Good Morning!

Maureen Miller, NBCT, PAEMST
Awardee 2015

STEM

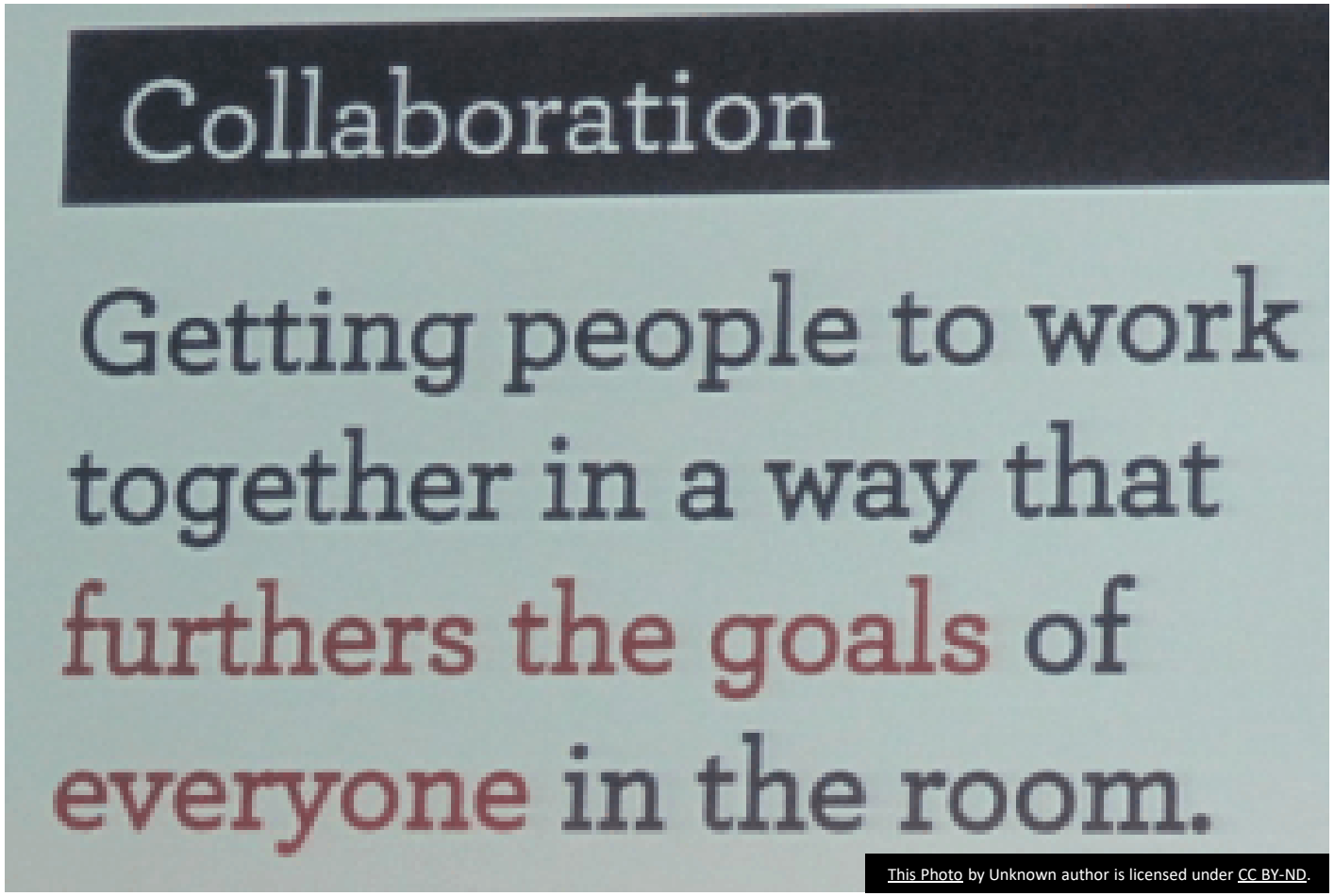

2018 Conference
Looking for CE with a focus on STEM and Careers


IOGA
WEST VIRGINIA


JOLT
COLA
"All the sugar and
twice the caffeine"


ZERO SUGAR
MONSTER
ENERGY
ZERO ULTRA


In the top 5 CE experience!



