



**Energy Literacy: K – Gray**  
**It's never too early or too late.**  
**National Association of State Energy Officials – September 2013**



# What is NEED?

## National Energy Education Development

The mission of the NEED Project is to promote an energy conscious and educated society by creating networks of students, educators, and business, government, and community leaders to design and deliver objective, multi-sided energy education programs.



In 2012-2013:

- 500 workshops
- 65,000 classrooms
- 50 states, Washington, D.C., U.S. territories, Canada, Thailand, the UK, Australia, and Kuwait

# NEED's Governance and Leadership

## NEED's Board of Directors

- Wendy Wiedenbeck, Encana
- Randall Luthi, National Ocean Industries Association
- Kristy Monk, American Electric Power
- Margaret Downey, Cape Light Compact/Barnstable County
- Guy Caruso, U.S. EIA (ret) and Center for Strategic and International Studies
- Wayne Yonkelowitz, Fayette County Schools, WV
- Linda Lung, National Renewable Energy Laboratory
- Barry Russell, IPAA
- Kristi DesJarlais, Phillips 66
- Kate Marks, NASEO
- Michael Perna, ConEdison Solutions
- Al Ryan, PECO

# Energy Literacy

What it is? It's not just awareness and marketing.

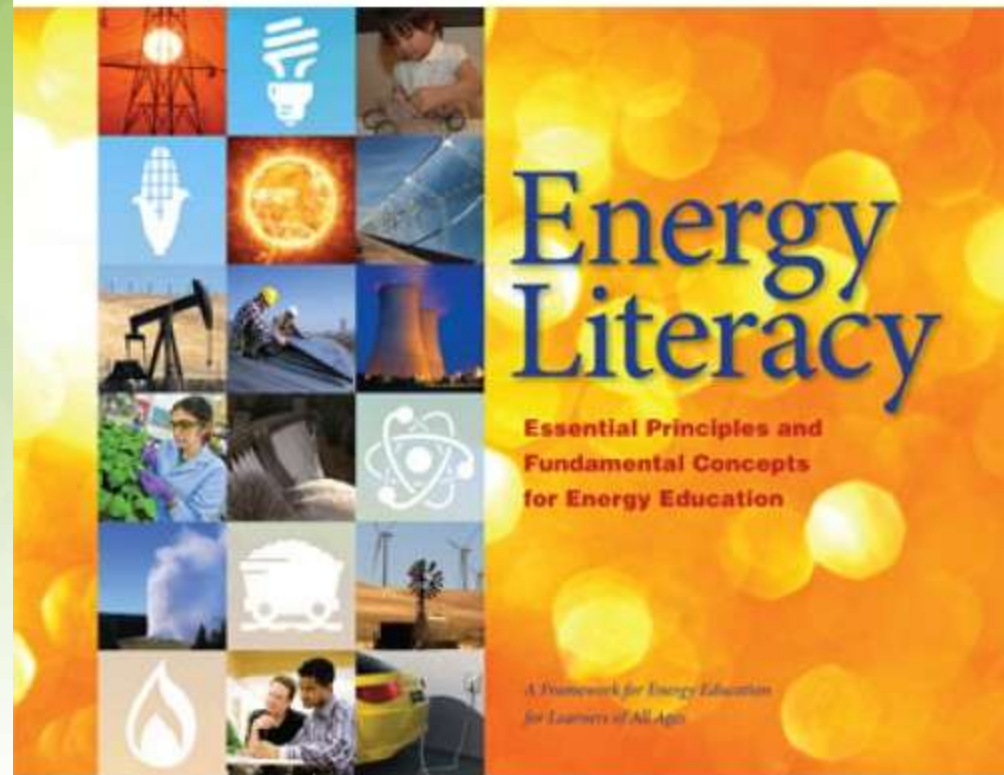
Energy Literacy is an understanding of the nature and role of energy in the world and daily lives accompanied by the ability to apply this understanding to answer questions and solve problems.

- An energy-literate person can:
- Can trace energy flows and think in terms of energy systems.
- Knows how much energy they use, for what & where the energy comes from.
- Can assess the credibility of information about energy.
- Can communicate about energy and energy use in meaningful ways.
- Is able to make informed energy and energy use decisions based on an understanding of impacts and consequences.

