

The logo for the National Archives and Records Administration (NARA), featuring the word "NARA" in white capital letters on a dark gray rectangular background with a thin red horizontal line at the bottom.

# How can sustainability be used as a context for energy education?

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Northwest Advanced Renewables Alliance





## Mission

We create tools for educators that equip and motivate students to:

- develop critical thinking skills,
- build global awareness, and
- engage in positive solutions for a sustainable future.



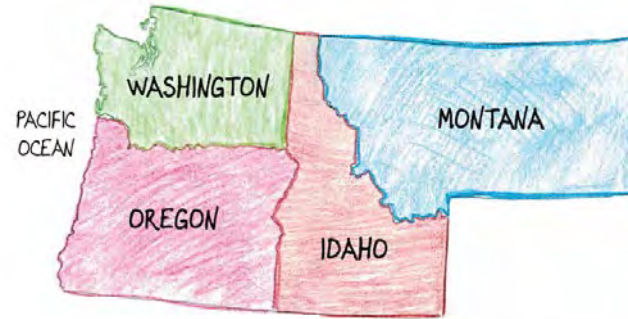
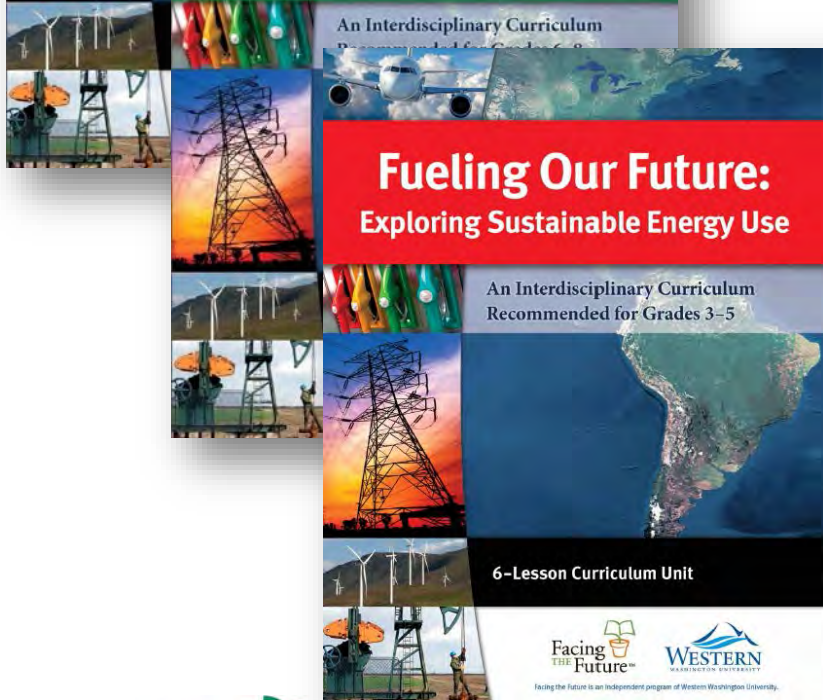
## Vision

We envision a sustainable world defined by:

- thriving societies,
- flourishing economies, and
- healthy environments.



Facing the Future is an independent program of Western Washington University.



## Scenario: Sustainable Flight in the Pacific Northwest

The federal government has mandated that an increasing amount of biofuel be mixed into jet fuel over the next few years in order to reduce the amount of crude oil used in the nation. The federal government has established regional councils to help identify the most sustainable biofuel feedstock(s) for different regions in the nation. You have been selected to be a part of the Pacific Northwest Regional Biofuel Council. This region includes Washington, Idaho, Montana, and Oregon. Over the next few days, you will:

- identify and understand the reasons for developing aviation biofuels,
  - conduct research on different kinds of biofuels and consider their impacts on the environment,
  - represent a specific stakeholder at a negotiation, identify other stakeholders' perspectives, and create a policy that identifies a sustainable fuel mix for the Pacific Northwest region,
- so that you can answer the following question:

***What are the most sustainable biofuels that can be produced in the Pacific Northwest for aviation?***





# Think.Pair.Share:

How do you define sustainability?





Sustainability: The principle of meeting current needs without limiting the ability of future generations to meet their needs.





## Small Group Activity

### Lesson 6: Fueling the Future Middle and High School Unit



Photo: LA FABRIKA PIXEL S.I. | DREAMSTIME.COM



# Is it sustainable?



Photo: Justin Hougham



Photo: Michael Gil\_Flickr.com

## **biofuel:**

Fuel made from biomass (living/recently living organic matter).



