Unit 1

Petroleum and Livelihood

Unit Objectives

Goal 1

Get well informed of what petroleum can do for human needs through task-based activities.

Goal 2

Understand why petroleum is so essential to human livelihood through cooperative learning.

Goal 3

Make an in-depth study of certain heatedly-discussed questions about the impact of petroleum on livelihood.

Petroleum does more than just provide gasoline for cars and jet fuel for airliners. Products and by-products of petroleum end up in items used daily around the world—billions of pounds of polyethylene plastic alone go towards making plastic bags, food containers, hula hoops, and other consumer products.

Pre-Class Activities

Activity One Get to Know the Role of Petroleum

Search online to make a list of petroleum-derived products and then group them into different categories. Share your categorized list with your team members.

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Activity Two Get to Know the Significance of Petroleum

Read the following article carefully, summarize the key points about what petroleum can do for human needs, and prepare for a class discussion.

Reading A

Petroleum: A Commodity Essential to Our Very Way of Life[1]

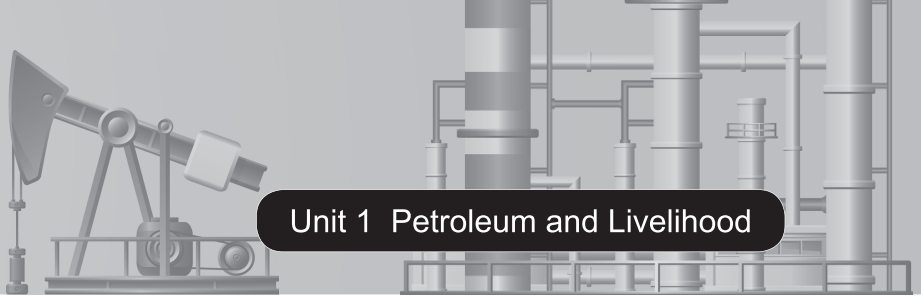
Edward Cross

President of Kansas Independent Oil and Gas Association

❶ When talking about petroleum, many people likely have the image of a barrel filled with a thick, black substance. But what most people may not realize is that petroleum is the building block of thousands of products that make our lives more comfortable, safer, cleaner, and healthier.

❷ When thinking about the role of oil and gas in our lives, many people may only think of

1. Cross, E. (unknown publication date). *Petroleum: A commodity essential to our very way of life.* Retrieved from https://www.kioga.org/public-information/op-ed/petroleum



vehicles and fuel, but petroleum plays an integral role in nearly every aspect of our lives. As a matter of fact, over 6,000 products come from petroleum. People use oil-based products every day, whether it is your television remote, cell phone, or even the toothpaste and toothbrush you use to brush your teeth.

❸ Synthetic fabrics such as nylon and polyester are made from petroleum. In addition, as a key component in heart valves, seat belts, helmets, life vests, and even Kevlar, petroleum is saving tens of thousands of lives daily. Furthermore, oil and gas are key components in many medicines and antibiotics, such as antiseptics, antihistamines, aspirin, and sulfa drugs.

❹ These are just a few of the improvements that oil and gas make in our lives and societies around the world, and as a top 10 oil producing state, Kansas is a major contributor to that. As a nation, we take great pride in our agriculture sector and the role it plays in feeding people around the world. In the same way, we should take great pride in the role our oil and gas industry plays in providing a commodity essential to our very way of life. Oil and gas are fundamental to our modern way of life and high standard of living.

❺ Also, the oil and gas industry makes our environment far safer and creates new resources out of raw materials.

❻ The energy we get from oil and gas is particularly valuable for protecting ourselves from the climate. The climate is always changing, whether mankind influences that change or not. In the last 80 years as CO_2 emissions have risen from an atmospheric concentration of 0.03% to 0.04%, climate related deaths have declined by 98%. Oil and gas make the planet dramatically safer.

❼ According to the Environmental Protection Agency, oil and gas methane emissions account for only 3.63% of total U.S. greenhouse gas emissions. Methane emissions from the oil and gas sector declined 3.8% in 2018, marking the fourth consecutive year of decline. The fact is our nation's 21st century oil and gas renaissance has made domestically produced oil and gas economical and abundant. This market-driven success has helped our nation achieve significant emissions reductions. The men and women of the oil and gas industry reject the stale mindset of last century's thinking peddled by some that oil and gas production and environmental stewardship are not compatible.