# Energy Literacy

What is it? It's not just awareness and marketing.

- 1** Energy is a physical quantity that follows precise natural laws. 
- 2** Physical processes on Earth are the result of energy flow through the Earth system. 
- 3** Biological processes depend on energy flow through the Earth system. 
- 4** Various sources of energy can be used to power human activities, and often this energy must be transferred from source to destination. 
- 5** Energy decisions are influenced by economic, political, environmental, and social factors. 
- 6** The amount of energy used by human society depends on many factors. 
- 7** The quality of life of individuals and societies is affected by energy choices. 



# Goals and Implementation

NEED exists in the space where educational needs and partner goals align:

- Teach about energy
- Create an understanding about energy among teachers, students, and the general public
- Train teachers and provide them the resources to effectively and confidently teach energy
- Extend the classroom to the living room – Kids Teaching Families
- Raise the level of knowledge, discussion, and understanding
- Data and information updated annually
- Review for accuracy, objectivity and subjectivity
- Aligned to state and national standards and evolving to align to Common Core and Next Generation Science Standards
- Advice and Subject Matter Expertise is wanted, solicited, and integrated



**The end-user guides development and delivery  
(Kid tested, Kid approved!)**

- Forms of energy
- Energy Sources
- Energy Technologies
- Electricity Generation
- Transportation Options
- School and Residential Energy Efficiency and Conservation
- Energy Decision Making
- Economics
- Energy in Global Markets



# NEED Curriculum and Training

## Science of Energy, Sources of Energy

# “They Don’t Understand Us.”

## What’s needed for literacy and workforce development

- Start early.
- Make it interesting.
- Make it real.
- Make it authentic.
- Make it personal.
- Tell the story (but be honest) .
- Ask the experts (it is all about the kids).
- Show the connections: We’re a connected society. Show and encourage explorations of the energy connections in daily life, in the big picture.
- Make the goal a smarter consumer.
- Speak Kid.
- Speak Teacher.
- Converse with the general public.





# What Can Be Done Better?

## Engagement at all levels

People are wondering about their future. In the energy space we have two goals: understanding and workforce development.

- Show them the way.
- Plan, engage, partner
- Campaign vs. Classroom
- Awareness vs. Understanding
- Education vs. Marketing



# Get There Before The “Others” (and stay)

## Rethinking how we prepare kids for tomorrow’s careers

- Every sector wants a piece of the classroom
- The reality of the classroom keeps that from being possible
- Energy needs to get there before the “others”
- Energy belongs there for many reasons: Consumers, public policy, decision making, and careers
- Open the doors of exploration
- Leave those doors open



## Since 1980, NEED has hosted the Youth Awards for Energy Achievement.

- Recognize student interest in energy
- Provide scholarships for students engaged and pursuing energy and/or education
- Local, state, and national awards
- Opportunity to include other awards in this program and offering
- Join us in June 2014 in Washington, D.C.

## Recognize Excellence (and Interest)



# Great State Examples of Commitment to Energy Literacy

- Tennessee (I'm not stealing Molly's thunder!)
- Kentucky Department of Energy Development and Independence
  - Teacher Workshops
  - Curriculum and Hands-On Equipment
  - Summer Energy Tour for Teachers
  - High Performance Schools Conferences
  - Regional support for teachers
  - Mini-Grants for energy efficiency
  - Better Buildings need Smarter Occupants
  - Public /Private Partnership Connections



# Great State Examples of Commitment to Energy Literacy

- **Rhode Island**

- Teacher Workshops
- Extensive Awards and Recognition Program
- Curriculum and Hands-on Equipment
- Reaching kids in class and in workshops – extra effort for hard to reach kids
- Energy Expos
- Public/Private Partnerships
- Direct student engagement



# Great State Examples of Commitment to Energy Literacy

- **Massachusetts**
  - Teacher Workshops
  - Extensive Awards and Recognition Program
  - Curriculum and Hands-on Equipment
  - Reaching kids in class and in workshops – extra effort for hard to reach kids
  - Energy Expos
  - Public/Private Partnerships
  - Direct student engagement
  - Significant Engagement with Energy Efficiency Program Administrators from the Utilities