Photo: Ryan Lackey\_Flickr.com



Photo: Cliff\_Flickr.com

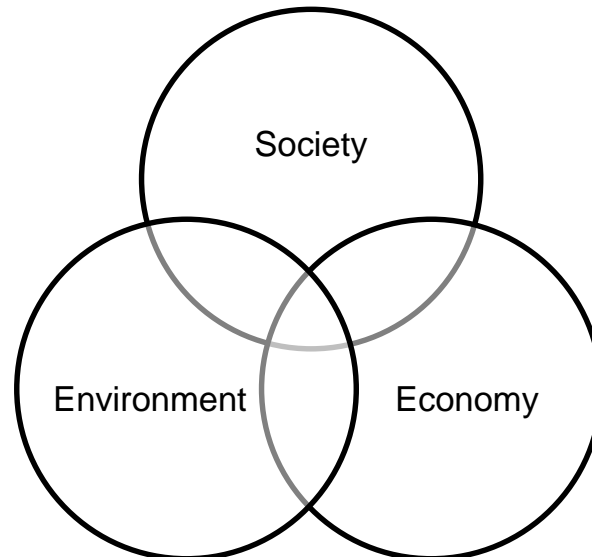
## **feedstock:**

The raw material used in manufacturing or processing.



# *Is it sustainable?*

1. Individually read your stakeholder profile, noting relevant information.
2. Introduce your stakeholder to your small group.
3. Discuss characteristics of your feedstock that are socially, economically, and environmentally sustainable.
4. As a group, decide where to place your feedstock (Post-it) on the Venn diagram.







## Society

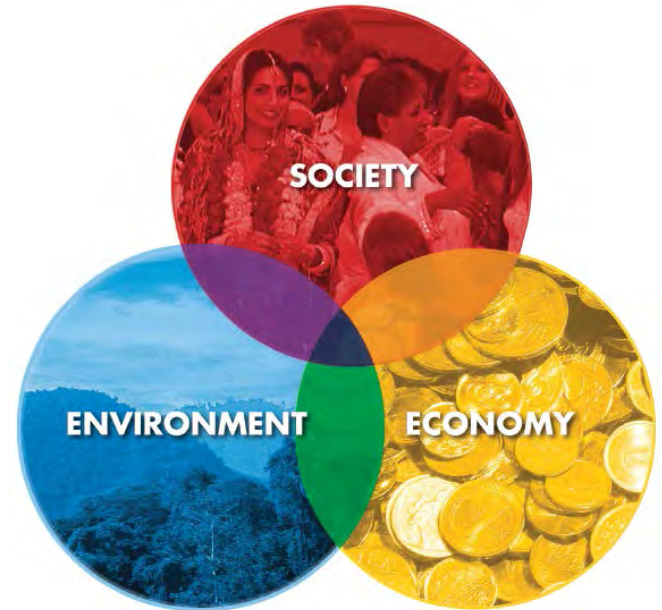
- How are people's lives affected?
- How are cultures affected?
- Do some people benefit at the expense of others?

## Environment

- How are living organisms affected?
- How are air, water, and soil affected?
- What is the long-term impact on the environment?

## Economy

- How are local, national, and international economies affected?
- What is the cost-benefit?
- Is there a long-term economic gain for people and communities?





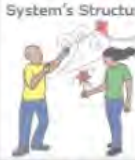













- Does renewable = sustainable?
- What was the value of addressing social, economic, **AND** environmental aspects of energy?
- What/Did you gain from examining the feedstock from multiple perspectives (stakeholders)?
- What skills, content, attitudes, or behaviors could be learned from an activity like this?
- Should energy education address sustainability?



## Habits of a Systems Thinker

The *Habits of a Systems Thinker* describe ways of thinking about how systems work and how actions taken can impact results seen over time. They encompass a spectrum of thinking strategies that foster problem-solving and encourage questioning. Though "habit" is defined as a usual way of doing things, the *Habits of a Systems Thinker* do not suggest that systems thinkers are limited by routine ways of thinking. Rather, the Habits encourage flexible thinking and appreciation of new, emerging insights and multiple perspectives.

 Big Picture	 Change Over Time	 System's Structure	<b>Recognizes that a system's structure generates its behavior</b>  A systems thinker understands that blame is not an effective practice to bring about lasting change to a complex system. Rather, focusing on the structure of the system facilitates an understanding of the outcomes of the system. A systems thinker realizes that to effect change within a system, s/he must use knowledge of the system's structure.
 Interdependencies	 Connections	 Changes Perspectives	
 Assumptions	<b>Habits of a Systems Thinker</b>	 Considers Issue Fully	
 Mental Models		 Leverage	 Consequences
 Accumulations	 Time Delays	 Successive Approximation	

**Source:**  
Systems Thinking in Schools  
Waters Foundation  
watersfoundation.org



# UN Secretary-General Ban Ki-moon

*Message to the Clean Energy Ministerial Meeting, May 2014*

“ Sustainable energy is the golden thread that connects economic growth, increased social equity and an environment that allows the world to thrive. Low-carbon growth can foster decent jobs, empower women, promote equality, provide access to sustainable energy, make cities more sustainable and enhance the health of both people and the planet.”





# Thank you!

Stay Connected @ [www.facingthefuture.org](http://www.facingthefuture.org)



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