

## Name the State – Electricity Primary Energy Source Profiles Teacher Notes and Key

This lesson, and the slow reveal graph lesson meant to precede it, were designed to address the following Idaho Science Standard for 4<sup>th</sup> grade:

4-ESS-3.1 (NGSS-P: 4-ESS3-1) Students who demonstrate understanding can: Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

This lesson is meant to be used after the Slow Reveal Graph: Where does Idaho's electricity come from? This slow reveal graph can be found here:

<https://stemazing.org/slow-reveal-graph-where-does-idaho-electricity-come-from/>

There are slides at the end of the slow reveal graph Google Slide Deck for Teachers which display the mystery state electricity primary energy source profiles. They have the profiles without the state names and then reveal the state. These slides are not necessary to use but might be handy.

### Engagement Suggestions

Put students into groups of 2-3 to discuss which states they think the mystery electricity profiles represent. Have each group come to a consensus about which state each electricity profile might represent.

If you have access to computers or other devices, students can also access the interactive map here to help them try to determine the state for each electricity profile:

<https://bit.ly/USAelectricity>

This interactive map comes from the Energy Information Administration – the federal agency in charge of tracking all energy data for the United States and beyond.

Students using the map can Zoom in to see a particular state. There is a legend available in the top right corner showing which kind of power plant each symbol represents if you click on the symbol show to the right.



It is important to point out to students that a single power plant could be responsible for generating a large amount of electricity. Because of this, basing guesses on the number of each kind of power plant can be misleading.

Below are hints for each state that can be used before revealing the identity of each state and the answer key for the mystery electricity profiles. The hints reference West Coast, New England, western population centers, the Mississippi River, and Atlantic Coast. You might spend some time before revealing the hints having students label the east and west coast on the map, the Pacific and Atlantic Ocean, the cardinal directions (N, S, E, W), and the various regions (Northeast, Southeast, Southwest, Midwest, West - <https://www.mappr.co/political-maps/us-regions-map/>). Be sure to point out New England when labeling regions.

## **Mystery State #1 Hints**

1. In 2020, wind energy produced 14% of this state's utility-scale electricity net generation with almost 3,800 megawatts of installed generating capacity.
2. In 2020, hydroelectric power accounted for 50% of this state's electricity generation.
3. This state is a partner in the West Coast Electric Highway.

**Mystery State #1 is Oregon.**

## **Mystery State #2 Hints**

1. More than three-fifths of this state is forested, but, despite its abundant forest resources, the state's primary biomass resource used for electricity generation is municipal solid waste.
2. This state consumes almost three times as much electricity as the state produces, but it uses less electricity per capita than all but four other states. (Interpretation of hint - it must have a large population.)
3. In 2021, solar energy accounted for 20% of this state's total in-state electricity net generation and accounted for more than three-fifths of the solar electricity net generation in New England.

**Mystery State #2 is Massachusetts.**

## **Mystery State #3 Hints**

1. This state has led the nation in coal production since 1986, and accounts for two-fifths of all coal mined in the United States.
2. This state's small population contributes to it being among the 10 states with the lowest total electricity demand, but it has the highest per capita electricity use.
3. This state sends almost three-fifths of the electricity it generates out of state. Several major interstate transmission line projects are in development to carry more electricity supplies from this state to western population centers.

**Mystery State #3 is Wyoming.**

### **Mystery State #4 Hints**

1. In 2021, nearly three-fifths of this state's total electricity net generation came from renewable resources, almost all of it from wind.
2. This state's biomass resources include landfill gas and agricultural biodigesters that produce methane gas, and they both fuel electricity generating facilities.
3. The largest of this state's four hydroelectric power plants is the largest privately-owned and operated dam and hydroelectric plant on the Mississippi River.

