasoline, petrol, coal, natural gas
___solar energy	e. gases in Earth's atmosphere trap heat
___biomass fuel	f. electricity from rivers, waterfalls, oceans
___geothermal energy	g. to make (especially to make electricity)
___hydroelectric energy	h. to decrease, to lessen
___reliance, to rely	i. energy from hot steam under the ground
___critical	j. fuel made from plant or animal garbage
___greenhouse gases	k. can be made again
___mitigation, mitigate	l. very big

8. Recap and Check In

Ask students what they have taken away from this lesson. Invite questions, thoughts, and responses.

Follow up by reviewing some of the key points:

- What causes climate change?
- Where does California's electricity come from?
- How much of California's electricity is generated from renewable energy sources?
- What sources of energy would be most appropriate for your community and why?
- How does climate change have a connection to employment?
- What are green jobs? Why is it anticipated that this sector of the economy will grow?

DAY TWO ACTIVITIES

1. Research Activity

- Return to the list compiled by the class of different industries that may include jobs that are now green: construction; organic gardening and agriculture; housekeeping without petrochemicals; paper, metal, and glass recycling; hybrid and electric auto manufacturing; repair of hybrid and electric cars; architecture and design; solar panel installation; making and installing wind turbines; and any others they came up with.

- Ask students to work in pairs and to select one of the jobs listed. Ensure that all jobs are allocated and that each student pair has selected a job. Explain that each pair will need to research how they could go about being trained for this work.

- When they have identified a course or training program near to where they live, ask them to write the name of the course and its location on flip chart paper and to attach it to the wall in the classroom. Encourage them to refer to the map at www.kqed.org/green-jobs, which shows the locations of California community college programs that offer green jobs training.

- Invite each pair to share their findings, then ask the whole class to discuss and evaluate these opportunities.

2. Comprehension Exercise

Stream the video of the photovoltaic class at Laney College, Oakland, California, at http://www.youtube.com/watch?v=Wx1Nn0dGw0g (video length: 2:44), then ask students the following questions:

1. What is the name of the college and where is it?
2. What is the short name for the class? (hint: it's just two letters)
3. What do the letters stand for? (p_____ v_____)
4. Which skills are involved in this course?
5. Do you need to be an engineer to understand this class?
6. What is an "economic downturn"?
7. How does the teacher of this class think we can get out of this latest economic downturn?

3. Analyzing Information

Initiate a discussion of the following training opportunities offered at Laney College in Oakland at http://elaney.org/wp/green/ogjc/ as an example of the kind of training programs now available. Ask the following questions about the courses:

- Which class can you take if you want to work in construction with recycled materials?
- Which class can you take if you want to know about new kinds of lights that use less electricity?
- Which class can you take if you want to check homes to see if they are losing warm air or wasting electricity?
- Which class can you take to know which kinds of kitchen appliances, heating systems, and air conditioning systems use less energy?

4. **Book a computer lab** with enough computers for every group of two or three students. Allocate to each group a different college from the list at http://www.labormarketinfo.edd.ca.gov/contentpub/GreenDigest/CA-New-Energy-Colleges.pdf. The colleges in this list are partners in the New Energy Workforce (NEW) Initiative, which is a consortium of community colleges working together to respond to industry's current and emerging new energy workforce needs.

   Allow sufficient time for students to scan the website of their particular school, find course descriptions and course outlines, research the news, take notes, and, if they choose, send themselves links. With their partner, they should note down key points to share with the class. What is this college offering that would be of interest to them? Review ideas with the class.

DAY THREE ACTIVITIES

Practical Assignments
Divide the class into groups and allow each group to choose ***one*** contact assignment from the following list or to suggest one of their own.

1. Collect articles from local media that relate to the growing "green economy." Students should look at local newspapers and neighborhood newsletters and listen to local media stations, and also check these media's websites to track examples of a developing green economy.

   Ask students to post their findings with sources clearly referenced on a class Google site. If students are sufficiently proficient in English, suggest that they post a summary blog to give an overview of developments and coverage.

2. What sectors of the green economy are present in your community? To help guide their research, give students a list that includes these categories: sustainable farming; organic gardening; stores and restaurants that offer sustainably farmed and organic choices; solar panel installations; green buildings; paper, metal, and glass recycling; hybrid and electric auto manufacturing; and so on.

   Alternatively, suggest students use **Appendix 1. Student Community Assessment Grid: Is the Green Economy Present in Our Community?** found at the end of this lesson plan.

   Ask students to post their findings on a class Google site. If students are sufficiently proficient in English, suggest that they post a summary blog to give an overview of developments and coverage.

3. Investigate the use of solar energy in your community. Direct students to the **California Solar Initiative – CSI** at http://www.pge.com/csi/. Suggest that they contact local businesses to find out what is happening.

   Encourage students to work in small groups and use Google Maps to generate a map that shows solar-powered businesses and buildings in their neighborhood. Suggest they tag locations on the map by dragging and dropping a place mark.

4. Track how to go about getting training in solar panel technology and installation. Include the following steps:
   - Investigate conferences and seminars on the construction of green buildings and find ways to talk to people who participate in these events. Professional associations and trade groups often provide inexpensive development workshops.
   - Check college websites and visit a college to understand what is involved in that college's training program.
   - Identify what kind of solar certification or credential is required for employment in this field.
   - Speak to a college counselor or a job counselor in an employment office to investigate subsidies that might be available for unemployed residents.
   - Look at state Department of Labor websites for no- or low-cost government-sponsored programs. Many community colleges offer low-cost courses aimed at people aged 50 and up.

5. Ask students to work in small groups and find a green business in their area. What makes this business green? If possible, they should visit the business and interview one or more staff members to understand the mission and goals of the company. They should also collect materials and visit the company's website to further this understanding, then prepare to report their findings to the class.

   If they are able to visit the location, suggest that they document their visit by taking pictures and creating a class Flicker account for sharing pictures at http://www.flickr.com/.

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APPENDIX 1

Student Community Assessment Grid
Is the Green Economy Present in Our Community?

	In your community, are there...?	None	Few	Some	Many
FOOD	Grocery stores that carry organic food				
	Grocery stores that carry fresh fruits and vegetables				
	Farmer's markets				
	Community gardens				
	Restaurants that offer organic food				
	Food recycling programs				
	City-provided compost bins				
ENERGY	Homes with solar panels or wind turbines				
	Businesses with solar panels or wind turbines				
	Alternative energy companies (solar panel companies, etc.)				
	Alternative energy producers (wind farms, etc.)				
	Buildings that are considered green buildings				
	Places that sell energy-saving appliances / devices				
TRANSPORT	Residents who drive hybrid or electric vehicles				
	City buses or city vehicles that run on alternative fuels				
	Pro-bicycle attributes (dedicated bicycle lanes, racks, etc.)				
	Streets designed for pedestrians (walking paths, sidewalks, trails)				
	Public or private car-sharing programs				
BUSINESS	Nonprofit or community organizations involved in creating a green local economy				
	Businesses that utilize green practices				
	Business owners interested in becoming a green business				
	Any green industries				
	Offices of sustainability				

Adapted from the Green-Collar Jobs Campaign Teaching Tools – The Green Wave & My Community, http://www.ellabakercenter.org/downloads/rtf/RTF_Activity1.pdf