❽ Oil and gas have also made the planet dramatically richer in resources. Until the Industrial Revolution, there were almost no energy resources. Oil and gas are not naturally resources. Those who first discovered how to convert oil and gas into energy weren't depleting a resource; they were creating a resource. The world is a better place for it. Life is all about taking materials in nature and creatively turning them into useful resources. And by creating the best form of energy resources, the oil and gas industry helps every other industry more efficiently create every other type of resource.

❾ More than a billion people around the world face challenges for adequate food and education, clean water, and protection from heat and cold due to a lack of access to safe, affordable, and reliable energy. We should work to ensure more people have access to safe, affordable, and reliable energy, no matter which state, nation, or continent they reside in, because people need more energy, not less, to rise out of poverty and enjoy health and safety.

While-Class Activities

Activity One Enrich Your Knowledge Cooperatively

Hold a group discussion about the categorized list of petroleum-derived products you've found before class. Each group will be asked to make a class presentation to share your list.

Activity Two Review Your Findings Collaboratively

In what ways is petroleum essential to our way of life? You are required to make a brief summary by following Reading A again. You may supply additional information other than Reading A.

Activity Three Map out the Consequences

Since petroleum is so deeply involved with our livelihood, can you imagine what would happen if oil someday is running out? Read the following article, hold a group discussion about the consequences of the absence of oil supply, and make a class presentation.

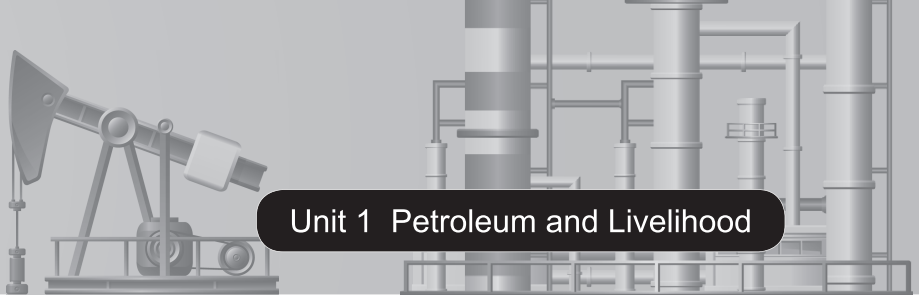
Reading B

Imagining a World Without Oil[1]

Steve Hallett and John Wright

❶ Dismantle the oil rigs and stack them in a pile. Radio the tankers and order them back to port. Pull out the drills and cement up the wells. (A year after the BP spill in the Gulf of Mexico, let's hope we've learned how to do that, at least.) Tow the platforms back to shore. Plug up the

1. Hallett, S., & Wright, J. (2011, April 21). Imagining a world without oil. *The Washington Post*. Retrieved from https://www.washingtonpost.com/opinions/imagining-a-world-without-oil/2011/04/12/AFppFHKE_story.html



pipelines. And lock up the Strategic Petroleum Reserve while you're at it—it has only about a month or so worth of oil in it, anyway.

❷ What would happen next? How would we live in a world without oil?

❸ First, there's transportation. With the overwhelming majority of the oil we produce and import devoted to powering our cars, motorcycles, trucks, trains, and planes, the impact on getting around would be most dramatic. Price-gouging would begin right away, and long lines would form at gas stations. The lines wouldn't last, though, because the gasoline would soon be gone. A strategic reserve of finished petroleum products—gasoline, diesel, and aviation fuel—has often been suggested but never created. Within a month, every fuel tank would be dry, all our gauge needles would point to "E", and the roads, rails, and skies would be virtually empty.

❹ How far is it to the nearest grocery store? How long does it take to walk—or bike, or skate—to work? Finally confronting our dependence on motor vehicles, we'd reach for whatever solutions we could find. Soon, we'd all be looking for an electric car (but there are precious few of those for sale) or converting our vehicles to run on natural gas. But we'd be waiting for some time to secure adequate natural gas supplies, establish delivery infrastructure, and switch over our cars.

❺ Our enslavement to black gold goes much further than the problem of getting from Point A to Point B. We also need to keep the lights on. And this would be possible, for the first month or so, because only 1% of America's electricity is generated from oil—coal carries the largest burden, along with natural gas, nuclear and hydroelectric power.

❻ But brownouts and blackouts would soon begin. Sure, our electricity is generated mostly from coal, but how would the coal be extracted without those diesel-guzzling yellow trucks? How would it be hauled to the power plants? (Remember, our trains all run on diesel, too). Heating and cooling our homes would suddenly get a lot more complicated, and our televisions and laptops would be just a few more weeks away from shutting off forever.