**Mystery State #4 is Iowa.**

### **Mystery State #5 Hints**

1. This state is the second-largest producer of electricity in the nation, after Texas. However, this state does not produce enough electricity to meet its power needs, and electricity demand is expected to increase as the state's population continues to grow.
2. In 2020, this state surpassed Arizona to become fourth in the nation, after California, Texas, and North Carolina, in total solar power generating capacity.
3. The state's two nuclear power stations are located on this state's Atlantic Coast. Those two plants typically provide more than one-tenth of the state's net generation.

**Mystery State #5 is Florida.**

### **Mystery State #6 Hints**

1. This state was the first state to set a deadline for having 100% of its electricity sales come from renewable energy, which is required to be achieved by 2045.
2. This state has the highest electricity retail price of any state and it is nearly triple the U.S. average rate, in part because the state relies on imported petroleum for more than 70% of its electricity generation.
3. Each of the six main islands in this state has a separate electricity grid. The grids are not connected by undersea electricity transmission cables, so each island is responsible for generating its own power.

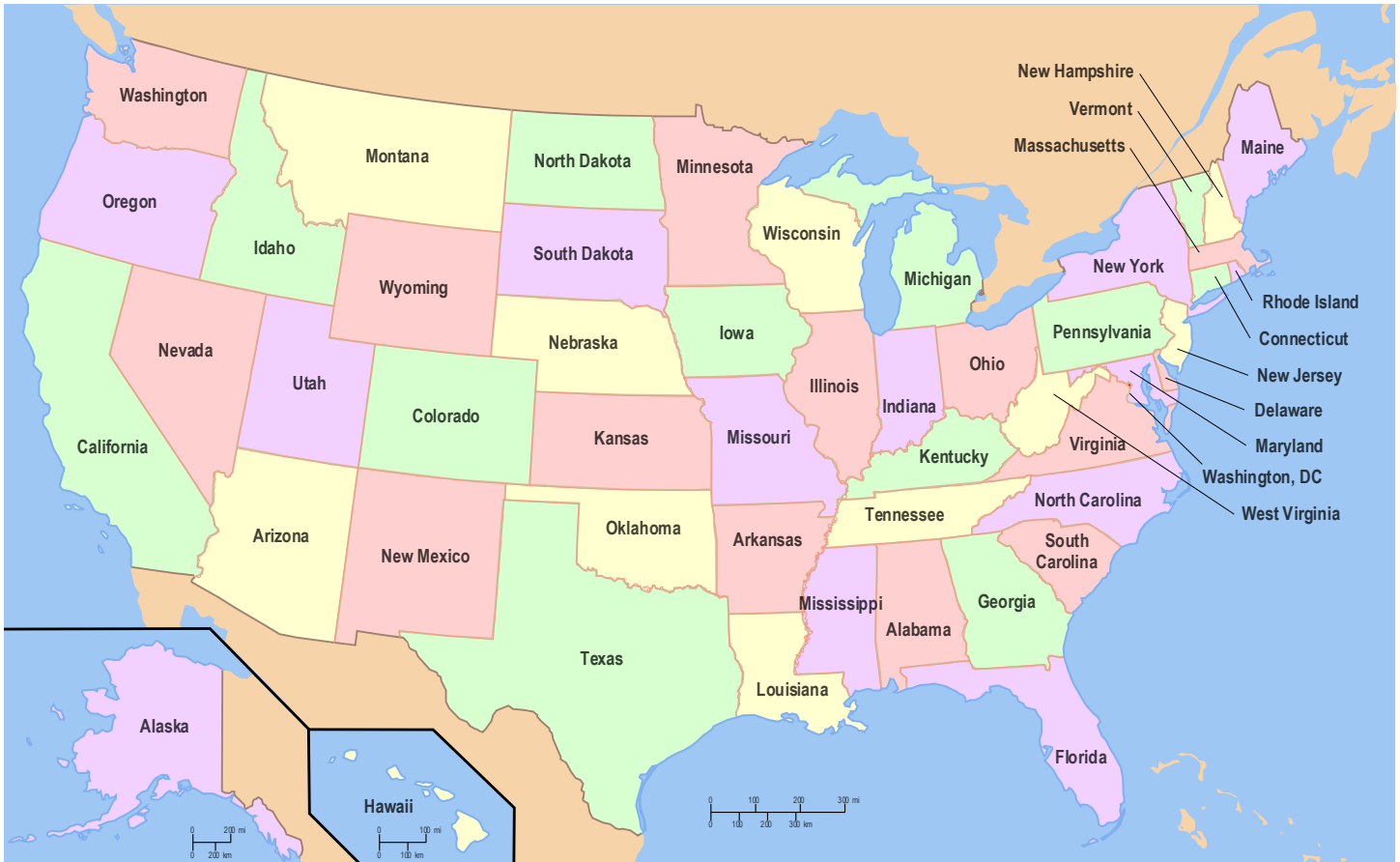
**Mystery State #6 is Hawaii.**

Resource: All of the state energy profiles came from this Energy Information Administration's site on December 17, 2022 - <https://www.eia.gov/beta/states/overview>

Name \_\_\_\_\_

Date \_\_\_\_\_

## Name the State – Electricity Primary Energy Source Profiles



Source: [https://commons.wikimedia.org/wiki/File:Map\\_of\\_USA\\_with\\_state\\_names.svg](https://commons.wikimedia.org/wiki/File:Map_of_USA_with_state_names.svg)

**Directions:** Make observations about the electricity primary energy source profiles. Discuss with your team and determine which state you think the profile represent and explain why.

You can access an interactive map of the United States of America from the Energy Information Administration, the with the power plants of various kinds highlighted here to help inform your discussion:

<https://bit.ly/USAelectricity>

Zoom in on a specific state to see the kinds of electricity power plants it has. Be careful, one plant could be much larger than another in terms of the amount of electricity it generates.

1. \_\_\_\_\_ state **Electricity Consumption by Primary Energy Source 2020**  
 (percent of total for all sources)



**Coal**  
(3.2%)



**Natural gas**  
(25.9%)



**Petroleum**  
(0.0%)



**Renewable energy**  
(70.8%)



**Nuclear power**  
0.0

Reasoning: \_\_\_\_\_

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2. \_\_\_\_\_ state **Electricity Consumption by Primary Energy Source 2020**  
 (percent of total for all sources)



**Coal**  
(0.0%)



**Natural gas**  
(73.3%)



**Petroleum**  
(0.3%)



**Renewable energy**  
(26.4%)



**Nuclear power**  
(0.0%)

Reasoning: \_\_\_\_\_

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3. \_\_\_\_\_ state **Electricity Consumption by Primary Energy Source 2020**  
 (percent of total for all sources)



**Coal**  
(85.6%)



**Natural gas**  
(1.4%)



**Petroleum**  
(0.1%)



**Renewable energy**  
(12.9%)



**Nuclear power**  
(0.0%)

Reasoning: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. \_\_\_\_\_ state **Electricity Consumption by Primary Energy Source 2020**  
 (percent of total for all sources)



**Coal**  
(26.8%)



**Natural gas**  
(8.9%)



**Petroleum**  
(0.1%)



**Renewable energy**  
(58.4%)



**Nuclear power**  
(5.7%)

Reasoning: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. \_\_\_\_\_ state **Electricity Consumption by Primary Energy Source 2020**  
 (percent of total for all sources)



**Coal**  
(8.8%)



**Natural gas**  
(69.8%)



**Petroleum**  
(0.9%)



**Renewable energy**  
(5.2%)



**Nuclear power**  
(15.4%)

Reasoning: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

6. \_\_\_\_\_ state **Electricity Consumption by Primary Energy Source 2020**  
 (percent of total for all sources)



**Coal**  
(15.5%)



**Natural gas**  
(0.0%)



**Petroleum**  
(71.8%)



**Renewable energy**  
(12.7%)



**Nuclear power**  
(0.0%)

Reasoning: \_\_\_\_\_

\_\_\_\_\_  
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