

Eco-Reps Workbook





ONE: ECO-REPS



"Education, if it means anything, should not take people away from the land, but instill in them even more respect for it, because educated people are in a position to understand what is being lost. The future of the planet concerns all of us, and all of us should do what we can to protect it. As I told the foresters, and the women, you don't need a diploma to plant a tree."

Wangari Maathai, "Unbowed"



BEING AN ECO REP

An Eco-Rep is a peer leader with the role of educating fellow students in a residential complex cluster about sustainability issues. This program is modeled after similar ones that on many other campuses. Eco-Reps encourage and teach others to live in a more sustainable way. Eco-Reps help raise awareness by distributing information, hosting activities in their hall, and talking to other students. Eco-Reps should also be aware of campus resources and be able to refer other students to these.

Being an Eco-Rep will allow you to not only engage your peers but also meet other students passionate about the environment and sustainability. You will gain insight into current and future environmental issues and ways in which you and the Office of Sustainability are addressing them. Eco-Reps should provide ongoing feedback to the Sustainability Coordinator and Graduate Sustainability Coordinator. Our goal is to continuously improve the program, and we need your help to do it!



Program Goals

Train a group of students to be peer educators for sustainability issues on campus

Prepare students to be leaders on campus and in their endeavors after college

Provide support for achieving the goals published in the ACUPCC

The mission of Eco-Reps is to support sustainability goals by developing student leaders who educate, motivate, and empower their peers through role modeling, sharing information, and programming around sustainability.

Responsibilities

Class

Goal: Each class is intended to help you grow your knowledge and your skills related to sustainability. Within each four-week period there will be one class discussing the material, one class working on ongoing projects, and one class with guest speakers or mini-field trips.

We will discuss successes and challenges as a group to provide each other support and new ideas. Class is an opportunity to help you succeed as a peer educator and leader on campus. Preparing by reviewing assigned readings and bringing program ideas is expected.

Eco-Reps must attend all scheduled class sessions. Prompt attendance is also expected. If you must miss a class or know you will be late, please contact the Sustainability Coordinator.

Community Resource

Goal: Be the community resource for questions, concerns, and ideas regarding sustainability

You will accomplish this by making your presence in the complex area known (introducing yourself to other students and staff members, having visible Eco-Reps signs on door, and other ways). You will provide direct responses to residents based on available resources and knowledge or refer them to another appropriate campus or community resource.

It is expected that you are available to other students in whatever way is appropriate to you. However, email correspondence is the minimum expectation.

Education & Outreach

Goal: Provide information about sustainability topics to different groups of people in your community in an effort to provide education and encourage them to share the information with other members of the community

You will accomplish this goal by hosting a dialogue session with a group of your choice (it could be your floor/hall or a student organization). You will also accomplish this by creating a passive program each semester. These tasks will be accomplished through both groups and individual projects.

The last education and outreach responsibility will include a semester-end forum presentation. Members of the ISU community will be invited to watch each individual Eco-Rep present a short 5 - 10 minute presentation on a personally selected sustainability topic.

Special Events & Initiatives

Goal: Be a student leader in sustainability initiatives across campus and advocate for sustainability outside of individual projects.

It is an expectation that you volunteer for big sustainability events through the Office of Sustainability like Sycamore Secondhand and Earth Day. Anything beyond that is awesome, but not an expectation.

Administrative Necessities

Goal: These requirements are meant to help document your work and build relationships with you.

Every project and program you complete must be documented through a photo that is sent to the groupme. Each month you will have a scheduled 1:1 meeting with the coordinator to talk about your progress and what you might need help on. You will also have an end of the semester evaluation.

All of these responsibilities are goals the Office of Sustainability has for Eco-Reps. These are subject to the syllabus for UC 110: Eco-Reps and UC 110: Eco-Reps pt. II. Most of these responsibilities are built in as assignments to the course.

ACCOUNTABILITY

Your consistent participation is integral to the success of this program. Individuals who do not abide by the agreed components of the program will be asked to leave. Potential reasons for being removed include consistently missing class without reasons, repeatedly missing deadlines, and consistently not completing projects. This is not meant to be a comprehensive list, and the decision would be on a case-by-case basis and be dependent on individual situations.



POSITION DURATION

The Eco-Rep position lasts for one academic year. There is potential to return to the program a second year in a coordinator position. However, this program is meant to be a stepping stone to larger involvement in sustainability and student leadership on campus. Therefore, we will be building other leadership opportunities into the program.

SUCCESSFUL CONVERSATIONS

You will have to find the delicate balance in how to remind people about sustainable behavior without becoming too nagging. It's hard to get people to listen when you're "too radical" (despite the fact that they should), and nobody likes to feel guilty about their choices or lifestyle. Be mindful that other students may have different interests, values, and ideals important to them. Perhaps they have never thought about sustainable issues before and you are bringing them up for the first time. Try to phrase it in a way that makes them care.

1. Listen: What are the needs of the person? What are the barriers that they facing?
 2. Question your assumptions: Find out the source of what's really happening in the situation. Perhaps things are not as they seem.
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BEING A PEER EDUCATOR

A peer educator is a trained person who assists others in their peer group to make decisions about a topic through activities undertaken in one-to-one or small group settings. They are also a type of mentor.

You will have specialized knowledge to share. The peers that you are trying to change may not have the same understanding of the topics that you do. They may not be as invested or interested in making change as you are. It is up to you to demystify it and make it seem interesting, relevant, and fun.

Peer education is:

Culturally appropriate:

"Peer education provides a means of delivering culturally sensitive messages from within"



A mentor is defined
a knowledgeable
and experienced
guide, a trusted ally
and advocate, and a
caring role model

Community-based:

"Peer education is a community-level intervention which supports and supplements other programs. It is a link to other community-based programs."

Accepted by their target audiences

"Many peers report that they are more comfortable relating to a peer about their personal concerns."

Beneficial for the peer educators

"Ideally, peer education helps the peer leaders themselves. They learn new skills and gain knowledge and confidence. At the same time, it helps those with whom the peer educators interact and for whom they model positive, protective behaviors."

CHANGING BEHAVIOR

As an Eco-Rep you are charged with a very difficult task: changing the behavior of your peers. Changing our habits is difficult and takes time - even when we know the change will be for the better! How many times have you told yourself to exercise more or procrastinate less? Here are some tips to help you effectively communicate with your residents about behavior change. Remember to stay positive and be patient.

EDUCATING AND MOTIVATING FOR CHANGE

Before beginning each educational campaign, think about the following things:

Target Your Audience

Ask yourself, what motivates this person? If you don't know, try to find out. Your audience will respond better to messages that speak to their values and interests. If you are talking to a group of people, try appealing to shared values and goals of the community. Ask them to explain why creating a sustainable community is important. Be flexible. Don't assume a tactic that worked for one person will work for all people.

Connect with Your Audience

Your audience will be more willing to listen to people they know and trust. When talking with them, try to emphasize shared interests and values. If you do not know the person you are talking to, try to emphasize your shared experience as an ISU student.

Develop Your Message

Your message should be clear and easily understandable. The way a message is delivered will make all the difference. Often times, environmental information (especially technical facts) is confusing to the average person. Most people don't see a clear connection between themselves and the facts that are being presented. Can you make a clear link between the individual and the information? What is the environmental concern? How does it affect the person? What are steps they can take to help improve it? Don't lecture. Have a conversation.

Allow Your Audience to Arrive at their Own Conclusions

Instead of telling them what changes they should make, help guide them to arrive at their own conclusions. Give your audience enough information to for them to make their own informed decisions. Once they take ownership, they are more likely to stick with new behaviors.

Things to Avoid

Do not overload your audience with apocalyptic messages. Make sure to include in your message a balance of issues and some possible solutions. Otherwise, you will leave your audience feeling depressed and helpless. Also, do not present unsustainable behaviors as the norm. For example, you wouldn't want to say that 85% of residential students take 20 minute showers. Instead you should say something like, we are trying to 85% of residential students to reduce their showers by at least 5 minutes.

INCLUSIVE & SUSTAINABLE PROGRAMMING

When you are programming, the following are things that you must consider:

It is essential that all our community residents feel welcome and included in our programming efforts. Think regularly and comprehensively about what it means to be inclusive and how this affects your actions. Because of our commitment to sustainability, all programs must also be sustainable. Consider the following checklist questions.

Inclusive Program Checklist

- When advertising for a program, are all types of people represented in images (ethnicity, ability, body, same gender couples, etc.)? Does my advertisement note who to contact in advance of the program if someone needs accommodations?
- Are there any holidays (including non-Christian) I need to be sure to schedule around and/or for? Am I only celebrating/decorating for Christian and/or American holidays?
- Am I prepared to interact with all residents at the program - not just people I know? Am I ready to find those students who might be alone and want someone to talk to? Did I design the program so everyone has the ability to interact with people they don't know?
- Is most of my target audience interested in my programs, or am I programming for the same people every time?
- What days and times are most students available? Am I only programming around what times are most convenient for me?
- Did I assess the accessibility of my program and space? (ex. Can a wheelchair easily maneuver? If showing a video, can I provide closed captions?)
- Is most of what we are doing free or low cost?
- Am I clearly advertising what the program is for? (especially if it may be triggering)
- Did I personally invite everyone to my programs, not just the ones I know will attend?

Sustainable Programming Checklist

- Do I have a convenient recycling receptacle at every program?
- Am I recycling everything that I can?
- Am I buying locally produced foods and goods and/or am I purchasing food from a local business?
- When appropriate, am I buying minimally processed foods? Bulk or minimally packaged foods?
- Can my event be vegetarian or vegan?
- Am I buying fair trade items? Organic items?
- Am I role modeling positive habits around recycling and utility conservation?
- Am I demonstrating sustainable practices in advertising? e.g. using the backs of old advertisements, making one big poster, using social media, etc.
- Am I purchasing only what will be used? What is your plan for leftovers?
- Am I only purchasing what I really NEED?
- Am I communicating sustainable practices to program attendees?
- Do I encourage students to bring their own reusable cups and dishes to the program? If I am providing, did I buy something more environmentally friendly? e.g. compostable, NO styrofoam
- Did I remind students to turn off their lights and electronics before the program begins?

RECYCLING X-FRAMES

The Office of Sustainability has recycling x-frames that anyone can rent to use. If your residential hall or programming location does not have any available recycling receptacles then contact the sustainability coordinator prior to your program.





SUSTAINABILITY



"This is what sustainability is meant to counteract: a moribund economic system that has drained the world of many of its finite resources, including fresh water and crude oil, generated a meltdown in global financial systems, exacerbated social inequality in many parts of the world, and driven human civilization to the brink of catastrophe by unwisely advocating for economic growth at the expense of resources and essential ecosystem services

Paul Mason, "Meltdown: The End of the Age of Greed"



SUSTAINABILITY

Sustainable Communities Are Communities Where:

The needs of everyone in the community are met and people feel safe, healthy, and happy



Our environment is appreciated, protected, and enhanced and damage to the environment is minimized

Our economy is vibrant, employment opportunities are improved and our working lives are more rewarding

Throughout the world, people want the same things: access to clean air and water; economic opportunities; a safe and healthy place to raise their kids; shelter; lifelong learning; a sense of community; and the ability to have a say in the decisions that affect their lives.



DEFINE SUSTAINABILITY

the ability to be
maintained at a
certain rate or level
~ *dictionary.com*



You've probably heard the word sustainability and it might not have been in reference to the movement and ideas that we're talking about. This simplistic definition is a starting point, but the sustainability movement is built on much more.

The "Sustainability" Buzzword

We hear the word sustainability in media, business, and various facets of life nowadays. Slowly, sustainability has become part of the corporate world. But it's become a blurry term that fits whatever socially good aspect the business wants. Corporations are opening new sustainability divisions and chief sustainability officer positions due to the growing consumer demand for product that aligns with their values. The corporate sector relies on different definitions of sustainability and what it means to be "sustainable", because then they can apply it to their operations.

"Sustainability" that is applied unintentionally can be used to take advantage of consumers intentionally. People can have one idea of what sustainability means and perceive a product to be aligned with their values due to the companies use of the sustainability buzzword. This is why it's important to understand what sustainability means and what the sustainability movement is founded upon.

The Three E's

Nearly all definitions of sustainability in recent years emphasize the ecological point of view. Which is the notion that human society and economy are intimately connected to the natural environment. Sustainability involves more than just the environment. Sustainability is responsible for social equity and sensible economics, as well as the interconnectedness of these domains.

Environment



Environmental sustainability occurs when processes, systems, and activities reduce, negate, or reverse environmental impact.

Equity



Social sustainability is a process for creating sustainable communities that promote wellbeing by ensuring every person has access to quality of life

Economy

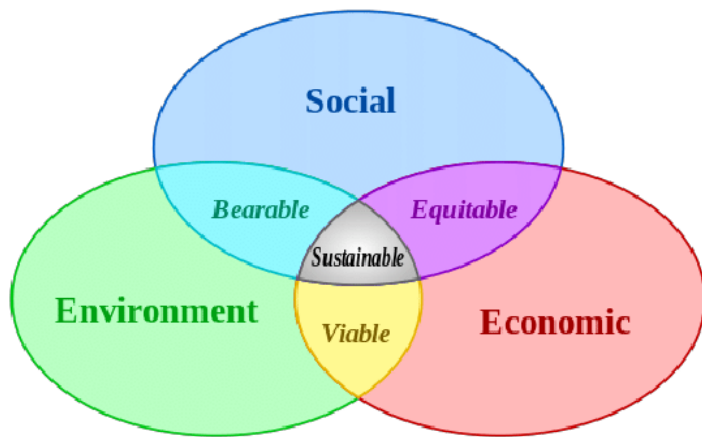


Economic sustainability is when processes and practices support long-term economic success without negatively impacting social and environmental aspects of the community

Sustainability is a complex concept. Sustainability is concerned with these three processes and their interconnection. Therefore, to be sustainable, our practices, programs, policies, and more must account for these aspects in all steps.

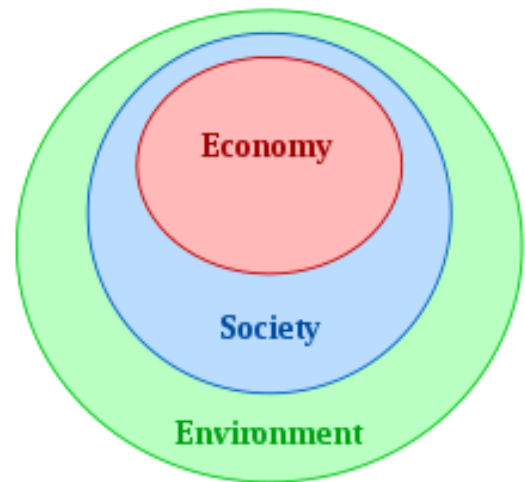
If someone refers to a business as sustainable when they mean it has the ability to support its economic production indefinitely, then that is not sustainability. We **MUST** take into account social and environmental factors to have a true sustainable economy

These are two regularly used models to depict sustainability. Each has its strengths and weaknesses, and each is meant to emphasize certain aspects of sustainability.

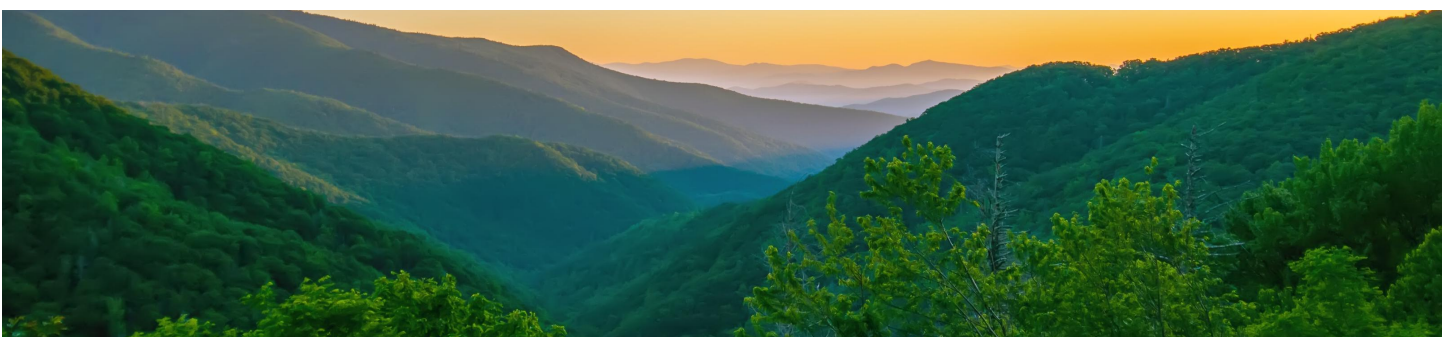


The Venn diagram visualizes each of the three pillars of sustainability while emphasizing the interconnectedness between each pillar. It is critiqued for emphasizing the social and economic domains as equally as important as the environment domain

The concentric circles model emphasizes the all-encompassing aspect of the environment. Without the environment and our planet we would not have society and economy. Society and social equity are of second importance while economy is third since a prosperous economy cannot exist without a healthy and just society.