Project Based Learning

Pipeline PBL

- Launch!
- Driving question---What is the future of energy production in WV?
- The classroom becomes a company.
- Company goal—build a pipeline!

Energy Company

- Six departments
- Application
- Career
- Each department contributes
- Many products, all present

Geology/Environment

Graphic Designer

1 FORMATION

Are fossil fuels renewable or non-renewable? Experiments show how the earth "cooked" (heat and pressure) ancient plant and animal life to create fossil fuels. Create info graphics about geologic time and the rock cycle.

2 MIGRATION AND TRAPPING

Is crude oil and natural gas found in large lakes underneath the earth's surface? Experiments show how crude oil and natural gas are trapped in porous rocks. Create 2D and 3D rock models to demonstrate porosity and permeability.

3 EXPLORATION

How do we find these valuable fossil fuels? Use contour mapping to look below the earth's surface and "see" rock formations. Create models and calibrate measurements using blank grids.

4 DRILLING AND WELL STIMULATION

How do we recover crude oil and natural gas? Use engineering design to create two models: a weight-bearing derrick and a working oil well applying principles related to porosity, permeability and flow of fluids to the surface.

5 PRODUCING AND TRANSPORTING

What happens to crude oil and natural gas once it is produced? How is it transported? Create a model pipeline and pipeline "pig" and apply principles of force, motion, velocity and engineering design.

6 REFINING

How are crude oil and natural gas liquids (NGLs) transformed into useful products? Use the chemistry distillation procedure to demonstrate the refining process. Follow lab safety procedures, collect data and understand the industry applications.

7 PETROCHEMICALS AND PRODUCTS

What other products besides transportation fuels are made from crude oil and natural gas? Explore a few of the 6,000 petroleum-based products. Design and implement a materials test for different petrochemical-based fabrics.


Mountain Line Company
Mountain Line


READING
IS SNOW
MUCH
5
6
7
8
★collections
fiction
MYE - SCO
SEB - ZUS
IBB - MUR
Campaign
for
Oil &
Gas


READING
Putnam Pipeline
Putnam Pipelines

Quotes from students

- I enjoyed it. It helped with my public speaking in preparation for the International Robotics Tournament.--Katelyn
- When I shared the project with my mom, she said it was a cool opportunity to work as a whole class.--Alec
- It was challenging to set up the pipeline. We had to use trial and error. We used photos as diagrams to set it up the next day. We have never worked as a whole class before.--Justin
- I liked it because it’s a project versus a test I like to collaborate with others.--Rylyn

Quotes from fellow teachers who helped…

- Doing a project like this makes the students see Art as applicable to the real world. They used elements they learned in Art class for their presentation.--Melinda
- Wow! That was fun to do a voice over for their commercial. Your room looked like chaos but when they presented it rocked.--Derek

And then Covid…

2021-2022
School year

Energy in WV Exhibit

- Big Question: What is the future of energy production in West Virginia?
- To answer this question, student groups will create an exhibit of the various sources of energy production in WV. The exhibit will showcase the current six types of energy: **Coal, Oil, Natural Gas, Hydroelectric, Solar, and Wind.** Each exhibit will include presentation of their research (answering the focus questions), a model of how their natural resource produces energy, and an interactive component.

Focus Questions:

How does the resource create electrical energy?

What is the history of the use of that resource to create energy?

How much electrical energy does the resource produce?