❼ Forget even trying to get to work anymore; we now have another set of problems to solve, especially if it's winter and our houses are getting cold. Can we quickly put together some solar panels and batteries? A wind turbine? What do we have growing in the back yard that can burn? Environmentalists have been nudging us to insulate our homes and generate electricity from renewable resources for a while now; this might be the time to start paying attention.

❽ It gets much worse still, of course, because a world without oil would quickly become a world without all of the products made from petroleum that we have come to know, love, and depend upon. The list of essentials that we'd soon be doing without is prodigious: virtually all plastics, paints, medicines, hospital machines that go "bleep", Barbie dolls, ballpoint pens, breast implants, golf balls…

❾ Eating would get tougher, too. If no one can truck in fresh veggies from across the country,

we might be inclined to go back to basics and grow our own food. Local farmers would become a necessity, not just people who sell us honey at the street fair. That said, make sure to keep the food coming, fresh and fast, because it's going to be awfully difficult to refrigerate. Fishing might work, so you'd need to get a new rod while supplies last. Alas, most of them are made of plastic. Then again, so is fishing line.

⑩ It's an interesting thought experiment to picture a world suddenly without oil. Taken to its logical conclusion, it encompasses so much more: a complete and rapid breakdown of society, leading to desperation, lawlessness, wars, and untold suffering. The scenario is unreal, of course, because we could never shut off our oil supply in a day, and in any case, there are trillions of barrels of the stuff still in the ground, right?

⑪ Yet, in a simpler sense, it's not so unrealistic, because even if it will happen more gradually than laid out here, we will indeed run out of oil. Output has already peaked in the majority of countries and has been declining in the United States since 1971. A handful of countries are still increasing production, but not enough to offset even bigger declines elsewhere. There is lots of oil still in the ground (we've used about half of the planet's generous endowment), but while the end of oil may be many decades away, the beginning of the end is now.

⑫ It's not just at the drip of the final drop that the oil crisis begins. It is when production stagnates and begins its inexorable fall. That perilous moment, alas, is now. Our oil supplies are about to begin to fail us. As oil becomes more scarce, we have to get serious about finding new solutions to power our world.

⑬ We have time to plan—but not that much time. And so far, we've done very little to prepare for a world without oil.

Activity Four Plan Your Own Oil-Free World

What might result from the oil deficiency according to Reading B? Summarize the key points and share with your team members. Illustrate your own perception of the world without oil and write down your own solutions or plans to tackle a world without oil.

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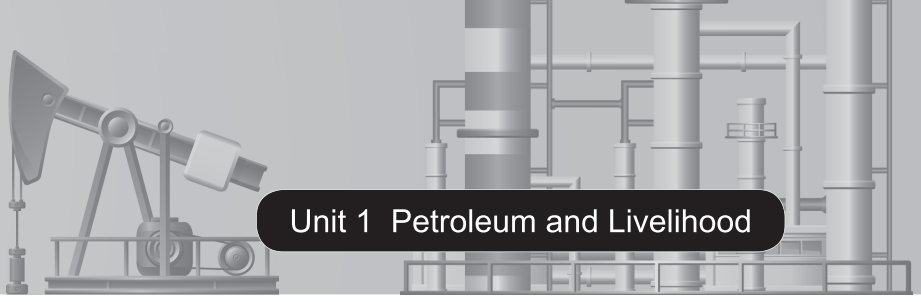


After-Class Activities

Activity One Enhance Your Perception

Following your own "doomsday scenario", get an in-depth understanding of the "aftermath" by Reading C and summarize the supposedly affected areas the writer probes into in time order.

Reading C

A World Without Oil: The Aftermath[1]

James Kenny

Introduction

❶ Oil, is quite simply the backbone of modern life. It's in the food we eat, the houses we live in, and in the cars we drive. It's probably the most important commodity in the world; indeed this cheap, economic fuel makes our modern world possible. Over the last 150 years, we have taken about a trillion barrels from the Earth, and most experts forecast that the equivalent of another trillion should still be there for us to extract.

❷ But let's conduct a little thought experiment; most of us are aware that we are living on borrowed time. We know that the oil will run dry someday in the future—we're not entirely certain when, but most experts are confident that we will have to find an effective alternative fuel within the next 100 years or else. In our thought experiment, I want you to imagine that all of the remaining untapped oil reserves still in the Earth suddenly vanished overnight. What we would do? How would we cope with it?

❸ The experiment begins; the oil disappears and almost immediately oil refineries around the world go into chaos mode; alarms go off deep underground, indicating a major problem.