There are many ways that these domains appear and interact in our daily life and in the need to mitigate impacts and reverse destructive effects of climate change. In general, if processes, projects, and programs do not address how they meet the environmental, social, and economic aspects of sustainability, then they are not sustainable. In our initiatives, we intentionally ask how we're incorporating each aspect.



HISTORY

Presented below is a rough outline of the history of the sustainability movement. It is taken from multiple sources that could provide a more in-depth examination into the history of sustainability. These follow more of the policy and publications that happened, but activism and political efforts contributed to these policies and publications.

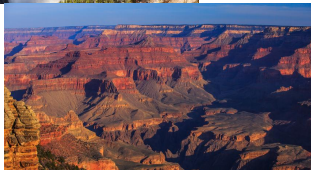
1859 Charles Darwin's "On the Origins of Species" influenced modern conceptions of ecology and biology, which underscores the understanding of how humans can live within their means

1866 Multiple ecological viewpoints had been developed up until this point, but "oecologie" became a term in 1866 and helped develop a consciousness around human relation to the environment

1892



SIERRA CLUB



John Muir, "The Father of National Parks", co-founds the Sierra Club which was originally meant for lovers of the outdoors

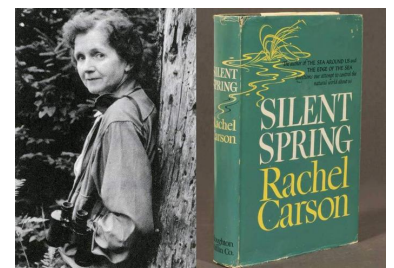
1901 Theodore Roosevelt became president and established the US Forest service and 150 national forests, 51 federal bird reserves, 4 national game reserves, 5 national parks, and 81 national monuments



1949 The United Nations (UN) held the first conservation conference with hundreds of experts from around the world to discuss how to conserve resources

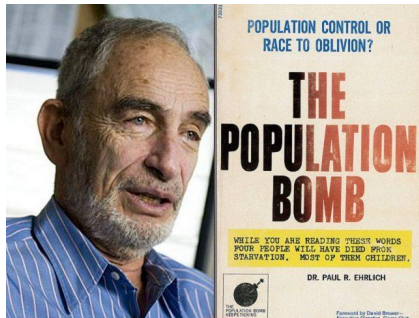
1955 Congress enacted the Air Pollution Act that focused on researching the effects of air pollution but didn't include any other items enabling action

1962 Rachel Carson releases "Silent Spring" which brought together research on toxicology, ecology, and epidemiology to suggest that pesticides were linked to damage in animal species and human health



1963 The Clean Air Act first passed into law

1969 The National Environmental Policy Act (NEPA) was established as a result of the growing movement and required all executive federal agencies to perform environmental assessments and environmental impact statements



UNESCO conference called "Man and His Environment: A View Towards Survival"

Paul Ehrlich publishes "The Population Bomb", which demonstrated the connection between human population, resource exploitation and the environment

1970 The very first Earth Day celebration took place on April 22nd

The Environmental Protection Agency (EPA) was created by executive order to drive environmental research and education, and to enforce environmental standards and laws



The Clean Air Act was amended to expand its power for regulating federal and state pollutants

1972 The Clean Water Act was passed and the EPA began administering its regulations for preventing water pollution, improving wastewater treatment, and protecting wetlands



The UN held their Conference on the Human Environment and formed the UN Environment Programme (UNEP) with the purpose of assisting developing countries in creating sustainable environmentally-friendly policies

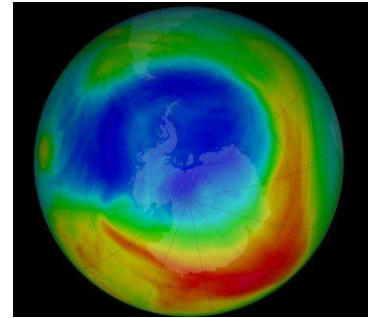
1979 Convention on Long-Range transboundary air pollution where an international agreement was signed to try to reduce and prevent air pollution

1980 UNEP-backed "World Conservation Strategy: Living Resource Conservation for Sustainable Development" document created by the International Union for Conservation of Nature is the first document to use the term "sustainable development"

Brandt Commission releases the North-South: A Program for Survival report that focused on poverty and environmental issues

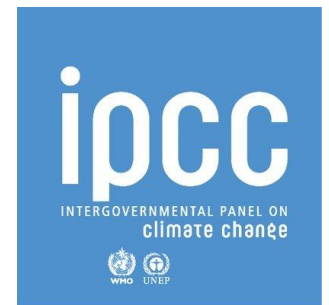
1982 UN General Assembly "World Charter for Nature" acknowledges that "mankind is a part of nature and life depends on the uninterrupted functioning of natural systems", but the US was the only country to vote against the charter

1985 Vienna Conference and the "Vienna Convention for the Protection of the Ozone Layer" was held to address the expanding ozone layer hole and to have a non-binding agreement



1987 UN published "Our Common Future", also known as the Brundtland Report, that encouraged countries to work together on sustainable development

1988 Intergovernmental Panel on Climate Change (IPCC) formed as an association of scientists dedicated to analyzing and summarizing current research on anthropogenic climate change



G7 Summit where seven industrialized countries discussed climate change and carbon dioxide emissions

1992 UN Conference on Environment and Development ("Rio Earth Summit") and several policy documents such as "Forest Principles", "Agenda 21", "Rio Declaration on Environment and Development", and "Framework Convention on Climate Change"



1993 UN Commission on Sustainable Development was created to oversee the implementation of Agenda 21 from the Rio Earth Summit

1997 Kyoto Protocol established with the UN Framework Convention on Climate Change, which is an environmental treaty that stipulates developed countries reduce GHG emissions by a targeted amount in two periods (2008-2012 and 2013-2020)

2000 UN-backed "Earth Charter" established that raises ecological sustainability to the level of a global ethic

2009 Copenhagen UN Climate Change Conference that had no agreement or meaningful plan of action adopted

China overtakes the United States as the world's largest emitter of GHG's, but ranks only 78th in per capita emissions



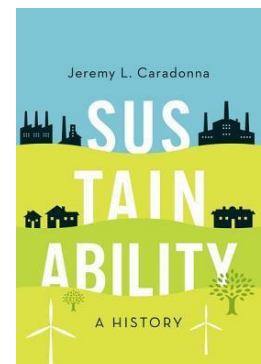
2015



UN General Assembly published the Sustainable Development Goals and extended the work of the Kyoto Protocol by having all 196 national delegations accept the Paris Agreement stating an agreement to limit global warming to less than 2 degree Celsius compared to pre-industrial levels

The current administration pulled out of the Paris Agreement and is repeatedly reversing environmental protections and steps from this sustainability movement.

For a dynamic exploration of the history of sustainability and the sustainability movement, read "Sustainability: A History" by Jeremy L. Cardonna



UN SDGs

The Sustainable Development Goals were adopted by all United Nations Member States in 2015 as part of the 2030 Agenda for Sustainable Development. There are 17 goals and they are all-encompassing, wide-reaching goals. Without achieving these goals, sustainability cannot be fully reached. Today, progress is being made but not at a speed or scale required to reach the goal of completing by 2030.

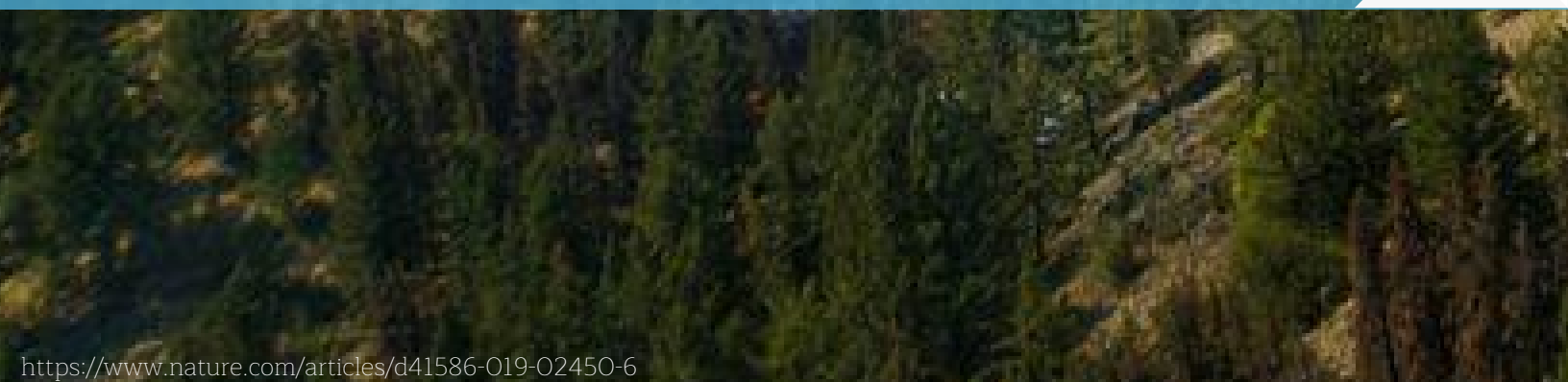


Implementation will rely on countries' own plans, policies, and programs. The SDG's are a compass for aligning plans with global commitments. Since climate change is already impacting so many of these processes, it will roll back the development gains we have made over the last decades. Therefore, investments in sustainable development will help reduce GHG emissions and build climate resiliency.

sustainable development; development that meets the needs of the present without compromising the ability of future generations to meet their own needs



CLIMATE CHANGE



"We are the first generation to be able to end poverty, and the last generation that can put an end to climate change, so we [must] address climate change."

UN Secretary-General Ban Ki-moon



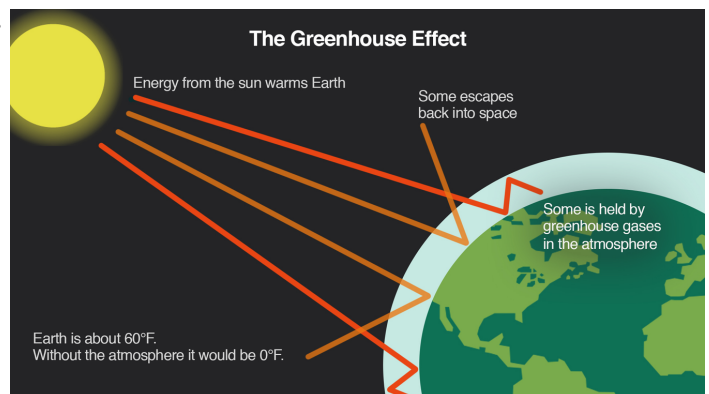
CLIMATE CHANGE

Climate change is a defining issue of our time and we are experiencing the effects right now. From shifting weather patterns threatening food production, to rising sea levels increasing risk of catastrophic flooding, the impacts of climate change are global. Without drastic action, adapting to these impacts in the future will be more difficult and costly.

What is climate change?

Our atmosphere is designed to keep things. Air, water vapor, and heat are trapped within our atmosphere in a similar way to greenhouses. This "greenhouse" effect of our atmosphere is naturally occurring, and it's one of the processes necessary for life. Earth would be about 62 degrees Fahrenheit colder without it.

Climate change is caused mainly by burning fossil fuels (such as coal, gasoline, natural gas). These are called "greenhouse gases" (GHG) and they store heat. Naturally produced GHG are necessary for life



on earth, and without them we would most likely freeze. Too many GHGs result in a global temperature rise where the climate becomes destabilized. The health of the global ecosystem is disrupted. As our industrialization, population, and standards of living continue to increase, so do the cumulative level of GHG emissions.

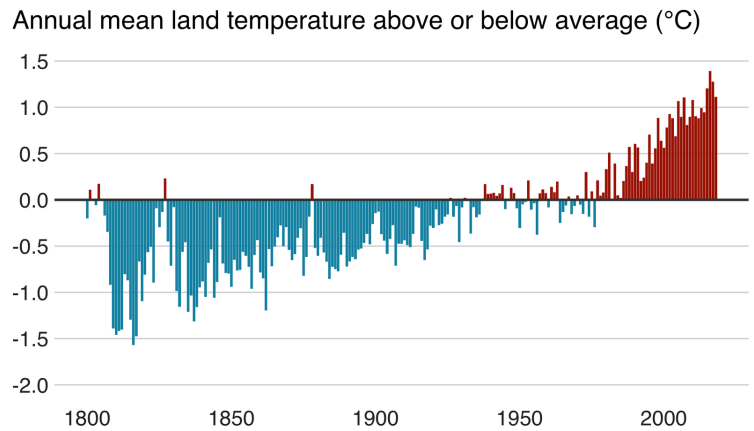
The concentration of GHGs in the earth's atmosphere is directly linked to the average global temperature.

WARMING

The world has been getting gradually warmer. This is linked to the greenhouse effect. The world is about 40 degrees warmer than before widespread industrialization according to the World Meteorological Organization (WMO). The 20 warmest years on record occurred in the last 30 years - with 2015-2019 making up the top five.

There are natural fluctuations in the climate but scientists say the temperatures are now rising faster than at any other time. Across the globe, the average sea level increased by 3.6mm per year between 2005 and 2015. Most of this change was because water increases in volume as the world heats up.

The world has been getting warmer



Note: Average is calculated from 1951-1980 land surface temperature data

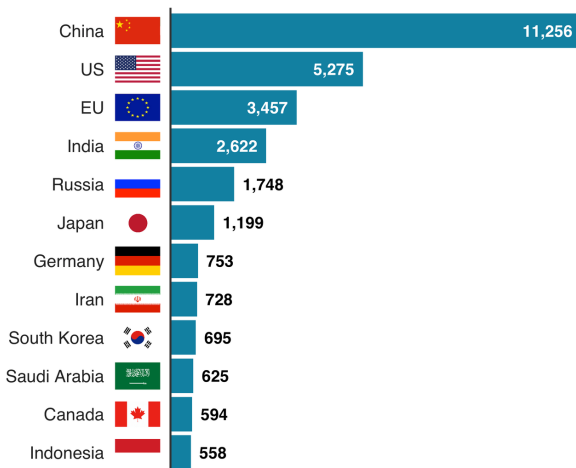
Source: University of California Berkeley

BBC

Melting ice is now thought to be the main reason for rising sea levels and most glaciers in temperate regions are retreating. Satellite records

The world's top emitters of carbon dioxide

Megatonnes of CO₂ per year



Note: One megatonne = 1,000,000 tonnes

Source: EC, Emissions Database for Global Atmospheric Research, 2018 data

BBC

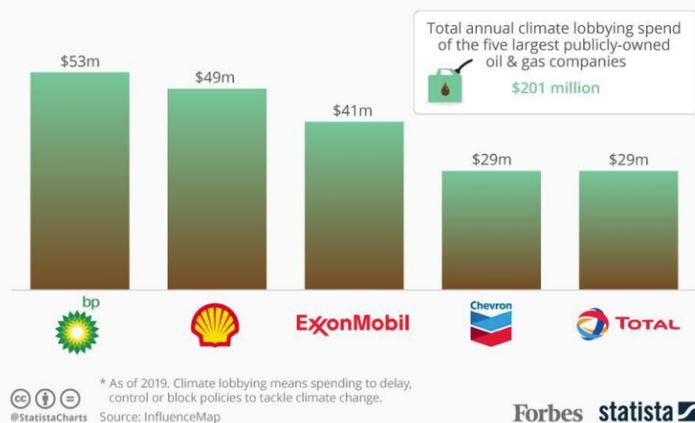
show a decline in Arctic sea-ice since 1979. The effects of this changing climate can already be seen in our landscape. Even if we cut GHG emissions dramatically, scientists say the effects will continue. Large bodies of water and ice can take hundreds to respond to changes in temperature and CO₂ takes decades to be removed.