# Other Great Examples of Success and Possibilities

- Significant investment from Arkansas and Kentucky with ARRA funding – HUGE strides during a short period of time.
- Hydrogen and Fuel Cell outreach in Virginia.
- Biofuels Education and Outreach in Illinois
- Solar and Wind Installs
- Programs can be small (\$10,000) or large (\$250,000)
- Can be flexible
- Require little day to day management from the State Energy Office
- Bring opportunities in government relations, community affairs, and public opinion

**NEED programming exists at the intersection of our mission to teach kids, teachers, and the general public about energy and our partners' need to be understood and to help people better understand energy.**

- **Make a commitment. A long-term one.**
- **ROI on education investments are hard to quantify.**
- **It is never too early to start investing in improving energy education and it is never too late,**
- **Energy education is the connection between community/social investment and workforce development.**
- **Remember that an understanding of science, math, engineering and technology is necessary in daily life.**
- **EVERYTHING relates to energy – so working to engage, improve, and energize is vital for the future of energy.**



## **Find the Connection**

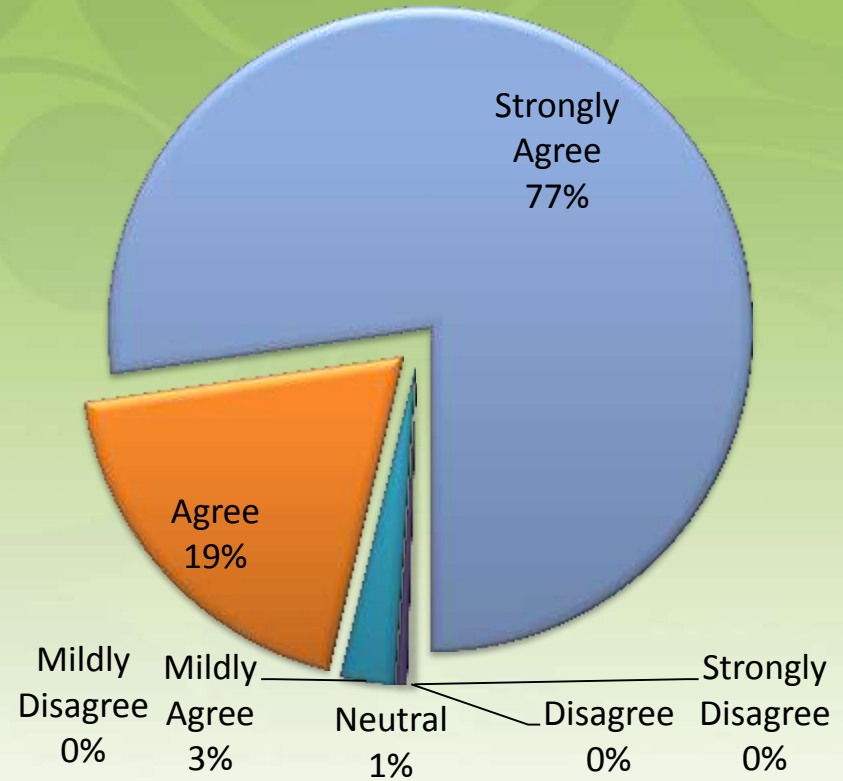


Schools Inservices and Training Programs ensure greater success of a program. Topics recommended to meet stategoals include:

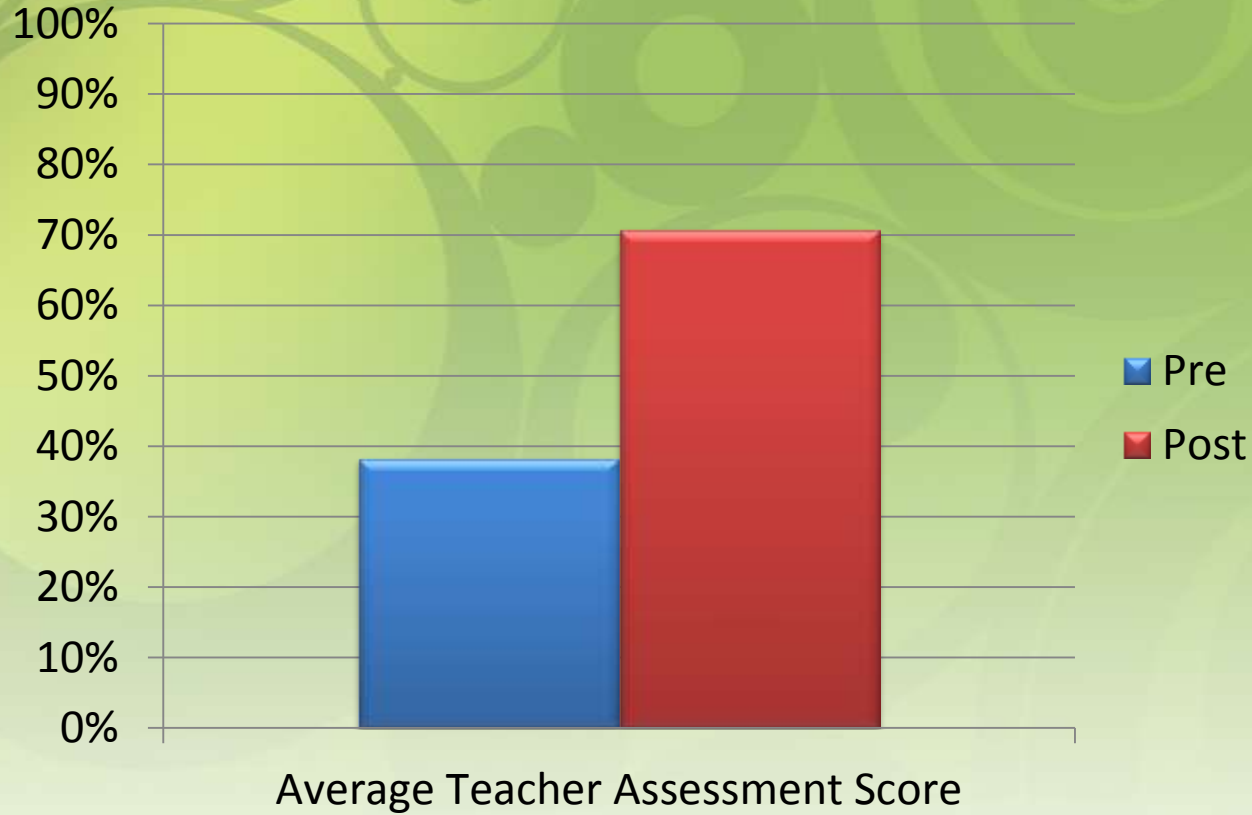
- Science of Energy
- Energy Sources
- Electricity Generation
- Energy Conservation
- School Energy Management and Parent/Family Engagement
- Developing and Supporting a School Energy Team

We evaluate pre/post teacher knowledge and pre/post student knowledge to demonstrate impact and ensure ROI.

The workshop will allow me to increase my students' energy knowledge.