From Prosperity to Poverty

24 Hours Later

❹ News reports around the world confirm beyond doubt that all of the oil reserves below ground across the globe have disappeared. The oil companies move quickly to stem the rising

1. Kenny, J. (2016, June 24). *A world without oil: The aftermath*. Retrieved from https://soapboxie.com/social-issues/A-World-Without-Oil-Part-One

panic by informing people that there are 20 million barrels left in the refineries. Across the oceans, huge tankers carrying millions of barrels of oil are on the move, but not in the usual direction. In the wake of the crisis, Earth's biggest oil exporters such as Russia and Saudi Arabia have recalled their boats.

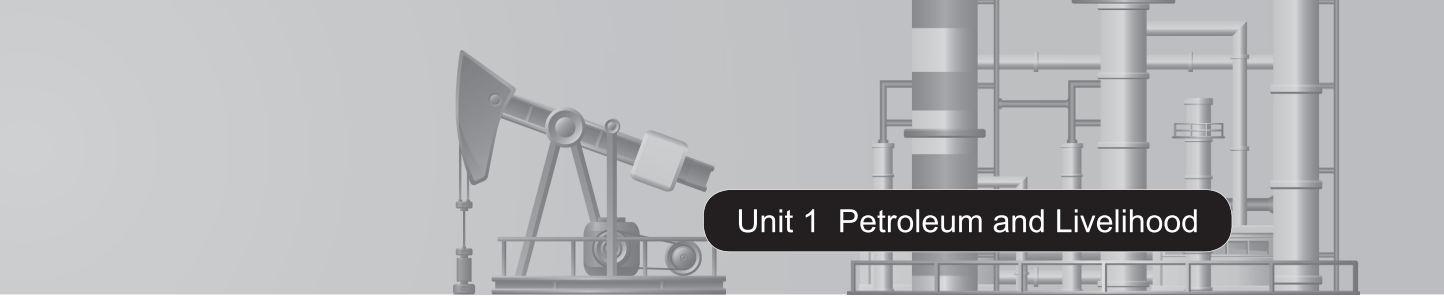
❺ This is a massive blow for the U.S., who is the biggest oil importer in the world. Each day, they produce more than 8 million barrels, but they actually consume double that amount. Now with the loss of imported oil, the deficit stands at 8 million and begins to grow.

❻ People quickly digest the news and flood into gas/petrol stations in the hope that they can fill up their cars for the last time, but many reports state that anyone preparing to queue faces a wait of two hours at least. Very quickly, gas/petrol stations around the world run dry; in the last frantic moments, many hike up the prices to truly astronomical amounts, and some of those determined people who sat in the queue hand over vast sums of money.

❼ Many countries around the world do have vast reserves of oil hidden away to deal with emergency situations similar to the one occurring now. The U.S. has roughly 725 million barrels of crude oil hidden away in secret location across the country. In order to protect what's left, the government takes dramatic steps, only allowing the most vital transports such as ambulances and fire trucks access to the oil. The age of planes, trains, and ships comes to a shuddering halt; roads become quiet, tracks empty, the skies quieter and cleaner. Each day in the U.S. alone, roughly 4 million people use aircraft for travel, but are now all stranded, forced to find alternative ways to get their destination. The loss of planes, trains, and ships also spells disaster for the delivery of cargo, over 100,000 tones of cargo will lie stranded, probably never to be delivered.

❽ The economic fallout is rapid; the growing, widespread panic forces the government to halt stock trading. The U.S. government took similar steps after the 9/11 disaster due to the panic that erupted in its aftermath. All of a sudden, two trillion dollars of oil stock become worthless; more than 400,000 people directly employed by the oil industry lose their jobs, and are reduced to have to find their way home by any means necessary. The uncertain economic future also forces thousands of manufacturing plants to shut down immediately, which spark protests from the millions employed in the industry who also lose their jobs.

❾ For the most part, we are largely ignorant of oil and just how important it really is. It's one of the most powerful and versatile fuels on the planet, made from dead organic matter that has been slowly compressed and heated over millions of years. It's in everything, from toothpaste, lipstick, polyester, and even plastic, but now it's all gone, and what was kept in reserve is dwindling rapidly. A huge chain reaction has now been set in motion, that is quickly crippling every part of our lives from hospitals, food, and of course power. The crisis is only just beginning.



Five Days Later

⑩ In just five short days, the loss of oil has forced governments around the world to declare martial law to stem the rising anger and anarchy among the population. In the U.S., the National Guard is deployed widely across the country, patrolling the streets of Los Angeles and Washington vigorously. The stock markets remain firmly shut, and unemployment has risen swiftly up to an astonishing 30%.