HOAX

Some people still believe that climate change is not real. Despite the scientific community being in complete agreement that a continual rise in GHG emissions will lead to catastrophic results, these folks deny. Some straight up deny the existence of climate change. Some agree with bits and pieces of climate change while denying other aspects. For example, some use the disagreements about timing and amplitude of expected warming as a reason not to believe it. [Why do people deny?](#)

Oil Firms Spend Millions On Climate Lobbying

Annual expenditure on climate lobbying by oil and gas companies*



For the past 30 years, the fossil fuel industry, political lobbyists, biased media, and individual people have created propaganda and a denial industry. The world's five largest publicly-owned oil and gas companies spend approximately \$200 million a year on lobbying against climate policy.

Common Types of Denial

Science Denial

Deniers suggest climate change is just part of the natural cycle or that models are unreliable and too sensitive to carbon dioxide

Political Denial

Deniers can argue that since other countries are not acting then we should not act. But not all countries are equally guilty of causing the current effects of climate change.

Economic Denial

Some say climate change would be too expensive to fix, even though it's estimated it could be solved by spending 1% of the world's GDP.

Crisis Denial

Deniers may say that we should not rush into changing things, especially if there's uncertainty. Some say it's not as bad as scientists make it out to be

EFFECTS

Future Impact



While the general impacts of climate change are pretty easy to predict, the individualized aspects are harder. It could cause fresh water shortages, alter the ability to produce food, increase the number of deaths from natural disasters, and more. Climate change is expected to increase the frequency of extreme weather events.

More water evaporates as the world warms which leads to more moisture in the air. This means many areas will experience more intense rainfall (and snowfall some places). The risk of drought in inland areas during hot summers will increase.

Developing nations, which are least equipped to deal with rapid change. They are most likely to suffer the most and first. In fact, they are experiencing changes right now.

When CO₂ is released into the atmosphere the oceans uptake the gas. Therefore, the more CO₂ released, the more gas in the ocean - causing it to become more acidic. It will cause further changes that are likely to create further heating. Including the release of large quantities of methane as permafrost melts.

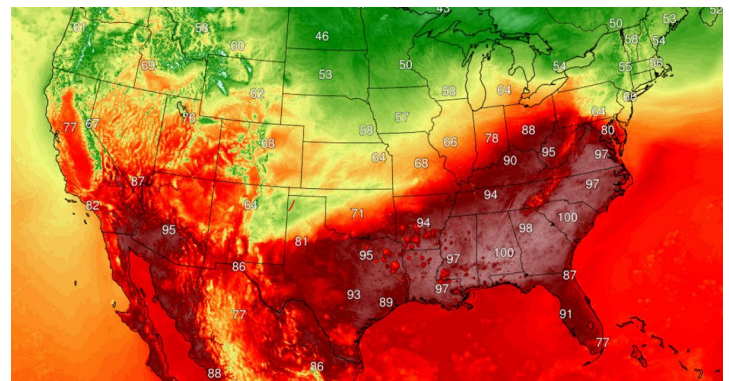


© picture-alliance/dpa/F. Hoemann

Extreme Heat Waves

When a person is subjected to extreme heat (105-110 degrees) Fahrenheit, their body may not be able to properly cool itself. This can relate to heat-related illness and if internal temperature reaches 104 then all cellular machinery begins to break down. The CDC reports that heat has killed an average of 658 people per year.

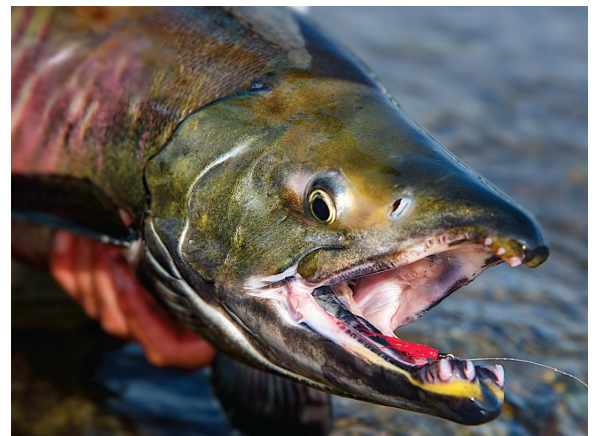
Rising average global temp.'s are one of the most direct indicators of climate change. As heat trapping emissions become more concentrated in the atmosphere and temperatures rise, extreme heat waves are expected to become more frequent and last longer. If emissions continue to grow, 74% of the world's population will be exposed to heat waves hot enough to kill.



October 2019 Heat Wave, ucsusa.org

Alaskan Salmon

Extreme heat is a major concern for wildlife such as the Alaskan salmon. The average temperature in Alaska was 7.9 degrees Fahrenheit higher than normal in 2019. This killed a large number of salmon of all varieties. The extreme heat decreased the amount of oxygen in the water, which caused the fish to suffocate. The estimated amount of dead salmon in one area of the Alaska's Koyokuk River was approximately 5000.



Hurricanes

Hurricanes form with warm water, and climate change is dramatically increasing the ocean temperatures. Wind damage from hurricanes increase from the warmer water temperatures. As the ocean temperatures rise, the more ocean water that evaporates into the atmosphere. This buildup also contributes to an increase in extreme rainfalls.

Warm water and warm air contributed to a massive rainfall in Hurricane Harvey, as there was approximately 27 trillion gallons of rain over Texas and Louisiana. This also became the second most expensive natural disaster in US history. Historically, hurricanes have impacted communities of color and low socioeconomic status people the most and they have been helped the least by our government.

Wildfires

The warming of the planet has increased dryness in the west of America. This has lead to an increase in wildfire frequency, size, intensity, and severity. Fire seasons have become longer. Wildfires are naturally occurring and essential for long-term health of ecosystems. Purposeful burning was a technique indigenous folks used long before colonization.



Many massive fires occurring in the US and across the globe are not healthy for ecosystems. Climate change is increasing wildfire risks in multiple ways. Snowmelts are occurring earlier with higher temperatures year round and increases in evapotranspiration have both caused burnable periods to extend. There's also seasonal extremes with wetter wet seasons and drier/hotter dry seasons.

Droughts



Droughts escalate slowly and damage is not immediately visible, but they are just as destructive for our ecosystems. Ecosystems will experience more wildfire, insect outbreaks, forest diebacks, and altered rates of carbon due to drought. The US is historically vul -

nerable to droughts and climate change increases this vulnerability. Increasing temperatures reduce rainfall and create a high pressure system. This system prevents moisture from traveling higher up in the atmosphere where it can produce rain or snow. Warmer temperatures increase the amount of evaporation and lower the average moisture level in soils. With climate change, time in between droughts are likely to become shorter. There will not be enough time in between for the land to recover. This stress could lead to a widespread death of trees and lower the amount of available carbon.

Floods

Floods are going to increase in both frequency and intensity. Warmer air holds more moisture, which means heavy rainfall. Heavy precipitation events now drop 55% more rain in the Northeast, 42% more in the Midwest, and 27% more in the Southeast compared to fifty years ago. The results of heavy rainfall have already been seen with mudslides, debris inundating communities, and various other destructive factors of flooding.



TALK ABOUT IT

As peer educators, you are tasked with talking to other people in your communities about climate change and sustainability. But we all know that it can be a tricky conversation with certain folks. It can become frustrating and circular in some conversations. Then how do we have productive conversations without getting angry or frustrated ourselves?

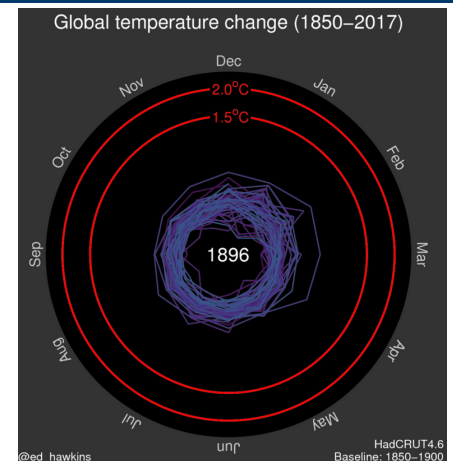
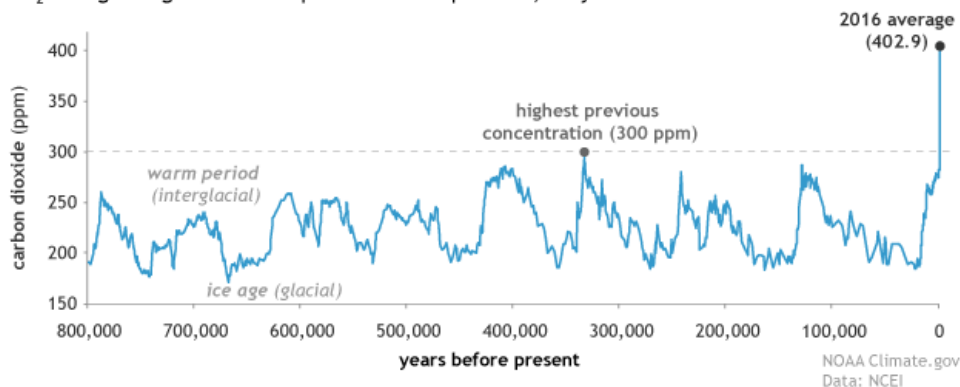


Do Not Bog Down in Data

Your primary task is not to tell people climate change is happening or to make them worry, it is to spark action. Public awareness of and concern about climate change is consistently high - with about 2/3 stating some level of

FACT CHECK: The majority of people actually believe in climate change

CO₂ during ice ages and warm periods for the past 800,000 years



worry. But concerns do not actively influence our day-to-day decisions or thoughts about what we are doing. You do not have to use piles of data. There are three facts that you can use to get the point across. First, carbon dioxide levels have increased far beyond any naturally appearing level since the industrial revolution. This is the result of massive amounts of fossil fuel burning. Second, global average temperatures have risen due to increased carbon dioxide in the atmosphere by at least 1 degree Celsius. Three, we need to meet the Paris Agreement temperature goals and rapidly decline emissions to zero if we wish to prevent average temperature rising.



Talk About the Current

It can be tempting to talk about the future impacts of climate change, since those are big and dramatic ways to show what will happen. However, it can make it seem beyond our reach and in the far-off future. Instead, talk about the impacts that are already occurring and affecting people. The top five hottest years are from the past 10 years. The Arctic summer sea ice is declining rapidly, at a rate of 13% per decade since the 1970's. Extreme weather events are increasing in frequency due to climate change, and these events have led to loss of lives. Think about the increases in hurricanes.



Make it Personal

Sometimes it can be helpful to use climate change projections. But when you do, it's important to get personal. Instead of talking about averages, talk about what is likely to happen to the area they live in:

If we carry on emitting as we are now: Florida will see sea levels continue to rise, with king tides flooding further inland every decade. This would leave houses uninsurable and potentially unsaleable.

If we carry on emitting as we are now: heatwaves that killed 50,000 people in Europe in 2003 will become increasingly likely.

In Terre Haute, heat waves will rise. Maybe the most important thing to point out about living here is that the Wabash will continue to flood during heavy rain seasons. This means that mudslides will rise, properties along the river will begin to sink, and the former industrial coal and ash materials will seep further into our water systems.



Utilize others that Recognize Climate Change

The messenger of a message is as important as the message. Referring to others, especially when they are surprising, can be a powerful trigger for other people to listen to your message. Some particularly useful references include:

- Fossil fuel companies actually acknowledge the reality of human-induced climate change
- Investors and bankers consider climate change impacts when making risk decisions
- Stories of people that are actively impacted by climate change, like folks in island nations that are actively losing land from rising sea levels. Americans that are located near landfill and incinerator sites that have increased rates of asthma and other health impacts.



Give People Agency

Make sure when you communicate that you give people ideas for what they can meaningfully do. People are not stupid, and they know that cupfuls of hot water are not commensurate with climate change. This approach risks diminishing the issue or diminishing the individual. The most significant elements of people's carbon footprint are travel and home energy use, so talk to them about things they can do for these issues.

It's important to talk to people about climate change and sustainability - no matter how uncomfortable



ENERGY



Just like Big Tobacco. Leading fossil fuel companies - like Big Tobacco companies before them - are noteworthy for their use of active, intentional disinformation and deception to support their political aims. Major fossil fuel producers like ExxonMobil have employed the same strategies pioneered by the tobacco industry to deceive the public and policymakers. There are important lessons from the campaigns to hold Big Tobacco accountable, which feature many key similarities and important differences - from the effort to hold major fossil fuel producers accountable.

Union of Concerned Scientists. "Holding Major Fossil Fuel Companies Accountable for Nearly 40 Years of Climate Deception and Harm"

ENERGY

In 2018, ISU spent
7.8 million on utilities

Electricity touches almost every aspect of our lives in the western world. It lights up our homes, cooks our food, powers small electronics. As a society, we rely on electricity. Other nations are developing rapidly, which increases the use of electricity on a vast scale. Our energy consumption has direct impacts on the environment.

What energy systems are there?

Over 72% of energy produced annually is sourced from the burning of **fossil fuels** such as coal, oil, and natural gas.¹ The formation of fossil fuels took millions of years, but they can be extracted and burned within days. Fossil fuels are an easy resource to obtain for a great deal of energy but are immediately depleted once used. To obtain energy from fossil fuels, we simply combust them. The resulting heat is used to vaporize water. The hot water vapor flows quickly and turns a turbine connected to a generator which converts this mechanical motion to electricity. We use the combustion of fossil fuels to power vehicles, heat buildings, provide electricity, and other daily necessities. Combustion of fossil fuels releases carbon dioxide and other pollutants. Carbon dioxide is one of the primary reasons global warming is happening so rapidly.



Chilled water systems provide cooling to a building by using chilled water to absorb heat from the building's spaces. A chiller removes heat from water by a refrigeration cycle. The chilled water supply is then pumped around the building to various air conditioning units. Chilled water is passed through a heat exchanging coil to cool the coil. A fan blows air across the cool coil to provide cold air to the building's space. After exiting the heat exchanging coil, the chilled water returns to the chiller, where it is cooled again and the process repeats.

1. "Energy Conservation and Greenhouse Gas Reduction" <http://www.swcd.net>

The US currently relies heavily on coal and natural gas for its electricity. Fossil fuels are **non-renewable energy** sources. This means that they cannot be used again once they are expired. Fossil fuel resources will eventually dwindle, becoming too expensive or too environmentally damaging to retrieve. In contrast, there are other sources of electrical energy – such as wind and solar energy – that are **renewable**. They are constantly replenished and will virtually never run out. Renewable energy sources are not as popular as fossil fuel energy sources, but their popularity is rising. As more money is invested in researching renewable energy, the efficiency of the technology is increasing and the price of the power they provide is dropping.

What energy does ISU use on campus?

ISU has one central heating plant with two perimeter chilled water plants. At ISU, grid-purchased electricity accounts for about 44% of total energy costs. The other energy costs come from natural gas, propane, and chilled water. All buildings have meters installed to monitor electricity use, but most are not individually metered. Sub-metering of buildings would be more ideal so we could identify areas of need for decreasing energy consumption.



ISU has a vertical shaft UGE wind turbine located between the Sycamore Towers. This type of design allows the generator and gearbox to be located close to the ground so service and repair can be easy. These wind turbines don't need to be pointed into the wind, which removes any need for wind-sensing and orientation mechanisms. There are solar panels located on campus, but they are located on the sustainability Garden House and the solar sycamore design across from the house.

NATURAL GAS

Natural gas is a nonrenewable fossil fuel. It cannot be replenished on a human time frame. But low investments provide a much higher amount of energy than renewable sources currently provide.

How does natural gas work?

To produce power from natural gas, it is extracted, then treated, then transported to power plants where it is burned in boilers or turbines. To extract natural gas, wells are drilled into the ground. After the gas is extracted, it is sent to gas plants to remove impurities such as hydrogen sulfide, helium, carbon dioxide, and water. Pipelines and ships then transport the purified natural gas and liquid natural gas from the processing plants to power plants. Power plants may then burn the gas in a boiler to produce steam, which turns a turbine to generate electricity. It may burn the gas in a combustion turbine to generate electricity.