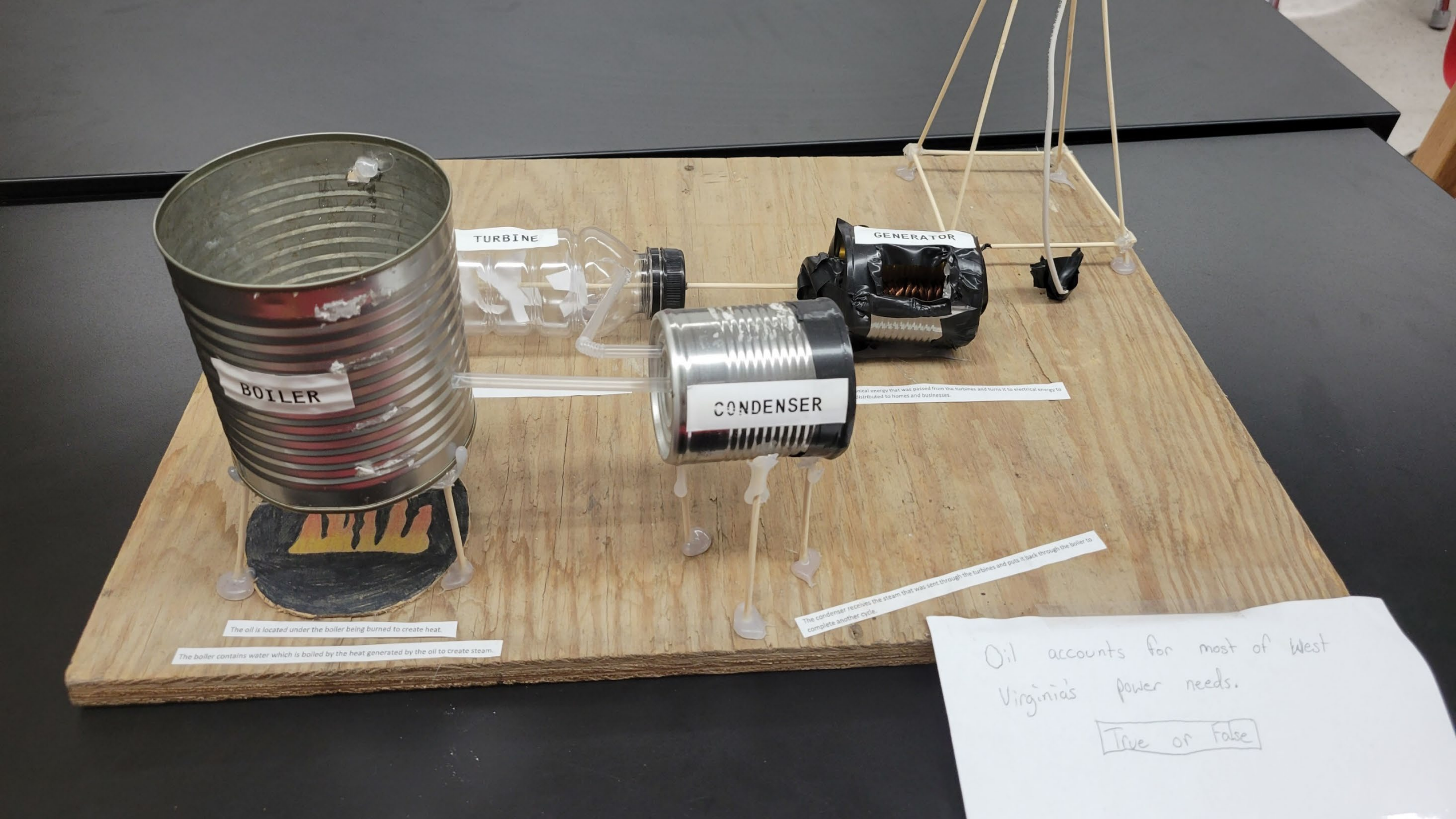
What are the positives and negatives of using that resource to produce energy?

What is the future for energy production utilizing that resource?

Where in WV is this energy source?

What are the sources of your research?

- Model
  - The model should reflect the research of how energy is produced by the resource.
  - It can but it is not required for it to have any moving parts.
  - Elements of the model should be labeled to assist the reviewer in understanding
- Interactive Component
  - Can be a fun fact, question reveal an answer
  - Can be a trivia type game, QR code
  - Goal is for the reviewer to have some interaction with the display exhibit


BOILER
TURBINE
GENERATOR
CONDENSER
The oil is located under the boiler being burned to create heat.
The boiler contains water which is boiled by the heat generated by the oil to create steam.
The condenser receives the steam that was sent through the turbines and puts it back through the boiler to complete another cycle.
Oil accounts for most of West Virginia's power needs.
True or False

Pros

- ✓ Natural gas is much cheaper than other fossil fuels.
- ✓ It is much easier to get. (**Found underground and taken up to the surface.**)
- ✓ Burns much cleaner than other fuels. (**Does not cause as much pollution as other fuels.**)
- ✓ It is extremely easy to move to other places. (**You can take it somewhere else in barrels to be burned for power.**)
- ✓ Gives off a lot of energy compared to other forms of fuels. (**A strong source of power.**)

Cons

- × Natural gas can cause air pollution. (**Makes the air dirty.**)
- × It is not renewable; you must find a new source to get more Natural gas. (**Cannot get back after used.**)
- × The bad air releases into the sky can possibly cause global warming.
- × The gas can even start earthquakes. (**This is because it is found in the ground and must be broken out from underground.**)
- × It can harm animals because the spots where natural gas is found can be where animals live and build their homes.