# Evaluate

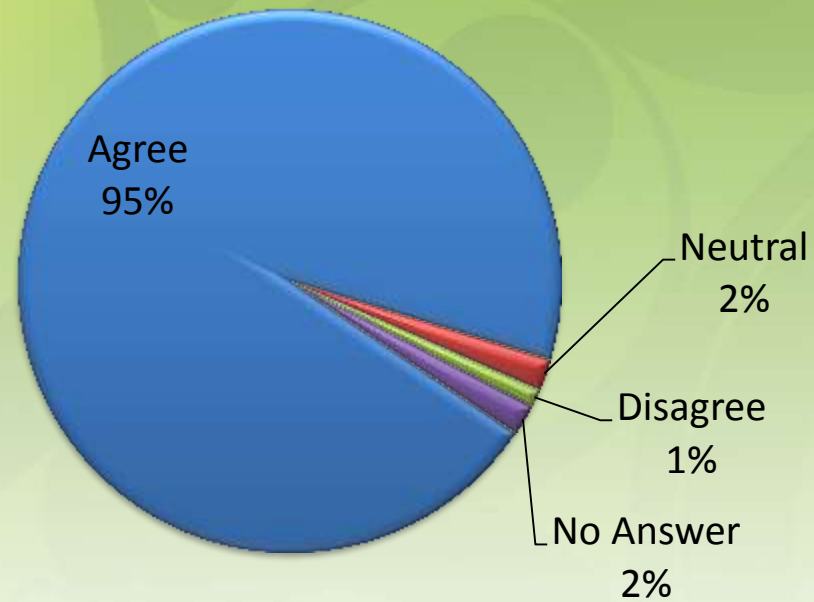


**Evaluate more....**



**And more...**

## The curriculum materials meet my classroom needs.



# And even more...

Location: \_\_\_\_\_

- Pre
- Post

1. What is the nuclear reaction that takes place inside the sun's core?
  - fusion
  - activation
  - fission
  - radiation
2. Most of the energy consumed in the U.S. is stored in which form of energy?
  - kinetic
  - thermal
  - chemical
  - mechanical
3. In which form do all energy flows begin?
  - electrical
  - chemical
  - radiant
  - nuclear
4. Which of the following is not a primary source of energy?
  - petroleum
  - natural gas
  - electricity
  - all of the above
5. Which energy source is used to generate approximately 50% of electricity in the U.S.?
  - hydropower
  - petroleum
  - coal
  - natural gas
6. What is the national average cost of a residential KWH of electricity?
  - 6 cents
  - 12 cents
  - 17.5 cents
  - 24.5 cents
7. When considering energy consumption in the U.S., which of the renewable energy sources provides us with the greatest amount of energy?
  - biomass
  - hydropower
  - wind
  - solar
8. When considering energy consumed in the U.S., which of the nonrenewable sources provides us with the greatest amount of energy?
  - petroleum
  - natural gas
  - coal
  - nuclear
9. Nonrenewable sources of energy make up what percentage of U.S. energy consumption?
  - Less than 60%
  - About 70%
  - About 80%
  - Over 90%
10. What are the top five sources of energy used in the United States?
  - uranium, wind, natural gas, hydropower,
  - petroleum, natural gas, coal, uranium, bi
  - coal, petroleum, uranium, hydropower, a
  - solar, coal, petroleum, geothermal, natu

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## Preview Intermediate (PRE)

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**17** An incandescent bulb converts 10% of the energy it uses into light and 90% into which form of

8 9 10 11 12 13 14 15 16 17 18 19 20 [Next](#)

### Condensed Item Analysis Report

Filter: Pre/Post + Post

Legend: Correct ■ Incorrect ■ Distractors Chosen More than Correct Answer ■

What is the nuclear reaction that takes place inside the sun's core?			Most of the energy consumed in the U.S. is stored in which form of energy?		
Response	Frequency	Percent	Response	Frequency	Percent
* fusion	35	97.22	kinetic	2	5.56
activation	1	2.78	thermal	0	0.00
fission	0	0.00	* chemical	34	94.44
radiation	0	0.00	mechanical	0	0.00
Missing	0	0.00	Missing	0	0.00

In which form do all energy flows begin?			Which of the following is not a primary source of energy?		
Response	Frequency	Percent	Response	Frequency	Percent
electrical	4	11.11	petroleum	5	13.89
chemical	0	0.00	natural gas	0	0.00
radiant	0	0.00	* electricity	30	83.53
* nuclear	52	88.89	all of the above	0	0.00
Missing	0	0.00	Missing	1	2.78

Which energy source is used to generate approximately 50% of electricity in the U.S.?			What is the national average cost of a residential KWH of electricity?		
Response	Frequency	Percent	Response	Frequency	Percent
hydropower	5	13.89	6 cents	8	22.22
petroleum	0	0.00	* 12 cents	28	77.78
* coal	31	86.11	17.5 cents	0	0.00
natural gas	0	0.00	24.5 cents	0	0.00
Missing	0	0.00	Missing	0	0.00

When considering energy consumption in the U.S., which of the renewable energy sources provides us with the greatest amount of energy?			When considering energy consumption in the U.S., which of the nonrenewable energy sources provides us with the greatest amount of energy?		
Response	Frequency	Percent	Response	Frequency	Percent
* biomass	30	83.33	* petroleum	29	80.56
hydropower	8	18.67	natural gas	7	19.44
wind	0	0.00	coal	0	0.00
solar	0	0.00	nuclear	0	0.00
Missing	0	0.00	Missing	0	0.00

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# Evaluation, Data and Reporting

**It's not too late. Even a little commitment helps. Get involved.**



Visit us at [www.need.org](http://www.need.org)  
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