Power plants are regulated by federal and state laws to protect human health and the environment, but there is a wide range of environmental impacts associated with natural gas. The biggest adverse impact is pollution and environmentally destructive practices like **fracking**

NATURAL GAS FACT

fracking
the process of injecting liquid at high pressure into the ground to force open existing fissures and extract oil or gas

Pro

Widely available
Cleanest-burning fossil fuel
Low initial investment
Often used with other fuels to decrease pollution

Con

Significant environmental impact from extraction, pipelines, and leaks
Transportation costs are high
Burns cleanly, but still has emissions
Lack of availability

COAL

Coal is a nonrenewable fossil fuel. It is a black or brownish-black sedimentary rock composed mostly of carbon and hydrocarbons. Coal was the first fuel of the industrial revolution. It fueled the US expansion westward and has had a long-lasting impact on the American spirit.

Indiana is one of the top 5 coal-consuming states¹

Environmental Impact

Coal mining and coal use has historically had a negative impact on the environment, particularly by creating sulfur dioxide which leads to acid rain. It also contributes to climate change with carbon dioxide production. Coal mining also produces methane gas, which exacerbates global warming far more than carbon dioxide. The coal industry is working to mitigate effects, by using “clean coal” processes. Which usually means they store carbon dioxide emissions deep within the ground to reduce their impact. However, the process of extracting and burning the coal is unchanged, so the long-term impacts of storing CO2 underground is unknown but the extraction process still has detrimental effects.

Coal-fired power plants are responsible for 1/3 of America's carbon dioxide (CO2) emissions²

Pro

Abundant supply in the US
Inexpensive to extract
Reliable
Generates large amounts of power

Con

Significant environmental impact from mining
Mining can be dangerous for miners
Emits major greenhouse gases and pollutants

1. U.S. Environmental Protection Agency (EPA), "Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2004, April 2006.

2. U.S. Energy Information Administration (EIA), "Coal Explained".

Social & Historical Impact of Coal

Coal is a large issue in the US and around the world. Coal appears to be the most cost efficient way to produce energy and many communities have historically relied on coal mines and plants for economic support. Automation of mining operations and the rise in natural gas use has reduced these jobs and deepened economic and political divides with these communities to the rest of America. We also have robust reserves of 263.8 billion short tons of coal (approx. 225 years worth).

"The hardest thing I've had to overcome was being from my small coal-mining town of Big Stone Gap, Virginia. My mother was a coal miner for nineteen years, and the expectations of making it out of my town were slim to none."

~ Thomas Jones in an interview with Robert Piper

The level of coal production devastates the natural environment of the surrounding mines and the climate. Additionally, it devastates the surrounding economy and well-being of the communities. States produce cheap and unrefined coal, which is shipped out of the state or to private companies.

These companies then export the profits and sell back the finished product of electricity at much higher prices. Most of America pays less than the true cost of their electricity, and the workers in these small coal-producing towns make up the rest. There are many health problems associated with coal, such as toxic pollutants released from burning coal. This can also contaminate surrounding water and food supplies.

SOLAR ENERGY

Solar technologies use sunlight to provide heat, electricity, hot water, and even cooling. Different types of solar collectors are used to meet different energy needs.

How does solar energy work?

Passive solar buildings capture the sun's heat to provide heating and light. **Photovoltaic cells** convert sunlight directly to electricity. **Concentrating solar power systems** focus sunlight with mirrors to create a high-intensity heat source, which then may vaporize water into steam. This is used to generate mechanical power or electricity. **Flat-plate collectors** absorb the sun's heat directly into water or other fluids to provide hot water or space heating.

Environmental Impacts of solar energy

Solar technologies produce few negative environmental impacts during operation. However, there are environmental concerns associated with the production of collectors and storage devices, such as the use of hazardous materials. In addition, solar technologies themselves require a lot of expensive equipment. The initial investment in solar energy is a huge setback. Currently, solar power provides less than 1% of US energy needs. Solar technologies offer us a route to harness the ever-present energy of the sun.

Pro

Nonpolluting
Most abundant energy source
Systems last 15-30 years

Con

High initial investment
Dependent on sunny weather/regional
Other sources needed in low light areas
Requires large physical space for panels
Limited availability of polysilicon

WIND ENERGY

Large, modern wind turbines are used to generate electricity, either for individual use or for contribution to a utility power grid.

How does wind energy work?

Wind turbines usually have two or three blades. Winds above the ground tend to be faster and less turbulent than those near the surface. Therefore, the turbines are mounted on tall towers to capture the most energy. As the blades turn, the central shaft spins a generator to make electricity.

Rising popularity

In recent years, wind has become an increasingly attractive source of renewable energy - wind energy is the world's fastest-growing energy technology. Offshore wind energy is becoming more popular because it requires no land and wind speeds are generally faster near the shore. While wind power helps the environment by producing electricity without pollution, there can be negative environmental impacts of wind power generation such as wildlife deaths. However, recent studies suggest that the number of birds and bats killed by collision with wind turbines is far lower than the number killed by collisions with other tall structures such as buildings.

Pro

No emissions
Affordable
Little disruption of ecosystems
Relatively high output

Con

High initial investment
Dependent on wind speed
Other sources needed in low wind areas
Extensive land use/distance from people
maintenance costs

HYDROPOWER

Hydroelectric power plants commonly use a dam on a river to store water. Water released from behind the dam flows through a turbine, spinning it, which then turns a generator to produce electricity.

7% of US
energy is from
hydroelectricity

Types of hydroelectric power

Hydroelectric power doesn't necessarily require a **large dam** - some hydroelectric power plants just use a small canal to channel the river water through a turbine. A **small or micro-hydroelectric** power system can produce enough electricity for a home, farm, or ranch. **Tidal energy** is another source of hydropower. Typically, a seawall is constructed at the mouth of a bay. During high tide, water is let in and at the peak is sealed off. When the tide eventually reaches and reaches its lowest point, the water is then released and spins turbines to generate electricity.

Limitations

Limited by available dam sites, high costs, and competing uses for those sites such as recreation, tourism, industry, and human settlements. Because of such limitations, water power could never generate all the electricity used in the US. In addition, there can be significant ecological consequences when dams or seawalls are put in place, such as shifting migration patterns and limited movement for aquatic life.

Pro

Reliable

No emissions

Capable of high yield

Output can be regulated to meet demand

Con

Significant environmental impact from changing water level

Dams are expensive to build

Dams may be affected by drought

Potential for floods

GEOHERMAL

Geothermal power uses the natural sources of heat deep inside the Earth to produce heat or electricity. Geothermal power generation produces few emissions and the power source is continuously available. However, the construction of a geothermal plant can be environmentally intensive. Additionally, the availability of geothermal "hotspots" relies on underground conditions, meaning that the number of sites is very limited.

How geothermal systems work

In direct-use geothermal systems, a well is drilled into a geothermal reservoir to provide a steady stream of hot water. The water is brought up through the well, and a mechanical system delivers the heat directly for its intended use. A disposal system then injects the cooled water underground or disposes of it in a surface storage pond. It's used for heating, drying crops, water-heat, or industrial processes.

Geothermal heat pumps are also used for space heating and cooling as well as water heating for residential and commercial applications. The technology relies on the fact that the Earth remains at a relatively constant temperature beneath the surface. A geothermal heat pump takes advantage of this by transferring heat stored in the ground into a building during the winter, and transferring it out of the building and back into the ground during the summer.

Pro

Reliable

No emissions

Capable of high yield

Output can be regulated to meet demand

Con

Geothermal fields are found in few areas around the world

High initial investment

Wells will eventually be depleted

Renewable Energy

Reasons to use renewable energy

- It's **clean** for the most part. Renewable energy does not release pollutants and carbon dioxide into the atmosphere.
- It **encourages economic development** by increasing research and manufacturing jobs
- It's **sustainable**, because it relies on earth's natural resources that are not limited
- It may **decrease our international dependency** since much of our current oil comes from other countries

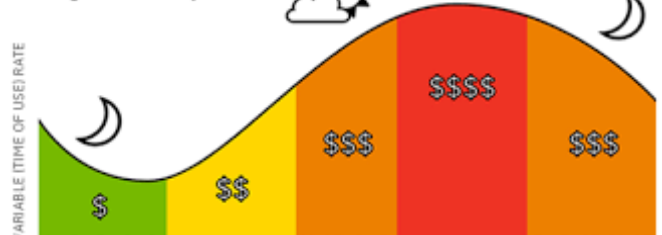
Actual limitations of renewable energy

Many sources are affected by natural conditions, such as regular overcast conditions blocking the sun. It can be costly due to the technology, but the more it is used and implemented the more prices will be driven down in a competitive market. It alters the landscape by taking up space on Earth's surface. It can be difficult to transport far, so it must remain local energy - which is actually a benefit to the environment compared to the environmental disasters that come from transporting fossil fuels long distances.

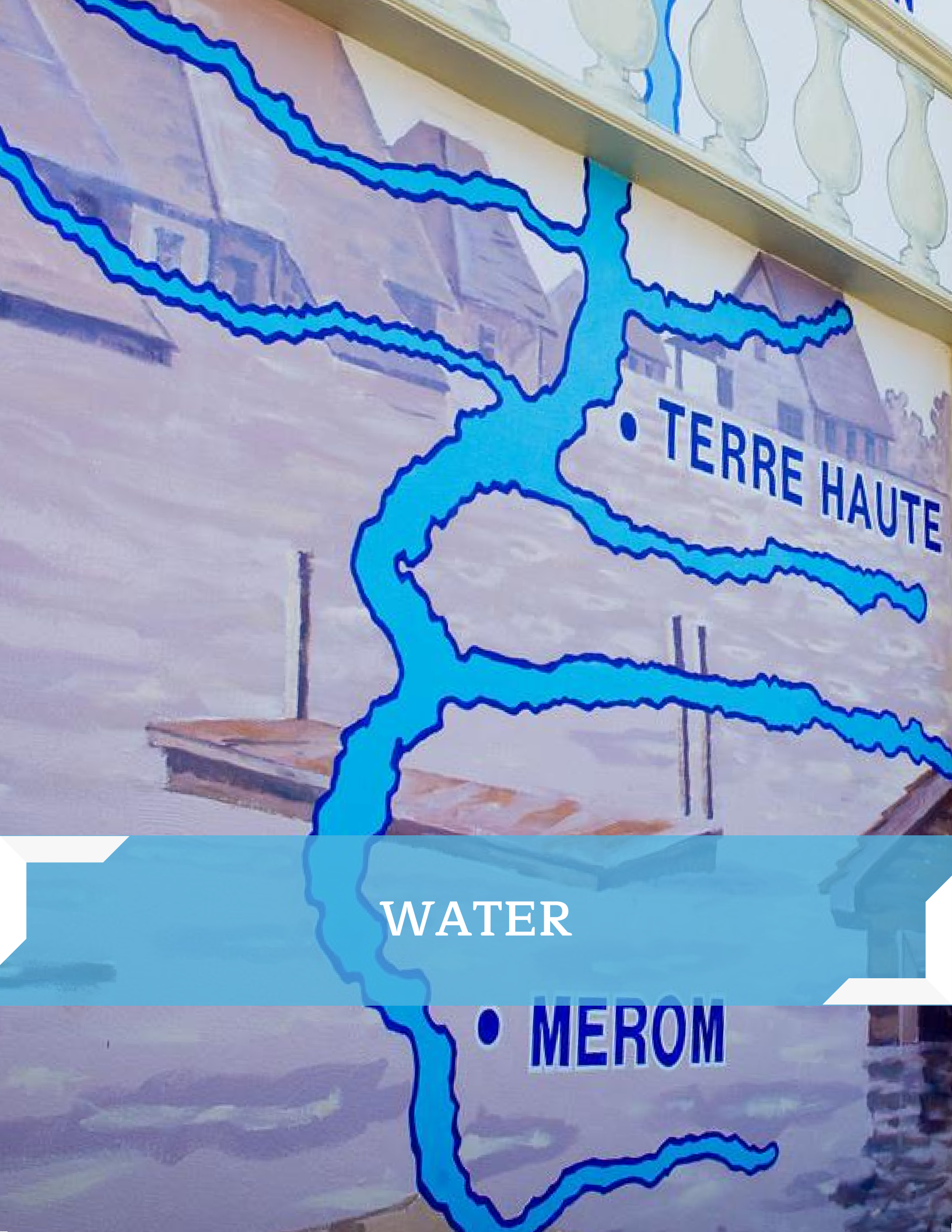
The Grid: A Barrier to Implementing

The electrical grid is currently incompatible with renewable technologies. Updating and transforming the electric grid is essential to the success of renewable energy. Energy from solar and wind can be highly variable and are often limited geographically. For instance, the southwestern US has huge potential for solar energy, however, efficiently storing excess energy or transporting it to other areas in the US is difficult because it's not designed for long-term storage or intermittent flow of energy.

How energy rates can change throughout the day



Reducing energy use in our lifestyles will make a transfer to renewable energy easier. The energy storage and fluctuation on the grid would be less of a problem.



• TERRE HAUTE

WATER

• MEROM

Mr. President

Hello my name is Mari Copeny and I'm 8 years old, I live in Flint, Michigan and I'm more commonly known around town as "Little Miss Flint". I am one of the children that is effected by this water, and I've been doing my best to march in protest and to speak out for all the kids that live here in Flint. This Thursday I will be riding a bus to Washington, D.C. to watch the congressional hearings of our Governor Rick Snyder. I know this is probably an odd request but I would love for a chance to meet you or your wife. My mom said chances are you will be too busy with more important things, but there is a lot of people coming on these buses and even just a meeting from you or your wife would really lift people's spirits. Thank you for all that you do fo rour country. I look forward to being able to come to Washington and to be able to see Gov. Snyder in person and to be able to be in the city where you live.

Thank you
Mari Copeny

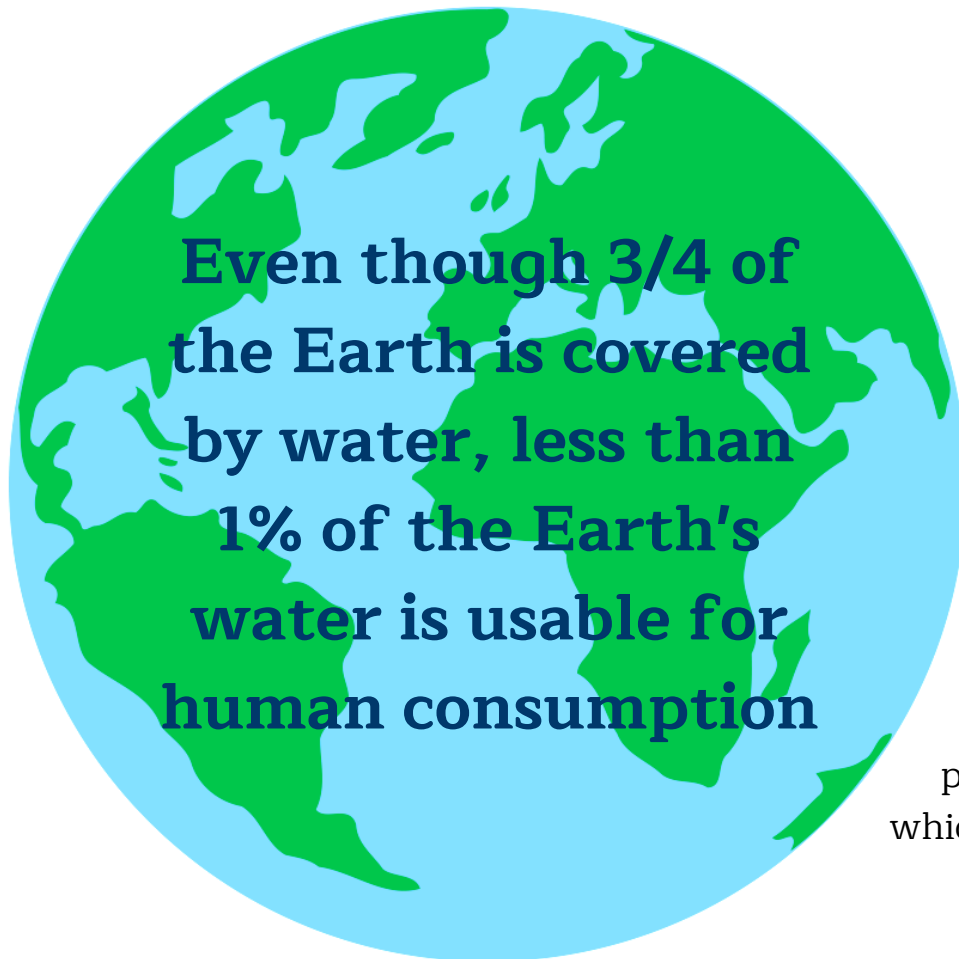


Mari, an 11 year-old activist in Flint, Michigan. Responsible for raising more than \$350,000 toward Flint's recovery

WATER

400 billion gallons of water
are used in the US every day

Water is a unique substance that is essential for life on Earth. However, 200 scientists in 50 different countries have identified water shortage as one of the two most worrying problems for the new millennium (the other was the entire climate crisis). Over the next 20 years humans will use 40% more water than they do now.¹



Aquifer:
a body of
permeable rock
which can contain
or transmit
groundwater

Although water makes up three quarters of the Earth's surface, less than 3% of that is freshwater. 74% of the freshwater is in ice caps or deep aquifers. Since so much of the world's freshwater is locked away, problems caused by water shortages are expected to increase in the next 20 years. The population of the world has more than doubled since 1970 and continues to increase while climate change disrupts rainfall patterns and disrupts our water supply.²

UN, "Water for Life", 2015

UNICEF, "The Progress of Nations", 1999.