History

French explorers first discovered natural gas in America in 1626 by observing Natives ignite gas leaking into Lake Erie. Natural gas was first contained and sold in 1785 in Britain to power homes as an alternative to oil. In Baltimore, Maryland 1816 natural gas was (for the first time) used to power streetlamps. In 1821 William Hart dug the first safe and successful natural gas well in America at the time.

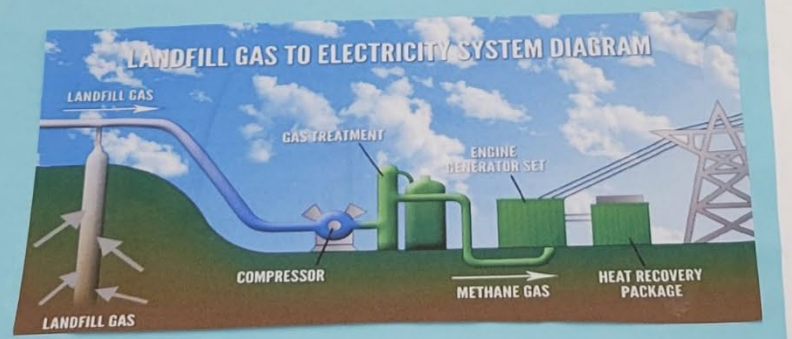
WV Locations

The energy source is also known as a powerplant. There are only 4 natural gas powerplants they are Axiall Natrium Plant, Pleasant's energy LLC, Big Sandy Peaker Plant, Cerdeo Generating Station.

Natural Gas

How Does Natural Gas Create Electricity?

Natural gas is frozen then liquified. It is moved to a power plant on a big ship. Once the liquified gas is at the power plant it helps make power. Which then sends power to homes, offices, etc.



How much electrical energy does natural gas produce?

Natural gas produces 0.9 lb. of electrical energy.

Future of Natural Gas

The future of natural gas usage is not bright. Because natural gas is a limited resource it has a finite amount. Though it will replenish eventually, that will take millions of years to happen. This means governments and private companies don't see it as a long-term fuel. Countries like the Netherlands have already turned its back on the fuel. Activist groups and coalitions have asked for a rehearing for a pipeline designed to transport natural gas that goes through San Diego. These groups include *The California Public Advocates, The Sierra Club,* and *The Southern California Generation Coalition.*

Websites

A Brief History of Natural Gas

Viewed November 15, 2021

A Brief History of Natural Gas - American Public Gas Association (apga.org)

Groups Join Fight SDG&E Natural Gas Pipeline Project

Viewed November 15, 2021

Groups join fight against SDG&E natural gas pipeline project along I-15 - The San Diego Union-T (sandiegouniontribune.com)

How is Natural Gas used to Generate Electricity?

Viewed November 11/15/21

Natural gas – Wikipedia

https://www.sfeenergy.com/how-is-natural-gas-used-to-generate-electricity#:YY7CZ2D

Natural gas

Viewed 11/15/2021

https://maps.google.com

Positive and Negative impact of Natural Gas

Viewed 11/15/21

Environmental Impacts of Natural Gas | Union of Concerned Scientists (ucsu

Positive and Negative Impact of Natural Gas (positivenegativeimpact.com

Energy Question?


Antero


A


LESSON
PLAN

Hands-on activities

Vocabulary Building

Career Exploration

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Teacher Comments

- ”I really enjoyed the Oil and Gas conference. I learned a lot and I enjoy implementing labs like we got at the conference. Thanks so much!”—Johnna
- “Thank you so much!”—Thomasa
- ”I integrated one of the activities into a lesson I do for sixth grade.”—Ms. Landis

Thank you!

Please come visit the classrooms!

Questions?