



# TeachEngineering

ALKANE RESOURCES ACTIVITY – Project Introduction



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## Use of Oil in the U.S. [CISTAR Intro Video](#)

Number of barrels of oil used the the US each day.

10,000,000

Percent of transportation fuel that currently comes from oil

90%

Percent of chemicals, including plastics, made from oil

>80%

Percent of transportation fuel and chemicals we want to replace with renewable sources

100

# Sources of Energy other than Oil

2060

Year we expect to be entirely reliant on renewable fuels

Shale

Resource readily available in the USA to replace foreign oil

100 years

How long can that resource last? Will that last until we reach reliance on renewable fuels?

$\text{CH}_4$   $\text{C}_2\text{H}_6$   $\text{C}_3\text{H}_8$   $\text{C}_4\text{H}_{10}$

Light hydrocarbons that are plentiful in shale gas (methane, ethane, propane and butane)

# Understanding Shale Gas

Shale gas processing produces fuel for transportation and petrochemicals

Shale gas must be converted into heavier products for use as fuel. One reaction is converting ethylene into butylene.

Shale Products

ethylene → butylene



# Project Glossary

Vocabulary	Definitions
element	Any one of the simplest chemical substances that cannot be broken down by chemical means. Chemical elements consist of atoms which all have the same number of protons.
compound	Any substance formed by the chemical bonding of two or more chemical elements in a fixed ratio.
chemical reaction	A process of chemical change in which chemical bonds are broken and reformed, resulting in new substances.
hydrocarbon	A compound consisting only of carbon and hydrogen atoms.
alkane	A hydrocarbon with no double bonds and with no ring formations.
monomer	A relatively small molecule which can be covalently bonded to other monomers to form a polymer.
oligomerization	The formation of an oligomer from a monomer. An oligomer is 2-100 monomers joined together.
renewable resource	A natural resource that is replenished by natural processes at a rate comparable to its rate of consumption by humans or other users.
non-renewable resource	A resource that will not return, or renew, or will only return after a long period of time.