Terre Haute consumes roughly 8.3 million gallons of water per day. The water comes from groundwater in four vertical wells and a horizontal radial collector well on property adjacent to the Wabash River.

You might hear people say that our water comes from the Wabash River, but that is entirely false.

Terre Haute Water Quality Report

pH	7.2	
Fluoride	0.7 mg/L	naturally occurring & additive
Sodium	16 mg/L	
Iron	0.02 mg/L	Limit of 0.3 mg/L
Manganese	0.01 mg/L	Limit of 0.05 mg/L
Disinfectant Residual Level in the distribution system	1.8 mg/L	Limit of 4.0 mg/L
Lead	3 ug/L	Action level of 15 ug/L
Copper	0.47 mg/L	Action level of 1.3mg/L
Arsenic	no data	Limit of 10 ug/L

*Indiana American Water, "Typical Water Quality Information"

Indiana's public water supply systems have consistent on-site inspections, and mandatory reports submitted by facilities. None of Indiana American - Terre Haute's test samples went over the lead action level of 15 parts per billion, and at least 90 percent of the samples were under 3 ppb (a part per billion is like adding a drop of water in an Olympic-size pool). The past five years water quality reports show no violations.

DISTRIBUTION

According to the Pacific Institute for Studies in Development, Environment, and Security, the necessary minimum per capita of water for an individual in the United States should be between 6 and 44 gallons per day. This includes needs for drinking, sanitation, bathing, and cooking. Here's a breakdown of the water withdrawals by each state:

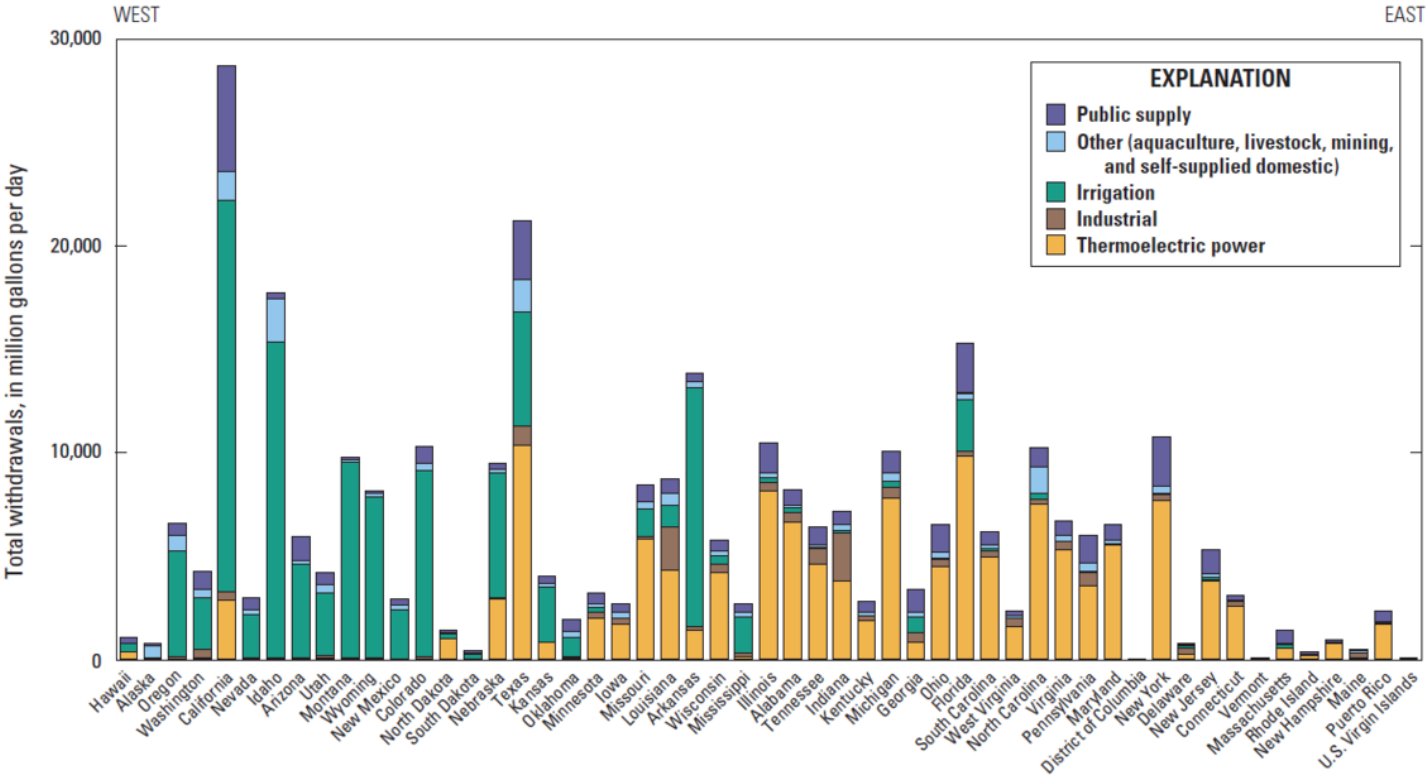


Figure 2. Total water withdrawals by State, and bar chart showing categories by State from west to east, 2015.

Thermoelectric Power Plants: these plants burn fuel, turning water into steam to move turbines and generate power

Mining: water is used to extract minerals, liquids, and gases from underground.

Irrigation: watering crops (even indoor greenhouses)

Public Supply: domestic, industrial, commercial, and other

Aquaculture: fish and seafood production

Industrial: manufacture/production of items like paper, chemicals, petroleum, refined metals, etc.

Industrial: manufacture/production of items like paper, chemicals, petroleum, refined metals, etc.

About 98% of rivers in the US have been subject to dam building, levee construction, and straightened channels. Humans have altered aquatic ecosystems that naturally provide services like lessening flood damages, recharging groundwater, filtering pollutants, and providing ecosystems.

ACCESS

Improved water management has brought enormous benefits to people in developing countries. In the past 20 years, over 2.4 billion people have gained access to safe water supplies and 600 million to improved sanitation.

1 in 6 people still have no regular access to safe drinking water

Why does this happen? In much of the developing world, you only have secure access to clean water if you own something. Most people do not, which means they must resort to buying or collecting water from public land and "must spend disproportionate amounts of time and energy in the pursuit of water." This is called water privatization.

Currently, over 80 countries, representing 40% of the world's people, are subject to serious water shortages. Conditions may get worse in the next 50 years as populations grow and as the climate crisis disrupts rainfall patterns. A third of the world lives in water stressed areas where consumption outpaces supply.

ASK YOURSELF: When was the last time you turned on the faucet and were worried water wouldn't come out? Have you ever considered the amount of water it takes to do something like wash your clothes or take that hot shower in the morning?

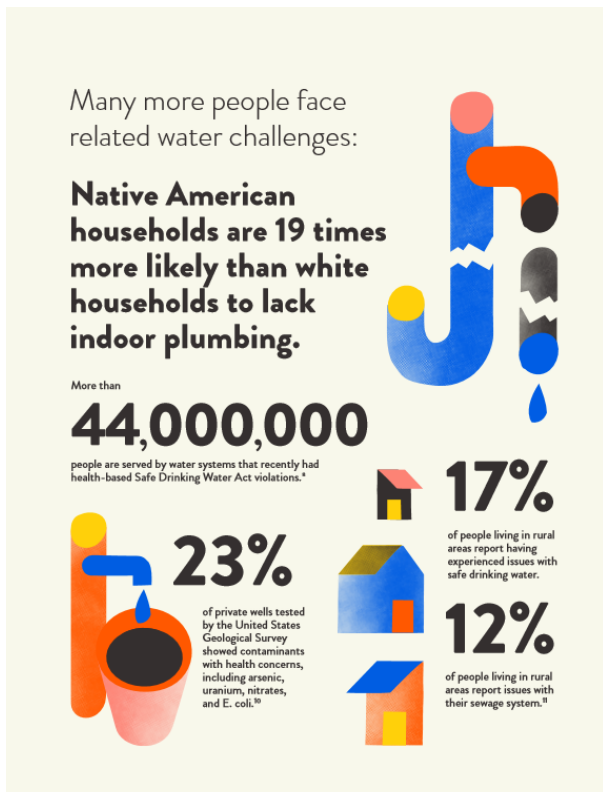


Almost 40% of the world's population lives within 60 kilometers of the coast. Disease and death related to polluted coastal waters alone costs the global economy \$16 billion. Unsanitary water, which provides a breeding ground for parasites, amoebas, and bacteria, damages the health of 1.2 billion people a year.

The cost of providing safe drinking water and proper sanitation to everyone in the world by 2025 will be \$180 billion a year - 2 to 3 times greater than present investments.

In the developing world, water-borne diseases are responsible for 80% of illnesses and deaths, killing a child every 8 seconds

Sanitary water access is an issue within the United States. On the Navajo nation in the Southwest, families drive for hours to haul barrels of water to meet their basic needs. In the Central Valley of California, residents fill bottles at public taps, because their water at home is not safe to drink. In West Virginia, people drink from polluted streams. In Puerto Rico (which is part of the US), wastewater regularly floods the streets of low-income neighborhoods. Families living in Texas border towns worry because there is no running water to fight fires.



This is the reality for people within the US. While the majority of Americans take high-quality drinking water and sanitation access for granted, millions of the most vulnerable people in the country - low-income in rural areas, people of color, tribal communities, immigrants - have fallen through the cracks. These communities did not receive adequate water and wastewater infrastructure when the nation made historic investments in these systems.

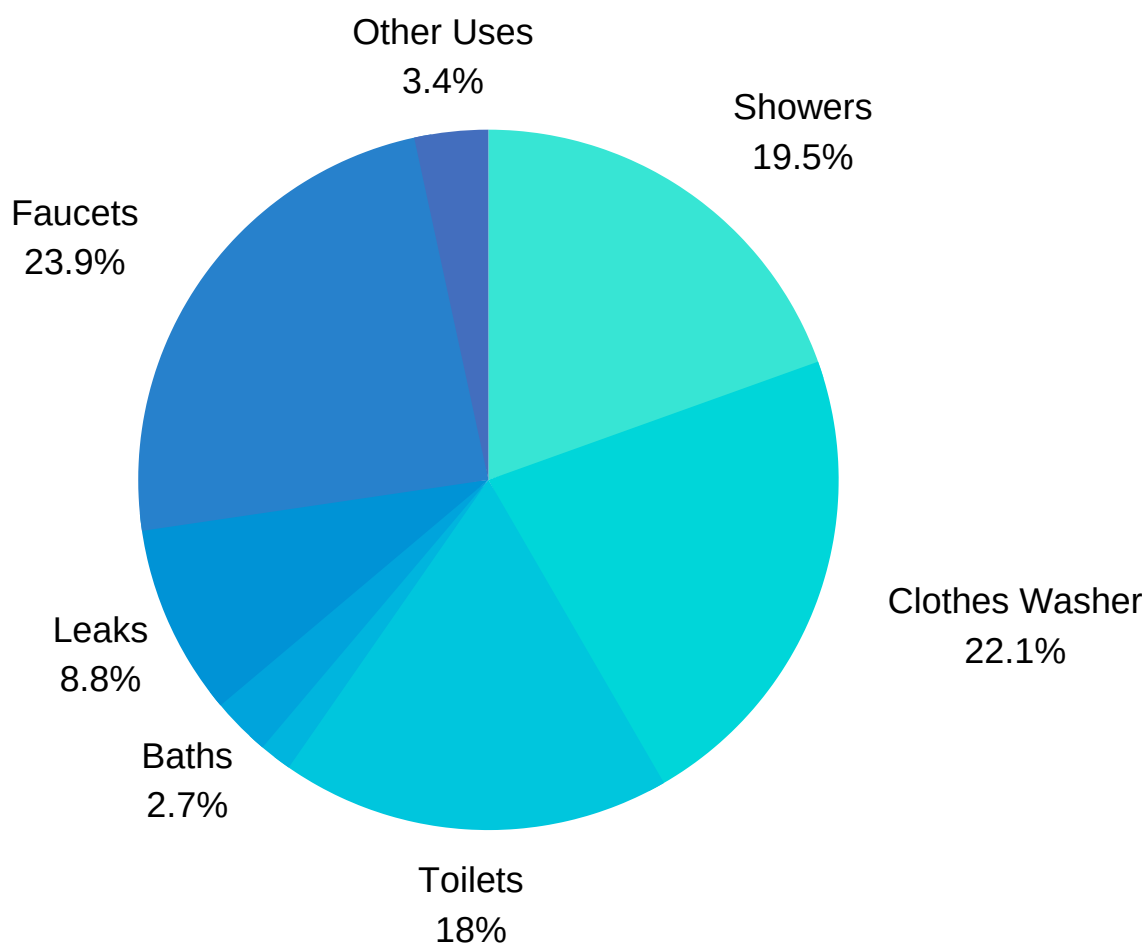
5 Major Findings from National Data

1. Federal data doesn't accurately measure the water access gap
2. Race is the strongest predictor of water and sanitation access
3. Poverty is a key obstacle to water access
4. Water access challenges affect entire communities
5. Progress is uneven, and some communities are backsliding

CONSUMPTION

The average American uses 88 gallons per day per person in the household. Usage varies a great deal across the country, because of differences in weather patterns and access. For example, water use tends to be higher in drier areas of the country that rely on more irrigation for outdoor watering than in wetter parts of the country that can rely on more rainfall.

Average US Indoor Water Usage



Less water going down the drain means more water available in the lakes, rivers, and streams. Using water more efficiently helps maintain supplies in reservoirs, ground water tables, and other water supply sources at safe levels. This protects human health and the environment. Lower water levels can contribute to higher concentrations of natural and human pollutants.