⑪ In less than a week, many of our most basic needs are suddenly out of reach. Food depot centres across the western world are now closed, sparking a major food crisis. Prior to the crisis, California for example sent out 1,300 trucks from its depots every day, delivering fresh food all over the country to grocery outlets. Now the trucks sit idle without their precious oil.

⑫ All of the big cities are hit hard; on average it takes one football field of farmland to produce enough food for just one person a year. Oil enabled the easy distribution of food from far and wide, but now without it, feeding a city of millions like New York becomes impossible. The trip to the grocery store now takes hours rather than minutes, and each outlet has a team of armed guards manning the doors, deciding how many people can enter the store at once. Inside the store, almost all of the best quality food has now gone, what's left are the ones that don't normally make it to the shelf, the ones that carry imperfections or are slightly off. But people can no longer afford to be fussy, and must make do with whatever they can find. The prices of food just like gas/petrol skyrocket, for example, in this new world a 5-lb bag of apples now costs nearly 12 dollars.

⑬ Roughly a quarter of all food consumed in the U.S. is imported from elsewhere, and with no more ships bringing fresh supplies, the food stocks dwindle dramatically. On farms, the loss of oil is even more dramatic, over the last fifty years farming has become industrial, with many containing hundreds if not thousands of cows and other livestock. On average, a cow needs around 100 lbs of food a day, while a pig needs around 8 lbs. In a bitter ironic twist, these animals raised to feed humans face starvation themselves.

⑭ The loss of oil causes power systems around the world to fail, plunging the world into darkness. Around the world, roughly 40% of electricity comes directly from coal burning power plants. In the U.S., Florida is hit hardest, as it mainly relies on electricity generated directly from burning oil. The major hospitals in cities such as Miami and Orlando are equipped with emergency backup generators, but even these rely heavily on diesel fuel processed from oil. In San Francisco, law and order breaks out. In the middle of the night, looters emerge en masse. But as well as looking for food, they search for cooking oil that can be converted into fuel for diesel engine cars.

One Month Later

⑮ Governments around the world initiate a global shutdown, keeping only the most essential services operational. The emergency oil reserves are converted into diesel fuel for cargo trains

that deliver coal to power plants, in an effort to restore power. The strategy works, and some basic electrical services are restored, but only in certain areas, as the electrical grids are no longer interconnected.

⑯ Florida is still in a state of blackout; the emergency fuel gets the trains running again, but instead of people, they carry food. The U.S.' oil supply continues to dwindle; even the most optimistic forecasts estimate that the U.S. only has 11 months worth of oil left. The gasoline or petrol powered car becomes obsolete; this is a total disaster for the U.S., as it is specifically built to serve cars. More than half of the population live in sprawling suburbs, and prior to the crisis had most of their food delivered straight to huge grocery outlets nearby. For the average American, the easy life has vanished; alternative measures must be found.

⑰ Out in the Midwest, farmers begin planting new crops to replace the usual fruit and vegetables. They select soya beans that contain oil which can be extracted and turned into diesel fuel. Corn is another crop that contains a fuel alternative and is grown extensively across millions of acres of land. The treasure yielded by this crop is ethanol which can be used to power gas/petrol powered cars.

⑱ While the U.S. roads sit empty, the story in Rio de Janeiro, Brazil is quite different. The roads are still packed with cars that are powered by ethanol extracted from sugar cane. In terms of biofuel production, the Brazilians are decades ahead of the Americans and other western nations. However, hope remains eternal that the end of the modern world hasn't arrived. Thousands of electric cars are still on the road and could pave the way for a better future. But back in the present, a more immediate and concerning challenge looms: the onset of winter in the northern hemisphere.

Five Months Later

⑲ The U.S. government announces the takeover of three of the biggest car manufacturers in the country. They intend to concentrate on producing electric trucks to help supplement the much needed food deliveries. Across the vast agricultural lands of the Earth, farmers take inspiration from Brazil and start planting sugar cane to speed up the production of ethanol.

⑳ However, in big cities across the U.S. and indeed the rest of the world, food terminals begin to close, resulting in a fast spreading famine. People form crushing queues at train stations waiting for food deliveries. Instead of fresh produce, they must make do with powdered milk and rice. The essential services such as coal delivery and emergencies are still operational; surviving on the ever dwindling oil reserves, everything else is at a standstill. The U.S. continues to dramatically reduce its oil consumption in order to stretch out the vital remaining reserves. But in just a few short months, there won't be enough oil for any food deliveries at all.

㉑ While food continues to be brought in, rubbish/garbage is no longer collected and taken away. In fact, any rubbish clear-up is a luxury afforded only to a few lucky people. The situation