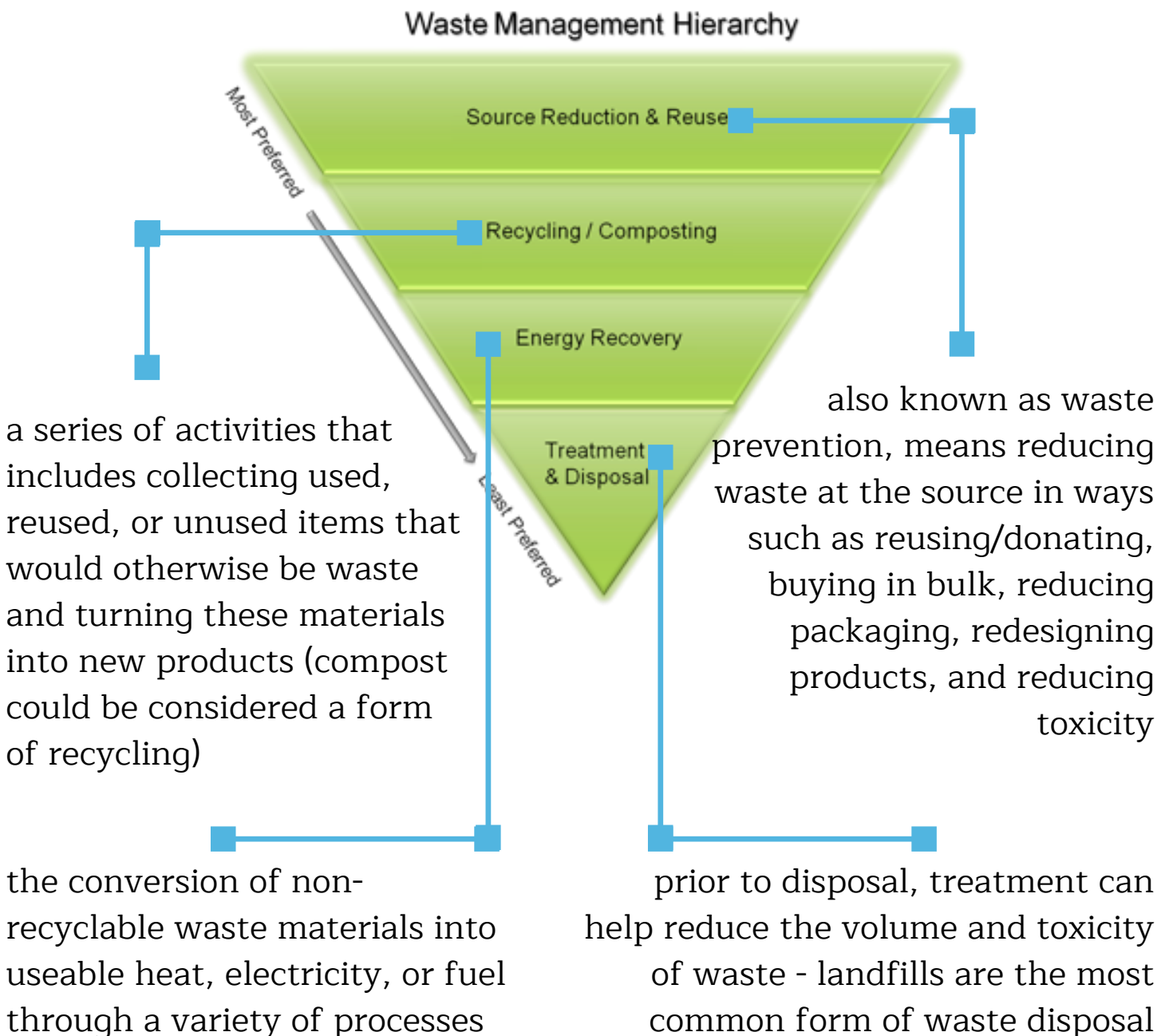
WASTE & PLASTIC



WASTE

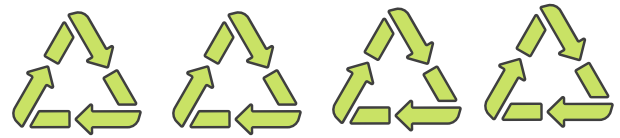
1 lb. of trash = 1 lb. of methane

The EPA developed the non-hazardous materials and waste management hierarchy. This hierarchy ranks the various management strategies from most to least environmentally preferred.



*Three R's and Zero Waste are explored in Personal Sustainability chapter

RECYCLING BASICS



The common perception of recycling involves plastic, metal, paper, cardboard, and glass. Personal recycling operations are dependent upon the resources available in individual communities. Some municipalities have contracts with waste haulers that also have recycling operations, but these can vary in types of operations. There can be drop-off locations, curbside pick-up, or other options that make it confusing to recycle properly.

Single-Stream Recycling

Single stream recycling is the most common option for waste haulers and municipal partnerships. Single stream recycling refers to a system in which all recycling commodities are mixed in a collection instead of being sorted.

Pro

- One container for all materials
- No separation is required
- Increases accessibility to recycling

Con

- Contamination ruins the entire load
- If an unacceptable commodity is in the bin then it's contaminated

Source Separated Recycling

It is sometimes referred to as dual-stream recycling depending on how much source separation required. Folks are required to separate their commodities prior to pick-up or drop-off.

Pro

- Lower levels of contamination
- Higher quality and more valuable recovered material
- Lower costs to process recyclables

Con

- Reduces some accessibility
- Requires more individual effort

Contamination is the biggest problem facing current recycling practices and single-stream is the most susceptible. However, single-stream is more popular for municipal recycling programs. Most recycling firms uphold source separation as the most reliable recycling process that gives the most financial benefit.



Recycling Center Commodities

Plastics



Includes all cleaned plastics #1 - #7. Check the bottom of the plastic container and if you see the recycling symbol 1-7 in the center, then it is typically acceptable - IF CLEANED

Papers



Includes newspapers, inserts, labels, magazines, catalogs, paperback books, manila folders, letterhead, notebook paper (no backings), computer paper, envelopes, coupon books, index cards, calendars, and brown paper bags

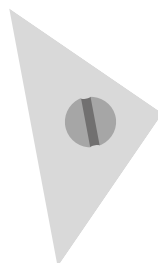
Glass



Many areas are no longer accepting glass

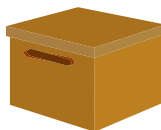
Glass has become incredibly expensive to recycle and many facilities are no longer taking it. All liquid and food waste must be removed before being recycled.

Metals



Includes aluminum cans, pie and baking pans, tin cans, steel food containers, empty aerosol cans, and lids. All items must be cleaned of food.

Cardboard



Includes corrugated cardboard, shipping boxes, cereal and dry food boxes, shoe boxes, tissue boxes, moving boxes, detergent boxes, soda/beer cartons, paper towel/toilet tissue rolls. All boxes must be FLAT.

Commodities Not Accepted in Common Recycling Centers

Batteries

If you try to recycle these through centers or curb-side then it will get landfilled. The corrosive nature of their ingredients make them hazardous for recycling facilities. Staples and Lowes accept rechargeable batteries.

Electronics

You should donate electronics if it still works. ISU Recycling Center has special e-waste collection days if you want to recycle them. Electronics are a separate recycling stream due to the highly specialized materials.

Bulky Plastics

Bulky plastic items like plastic furniture, laundry baskets, and plastic playground sets can sometimes be recycled depending on what recycling centers accept. Often times not from curbside pick-up.

Hazardous Materials

Do not recycle packaging that contains dangerous products - or in other words, products that are ignitable, corrosive, or toxic. Examples include oil paint, motor oil, fuel, poisons, or medical waste.

Plastic Bags/Wraps

These are recyclable through store drop-offs. Recycle these items at the local grocery store. When put in with recycling center materials they can get wrapped to equipment.

Food Soiled Recyclables

Food should never be put into recycling. A little bit of food residue is sometimes fine, but it should be relatively clean and dry. Some recycling experts say recycling the pizza box is fine as long as there's nothing left inside.

Light Bulbs

Light bulbs have special recycling streams. You need to take them to a special drop-off location that accepts them. Republic Services, Inc. and Batteries Plus Bulbs accept light bulbs with varying restrictions.

Polystyrene (Styrofoam)

Foam cartons, meat trays, peanuts, or any other type of foam is not typically recyclable in drop-off locations or curbside pick-up. Many local grocery stores have take-back programs

Non-Recyclable Commodities

Window Panes & Mirror Glass

Since these glass materials have a different melting point than glass packaging, there is not a system set up at glass recyclers to handle these.

Bagged Recyclables

The vast majority of communities cannot recycle stuff that you put inside of a plastic bag due to the reasons in Plastic Bags/Wraps. You're wasting your recycling effort, because they'll landfill the contents.

Multi-layer Flexible Packaging

Bags, pouches, wrappers, etc. that are made of multi-layer packaging (like potato chip bags) that are different materials at each layer. This makes them difficult to be recycled.

Wood

Wood in things like popsicle sticks or protective packaging is not recyclable. However, they are compostable.

Ceramics

Any pottery, dishes, or other household items made of ceramics aren't recyclable. Either donate usable items to a reuse store or put them in the trash.

Textiles

Clothes just aren't recyclable through curbside recycling or drop-off community recycling. There are take back programs like H&M's and reuse stores.

Hangers

Hangers get tangled up on equipment at recycling facilities. Some are made of recyclable materials, but their shape causes problems and they will not get recycled.

Propane Cylinders

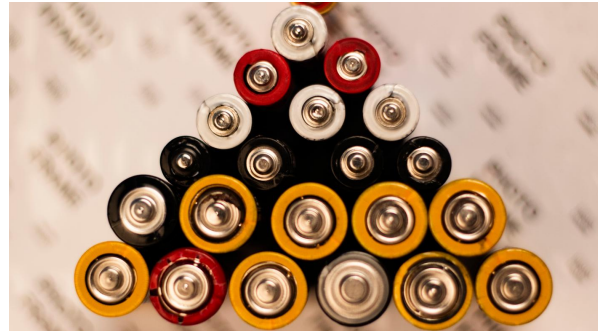
See if you can return empty propane cylinders to where you purchased them. Check if your community has a household hazardous waste recycling program.



HAZARDOUS MATERIALS

BATTERIES

Some batteries contain lead, mercury, and cadmium, with smaller amounts of antimony, lithium, cobalt, silver, zinc, and other chemicals. Some of these can cause serious pollution and health problems. cadmium, for example, does not degrade and cannot be destroyed unless it is deposited in a secure waste disposal site. It can get into the food chain, where it impacts all environmental sectors and can damage livers, kidneys, and the brains of human and fish. Mercury cannot be destroyed - it contaminated by inhalation or skin contact. Batteries are considered a Universal Hazardous Waste.

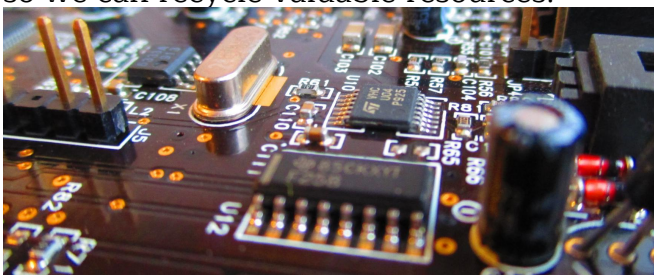


RECHARGEABLE BATTERIES

Rather than using disposable batteries, consider using rechargeable batteries. If you need to use batteries, use rechargeable. Even better is avoiding batteries altogether though. There are solar battery rechargers as well.

E-WASTE

Electronics are a growing problem in the waste stream. Computers pose an environmental threat due to the material. There are high trace amounts of lead, mercury, cadmium, chromium, and many other hazardous materials in the circuit boards, batteries, and more that holds it altogether. Keep these materials separate so we can recycle valuable resources.



TECHNO TRASH

Techno-trash is used to describe all the spent supplies and obsolete accessories associated with computers and electronics. Techno trash includes pretty much everything but the computer itself: storage devices, CD's, floppy disks, hard drives, zip disks, cell phones, I-pods, empty print cartridges, cables, cords, part of circuit boards, video tapes, PDA's, etc. Don't throw away your techno trash. Keep these materials separate so we can recycle valuable resources.

Zero Waste

The visionary goal of zero waste expresses the need for a closed loop industrial/societal system. Waste is a sign of inefficiency. Zero waste includes concepts of zero solid waste, zero hazardous waste, zero toxins, and zero emissions.



The entire concept of waste would be eliminated. Instead, waste should be thought of as a residual product or a potential resource to counter our basic acceptance of waste as a normal course of events. Reduced environmental impacts, reduced costs, and increased profits are residual products or resources to natural or industrial systems in a zero waste system. This may involve redesigning both products and processes in order to eliminate hazardous properties that make them unusable and unmanageable in quantities that overburden both industry and the environment.

Zero waste strategies consider the entire life-cycle of our products, processes, and systems in the context of a comprehensive systems understanding of our interactions with nature and search for inefficiencies at all stages. Waste can be prevented through the design of full life-cycle thinking systems. We should work to "design" our wastes so that they have future applications.

A Life Cycle

Every product goes through a life-cycle

- Raw materials (like trees, metals, and oil) are harvested or extracted
- Raw materials are transported and processed in a factory
- The materials are used to manufacture and package a product
- The product is transported to a distribution center or warehouse
- The product is transferred to a store

Every step uses energy and creates greenhouse gases. So does disposing of products when you're done with them. The trucks that pick up your trash burn fuel. In some places, trash ends up getting burned. Landfills emit greenhouse gases. All steps produce GHG's.

Compost

Compost is organic material that can be added to soil to help plants grow. Food scraps and yard waste together currently make up more than 28% of what we throw away, and should be composted instead. Making compost keeps these materials out of landfills where they take up space and release methane, a potent greenhouse gas.



Composting requires three basic ingredients:

1. **Browns** - this includes materials such as dead leaves, branches, and twigs
2. **Greens** - this includes materials such as grass clippings, vegetable waste, fruit scraps, and coffee grounds
3. **Water** - having the right amount of water, greens, and browns is important for compost development

Brown materials provide carbon for your compost, the green materials provide nitrogen, and the water provides moisture to help break down the organic matter.

Local Composting

reTHink in Terre Haute has a local food composting program where folks can rent a bin and drop-off every month.

The 2019-2020 Eco-Reps initiated vermicomposting on campus and the project will continue on thanks to the work of various campus partners. The goal is to have a vermicomposting building across from the Office of Sustainability.



Waste & Environmental Justice

People of color and people with low-income have borne greater environmental and health risks than the society at large.

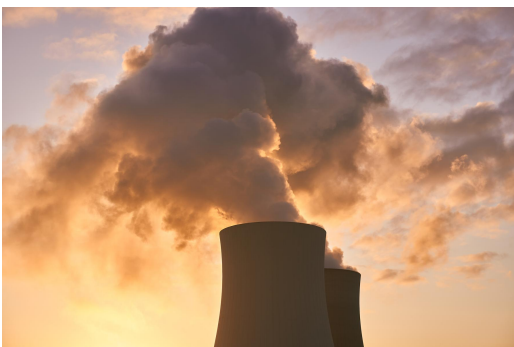
Landfills are an example of this type of polluting. As we begin to run out of space in landfills, we have begun shipping our waste to developing countries instead with an larger proportions of people of color.



Minoritized populations disproportionately undertake or are subjected to environmentally hazardous activities because they have few economic alternatives and/or are not fully aware of the risks involved. A combination of this lack of awareness coupled with relative lack of political and economic power that makes minoritized communities a target for hazardous activities.

A disproportionate quantity of minoritized communities play host to landfills, incinerators and other potentially toxic facilities.

Environmental racism and discrimination has historically been evident in the process of selecting and building environmentally hazardous sites, including waste disposal, manufacturing, and energy production facilities. Among the earliest documentation of environmental racism was a study of the distribution of toxic waste sites across the US.



In communities with 2 or more commercial hazardous waste facilities or any of the nation's five largest landfills, the average % of minoritized folks was more than three times that of the communities without such facilities. 3/5 of the largest hazardous waste landfills in the US were located in predominantly Black or Latinx communities.

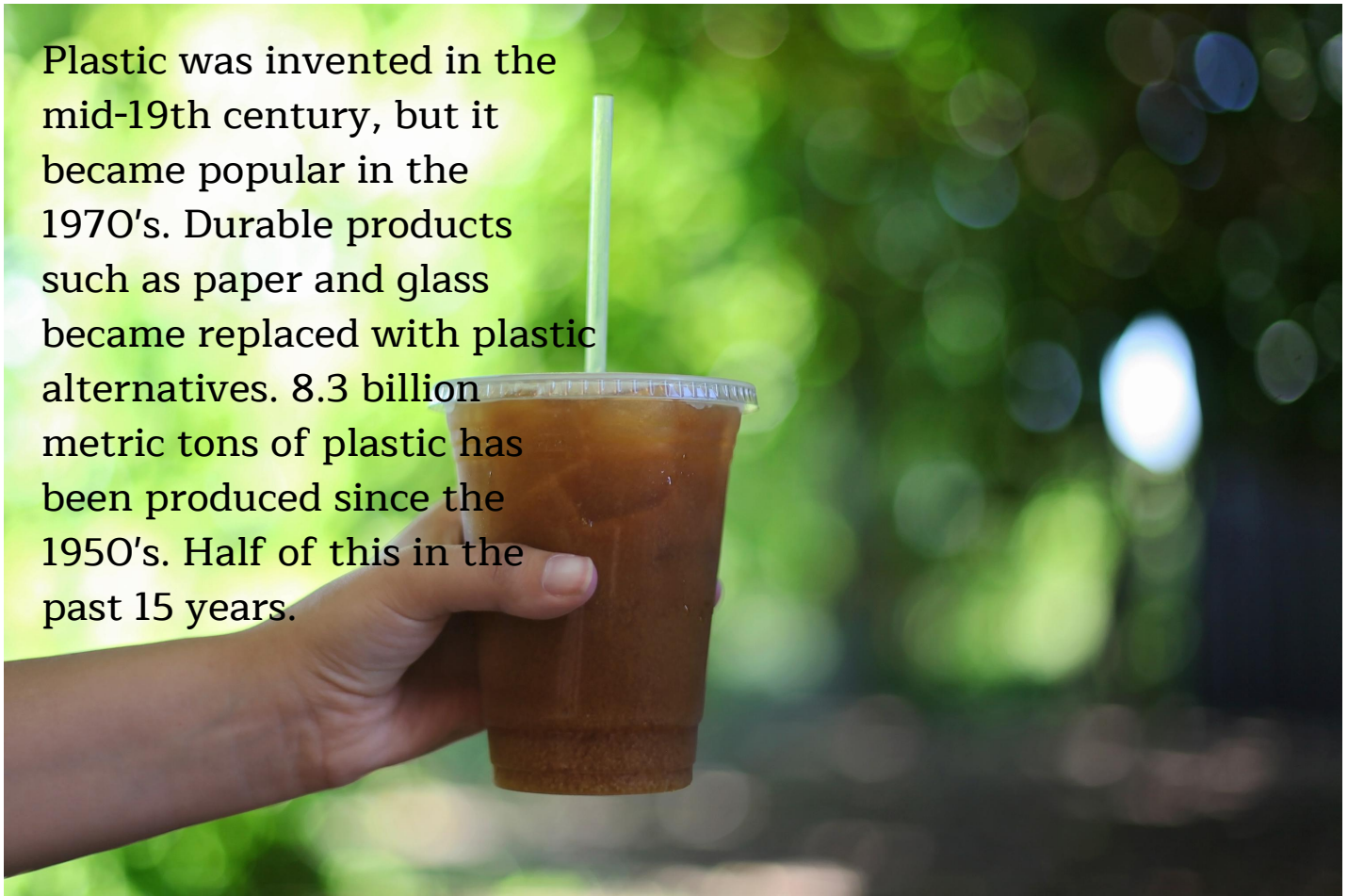
Rates of cancer, cardiovascular disease, central nervous system disorders, and more effects are higher in the communities close to these sites.

PLASTIC

The total amount of plastic waste is almost equal to the weight of the entire human population

SINGLE-USE PLASTIC Goods made primarily from fossil fuel-based chemicals and meant to be disposed of right after initial use. Most commonly used for packaging and services.

Plastic was invented in the mid-19th century, but it became popular in the 1970's. Durable products such as paper and glass became replaced with plastic alternatives. 8.3 billion metric tons of plastic has been produced since the 1950's. Half of this in the past 15 years.

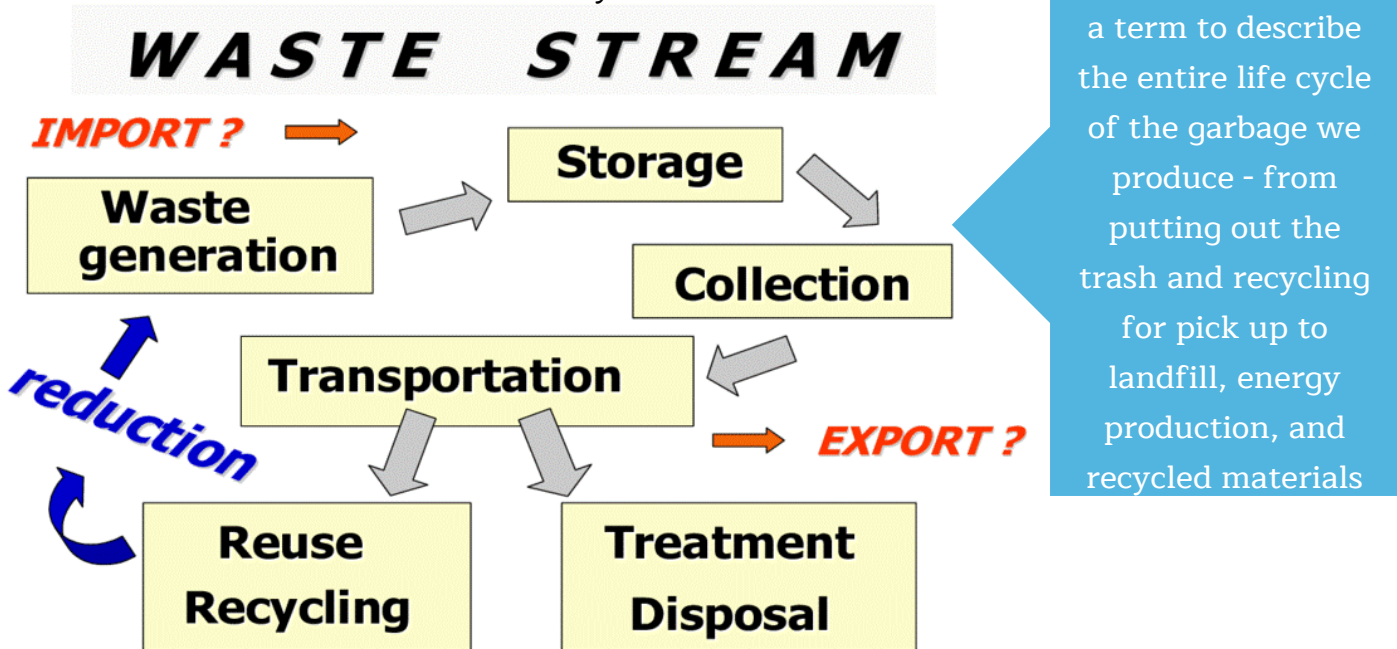


Some single-use plastics are necessary and important for people, such as surgical gloves and straws for people with disabilities. However, these important uses make up a small portion of the single-use plastic uses. More than half of non-fiber plastic comes from plastic packaging alone, which is most of single-use items

Single-use plastic highlights the emphasis on convenience over durability and long-term impacts that our culture perpetuates. Reliance upon single-use plastic means waste is accumulating at staggering rates.

We produce 300 million tons of plastic each year worldwide where half is single-use

Single-use plastic waste and pollution is visibly seen on our streets and neighborhoods. However, our waters suffer the most. Litter can be the first stage in a waste stream that enters waterways as plastics tossed on the street are washed away via storm drains into rivers and streams. Our waterway plastic pollution is concentrated, as ten rivers carry 93% of the world's total amount of plastic that enters the oceans via rivers each year.

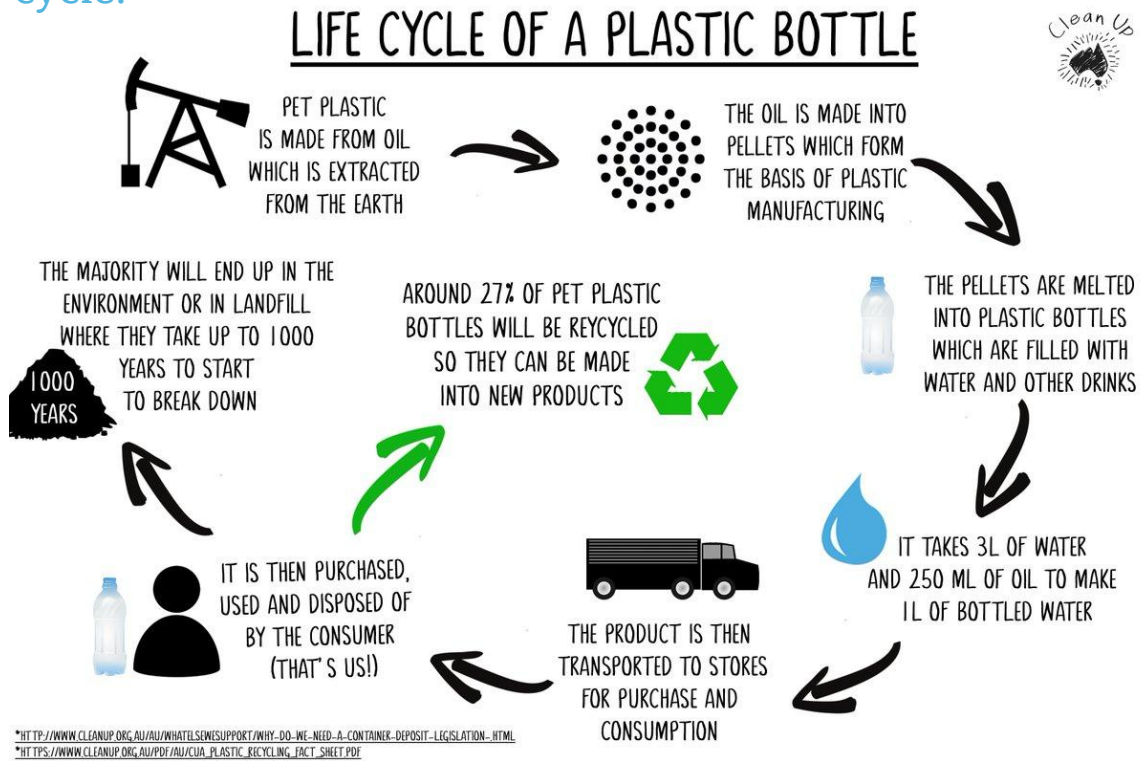


Between 4.8 million and 12.7 million metric tons of plastic per year make their way into the oceans through people living within 30 miles of a coast. A majority of this comes from countries that lack infrastructure to manage waste in a sustainable way. Marine animals bear the burden of this within their ecosystem. Recent

studies show plastic in the guts of 90% of seabirds tested and 100% of the turtles. Scientists estimate there will be more plastic than fish in the ocean by weight in 2050.

India generates 25,940 tons of plastic waste every day, but collects 60% of it

Plastic production contributes to GHG emissions at every point in the life cycle.



Plastic pollution impacts vulnerable communities first. Even if plastic doesn't end up in the ocean, recycled plastic is often exported from high-income countries to developing countries to process. Plastic waste destroys the land and the incineration process produces toxic fumes which destroy the air. This leads to a range of health impacts, including cancer. Single-use plastic and other plastic materi-

als are also often the cheapest alternative. Therefore, the communities that are impacted the most by plastic waste and pollution are also the ones that utilize them the most. They do not have the financial privilege for purchasing more sustainable alternatives. The worst effects are pushed onto these communities with the fewest resources to fight back. We must understand privilege in sustainability

While reducing plastic waste in personal lives would be an effective means of avoiding waste - we need to shift our attention to the large corporations producing plastic.

Large corporations producing single-use plastics have one of the biggest environmental impacts. Through a plastic audit conducted by Greenpeace volunteers, it was discovered that Coca-Cola, PepsiCo, and Nestle products were found most often in waste streams.

Coca-Cola alone produces 3 million tons of plastic packaging each year, equivalent to 200,000 plastic bottles per minute



Policies like bottle bill laws require retailers to add a fee on individual bottles that can be redeemed when customers recycle them. These policies are ways to increase corporate responsibility for sustainability. The plastic industry has tried to promote the idea that if we only recycled better, we would solve the problem of plastic pollution. Unfortunately, this isn't the solution. Corporations profit off throwaway culture by utilizing cheap single-use plastic packaging and service-ware. They design their products to end up as waste and pollution the minute they are made. It should be corporate polluters who must change their production methods and adopt sustainable solutions to stop the waste crisis. As long as single-use and non-essential plastics are produced and available for consumers, all recycling efforts will be futile.





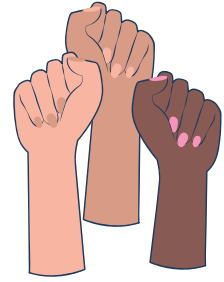
ENVIRONMENTAL JUSTICE

"You can't have climate change without sacrifice zones, and you can't have sacrifice without disposable people, and you can't have disposable people without racism. We're in this global environmental mess because we have declared parts of our planet to be disposable"

Hop Hopkins, Director of Strategic Partnerships for Sierra Club, in "Racism is Killing the Planet"



Environmental Justice



Under federal policy, all federal agencies must make environmental justice part of their mission. The EPA defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies".



How do we define it?

Environmental Justice: Civic activism and advocacy to protect the right to healthy and sustainable communities for all

Environmental Equity: When no single marginalized group has disadvantages when dealing with environmental hazards

Environmental Racism: Intentional or unintentional environmental policies, practices, actions, etc. that impact Black, Indigenous, and People of Color (BIPOC) unfairly



Environmental Justice is also a movement within sustainability and climate justice, because voices from marginalized backgrounds were heavily ignored within it.

History

The characteristics of the issues that have been affecting our communities of color are part of discriminatory patterns of housing, land use, transportation, employment opportunities, occupational status, political disenfranchisement, and access to information and medical care. The following historical account follows the beginnings of the EJ movement, but do not include the vast history that led to these discriminatory patterns. Keep in mind that the Civil Rights Movement was also starting to occur.

Environmental Justice Movement

1859 Warren County, NC - A low-income and predominantly Black county was chosen by the state for the a toxic waste landfill to dispose of illegally dumped items. Community residents enlisted the support of the United Church of Christ Commission for Racial Justice to engage in a nonviolent civil campaign which resulted in over 500 arrests. This event is viewed as the transformative beginnings for environmental justice

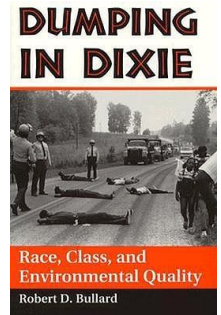


1983 U.S. General Accounting Office Report finds 3 out of the 4 offsite hazardous waste landfills in the EPA's Region 4 (Southeast) were located in predominantly low-income and Black communities.

1987 Toxic Waste and Race in the United States - A landmark report by the United Church of Christ Commission for Racial Justice was the first national study on the demographic patterns associated with the location of hazardous waste sites (both operating and abandoned). One thing the study found was that a community's racial composition was the most significant factor in explaining the existence of operating hazardous waste treatment, storage, and disposal facilities.

1990 We Speak for Ourselves: Social Justice, Race, and the Environment - This book became emblematic of a major tenet of Environmental Justice; Affected communities must play a meaningful role in identifying, defining, and articulating concerns and become equal partners in achieving solutions.

Dumping in Dixie: Race, Class, and Environmental Quality - this first academic text on EJ overviewed EJ struggles in urban, rural and suburban Black communities in the south.



- 1991** First National People of Color Environmental Leadership Summit - The first conference of its kind sponsored by the United Church of Christ Commission for Racial Justice, which brought together 1,000 people from all 50 states and solidified the grassroots people of color environmental movement in the US. This summit moved EJ from merely being focused on hazardous facilities placement to embracing more global issues such as public health, cultural survival, and sovereignty of indigenous people, land rights, land use, community empowerment, transportation, energy, federal facilities cleanup, urban decay, economic justice, sustainability, and trans boundaries issues.
- 1992** Establishment of EPA Office of Environmental Justice - After a series of dialogues with members of The Michigan Coalition, EPA administrator established the Office of Environmental Justice and published the EPA report "Environmental Equity: Reducing Risks for All Communities".
- 1992** Environmental Justice Act of 1992 - Congress representative John Lewis and Senator Albert Gore introduced this bill to establish a program to assure nondiscriminatory compliance with all environmental, health, and safety laws to assure equal protection of the public health. Despite the support of 44 co-sponsors, the bill died following a series of subcommittee hearings. The bill was redrafted and reintroduced the following year, but died after committee referral.

EJ Delegations at UN Earth Summit - Several documents produced from this conference represent EJ principles, such as Principle 3 "the right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations".



1994 Environmental Justice Executive Order - President Clinton signed Executive Order 12898, "Federal Actions to Ensure Environmental Justice in Minority and Low Income Populations". This order focused on the application of the National Environmental Policy Act (NEPA) and called for improved methodologies for assessing and mitigating impacts and health effects on communities, collection of data on low income and minority populations, and identification of the impact on subsistence populations. It encourages participation of the impacted communities in the various phases.

National Environmental Justice Advisory Council - EPA established a formal federal advisory committee to provide advice on issues related to environmental justice



The Environmental Justice movement is continued into the 21st Century and continues today. It began to become bigger and more involved in organizations and civic activism work all over the country and the world. The United Nations consistently integrates and centers environmental justice. Organizations like the Sierra Club and NAACP are working on environmental justice initiatives and efforts. So what does local environmental justice history and work look like?



Indiana

Indiana has a host of environmental issues related to industrialization and destructive actions. Additionally, the communities of color (often low-income and Black) are the ones that are impacted the most.

Population estimate: 6,732,219

White: 84.8%

Black or African American: 9.9%

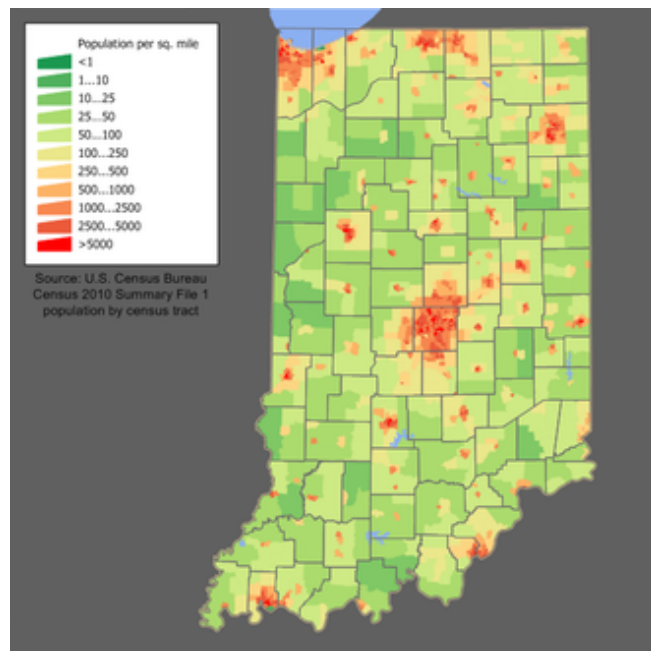
Asian: 2.6%

Two or More Races: 2.2%

Hispanic or Latino: 7.3%

Persons in poverty: 13.1%

*Data provided by the United States Census Bureau

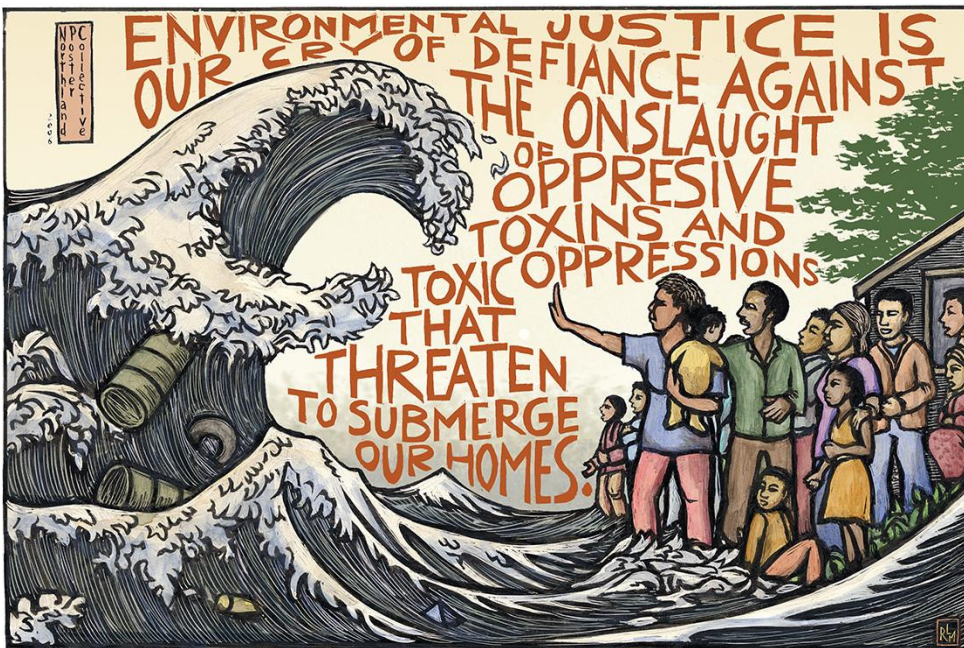


1996 EPA Region 5 Agenda for Action - Indiana's regional EPA office designates northwest Indiana as one of its geographic initiatives. NW Indiana has experienced years of environmental degradation due to the steel and petroleum refining industries.

1997 Environmental Justice Community/University Partnership Grants - Allocated over \$2 million to eleven individual US projects, and Indiana University Northwest received funds to establish the Northwest Indiana Environmental Justice partnership and Resource Center (EJRC)

1997 EPA EJ Grant for IDEM - The Indiana Department of Environmental Management received this grant and two years later, the Indianapolis Urban League's Environmental Coalition published a study on the relationship between race, income, and toxic air releases. This study concluded that low-income residents and Black residents (who make up 90 percent of the minority population) are disproportionately located near TRI (toxic release inventory) facilities in Indianapolis, IN. These populations face greater health risks from hazardous air emissions.

- 2000** IDEM Convenes Interim Environmental Justice Advisory Council - IDEM put together a stakeholder-based group comprised of citizens, environmentalists, academics, and industry representatives from across the state to develop an EJ Strategic Plan. The plan offers a vision statement: "No citizens or communities of the state of Indiana, regardless of race, color, national origin, income or geographic location, will bear a disproportionate share of the risk and consequences of environmental pollution or will be denied equal access to environmental benefits"
- 2002** National Academy of Public Administration Report - A congressionally-charted non-partisan organization published a report on the EJ efforts of four states, and identified Indiana as one of four "models for change"
- 2006** IDEM Environmental Justice Policy - IDEM adopts a policy and amends in 2008, that identifies EJ as including the "fair treatment and meaningful involvement of all people in the implementation of environmental decision-making pursuant to all Federal and State environmental statutes, regulations, and rules"



These are some of the policies and documents that have furthered environmental justice at the policy and practice level for Indiana. As you can see in the brief discussion about Northwest Indiana, there are issues present.

Let's look a little further into the actual instances of environmental racism and injustice within Indiana, and the practices that have begun to address these issues.

Environmental Racism

There are many examples in our country about environmental racism and unjust practices and policies. Flint, MI is a shining example of environmental racism. Death Alley (formerly known as "cancer alley") is another well-known example in the US. There are also many examples in the global context. However, we're going to focus on local stories to Indiana.

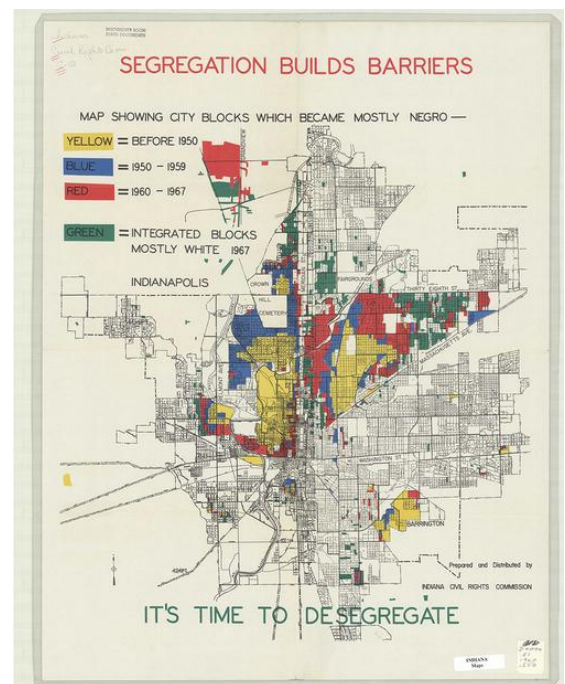
Residential Segregation in Indianapolis

Zoning is a land use control power that municipal level governments have. Racial zoning was deemed unconstitutional in 1917. But continued after cities enacted legislation that distinguished their laws from the exact practices that were originally deemed unconstitutional, even though they essentially were accomplishing the same thing.

By the 1930's, redlining practices caused a severe housing shortage for Black communities, which led to overcrowding, structural disrepair, inadequate sanitation, and price gouging. Two public housing programs were initiated by the city, but reinforced segregated zones by building them in the Black communities.

During this time, public and private funding was redirected to suburbs because that's where white people lived. One example of environmental justice during this time was the Butler-Tarkington Neighborhood Association that strived to improve quality of life for this neighborhood. They were successful in preserving Tarkington Park instead of allowing the city to turn it into a parking lot for commercialization.

The diversion of funding and investment in downtown Indy led to further decline in the urban environment. Housing abandonment, demolition by neglect, mortgage foreclosure, and declining property values plagued neighborhoods. Residents faced increasing food deserts, closing businesses, and higher rates of crime. The neglect led to flooding from an outdated combined sewer system with raw sewage. These combined sewer systems were outlawed in the 70's, but were not addressed until 1999.



Solar Net Metering

Indiana trails behind other Midwest states on many sustainable energy public policies and ranked #1 in terms of carbon emissions per capita. Solar energy installations are climbing for communities. However, not all communities have access to affordable renewable energy. Renters, low-moderate income residents, people who lack adequate credit, and anyone who lives under a shaded roof face difficulty in accessing benefits of solar energy. These folks are often communities of color due to the practices of redlining and impacts of generational wealth and inequity.



While folks from these communities begin to gain access to the ability to get solar energy, Indiana energy companies are starting the process to restrict benefits. In 2017, Indiana passed a law that takes away net metering. Net metering ensures you receive fair credit for the electricity your system produces. It allows you to count the electricity you generate with your system against the electricity you buy from your utility. In May 2020, Vectren became the

first Indiana Investor Owned Utilities (IOUs) to file a petition to end net metering. They propose a new, lower rate to replace net metering called excess distributed generation (EDG) rate. This a worse deal for users. So not only do folks from communities with less access not have the ability to access solar energy, they are losing the financial draw for when they do gain access.

Michigan City Coal Plant

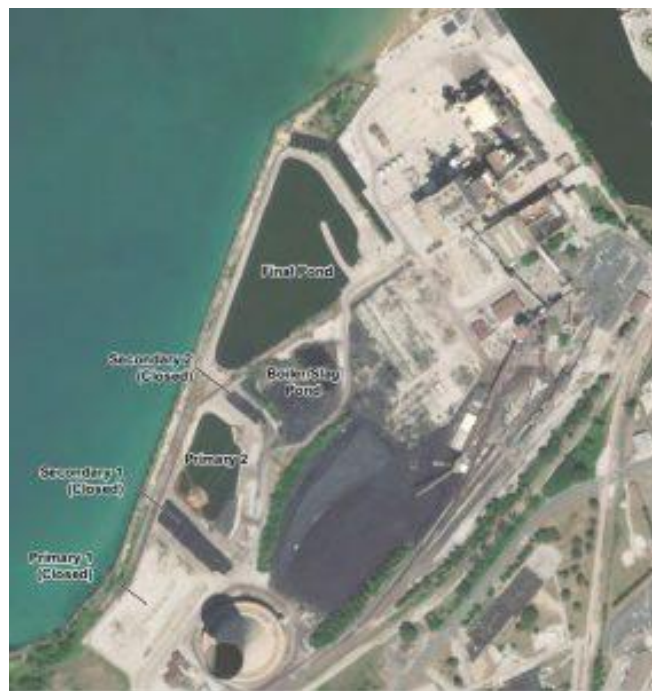
From 1882 to 1928, the Northern Indiana Public Service Company (NIPSCO) operated a manufactured gas plant in Michigan City. In 1929, NIPSCO began building a coal-fired plant on a nearby site closer to Lake Michigan. The power plant began operations in 1931 and has been in operations since then. Between 1931 and 1950, NIPSCO built steel sheet pile walls along Trail Creek and the Lake Michigan shore, which border their property.

1951



They filled in behind the sheet pile with a mix of coal ash, soil, and sand from 1931 to 1972. This created “made land” with fill up to 40 ft. deep behind the sheet pile. NIPSCO built parking lots, buildings, and their coal ash ponds on this made land. Until recently, they used the water to rinse the ash from the power plant into the coal ash ponds where the ash would settle out. When each pond was full, they would dig out the ash for recycling

2020



or disposal elsewhere, often at their land fill at the Schahfer power plant in Jasper County. Currently, the coal ash is being sent for recycling or sent for disposal at Schahfer and none is being disposed of on site. NIPSCO is now required by federal law to decide on final disposal of the ash in the ponds. There are some gaps in their closure plan and a coalition of public interest groups submitted comments to IDEM and started a petition of demands.

Greentown IN vs. East Chicago IN

In 2016, Greentown IN drinking water tested high in lead. Governor at the time Mike Pence responded immediately to aid the community, and compared the situation to Flint, Michigan's lead crisis. Within two months, the issue had been resolved and residents were back to drinking clean water.



In 2016, the mayor of East Chicago ordered the relocation of residents in West Calumet Housing Complex due to lead contamination. Soil testing revealed potentially the highest levels ever found in the country. The housing complex had been built on the site of a defunct lead smelter and close to other lead smelting operations. It was eventually revealed that the problem had been known to city officials and the EPA for decades, yet residents were not warned. Recently, it has been discovered that East Chicago's drinking water is also contaminated.

Governor Pence, and the rest of the state, did not come to East Chicago like Greentown. What's the difference in response? Greentown's population of 2,400 is 97% white and East Chicago's population of 28,000 is 43% Black and 51% Latinx. This is a prime example of environmental racism and its disproportionate impact of environmental hazards on people of color.



TRANSPORTATION

"If you design communities for automobiles, you get more automobiles. If you design them for people, you get walkable, livable communities".

Parris Glendening, Former Governor of Maryland



Transportation

Cars and trucks are one of the most environmentally damaging factors, but it's one of the things we engage in the most. In addition to causing air pollution, cars and trucks also cause water pollution due to manufacturing and gasoline. Vehicles also require roads, which are damaging to the natural ecosystem. Alternative transportation is growing, but it requires city's that are capable of making alternative transportation viable.

~ 12,000 people
commute into Vigo
county from other
counties



Commuters at ISU

ISU is considered a commuter school, because a majority of the students commute to classes instead of live on campus. Couple this with the fact that over 10,000 people travel into Vigo county for work, how many people are contributing to travel-related GHG emissions?

Almost 90% of ISU staff commute with only the driver in the vehicle

70% of students commute with only the driver in the vehicle



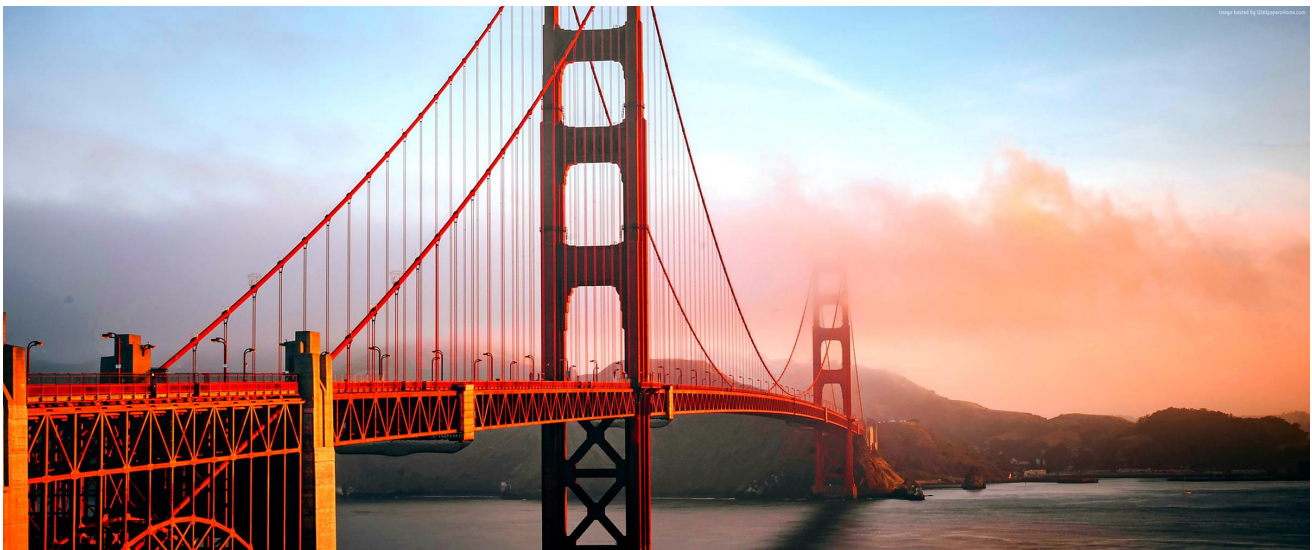
Indiana

Approximately 96,962 miles of road managed by the state



Approximately 3,786 miles of freight railroad

Approximately 19,280 bridges



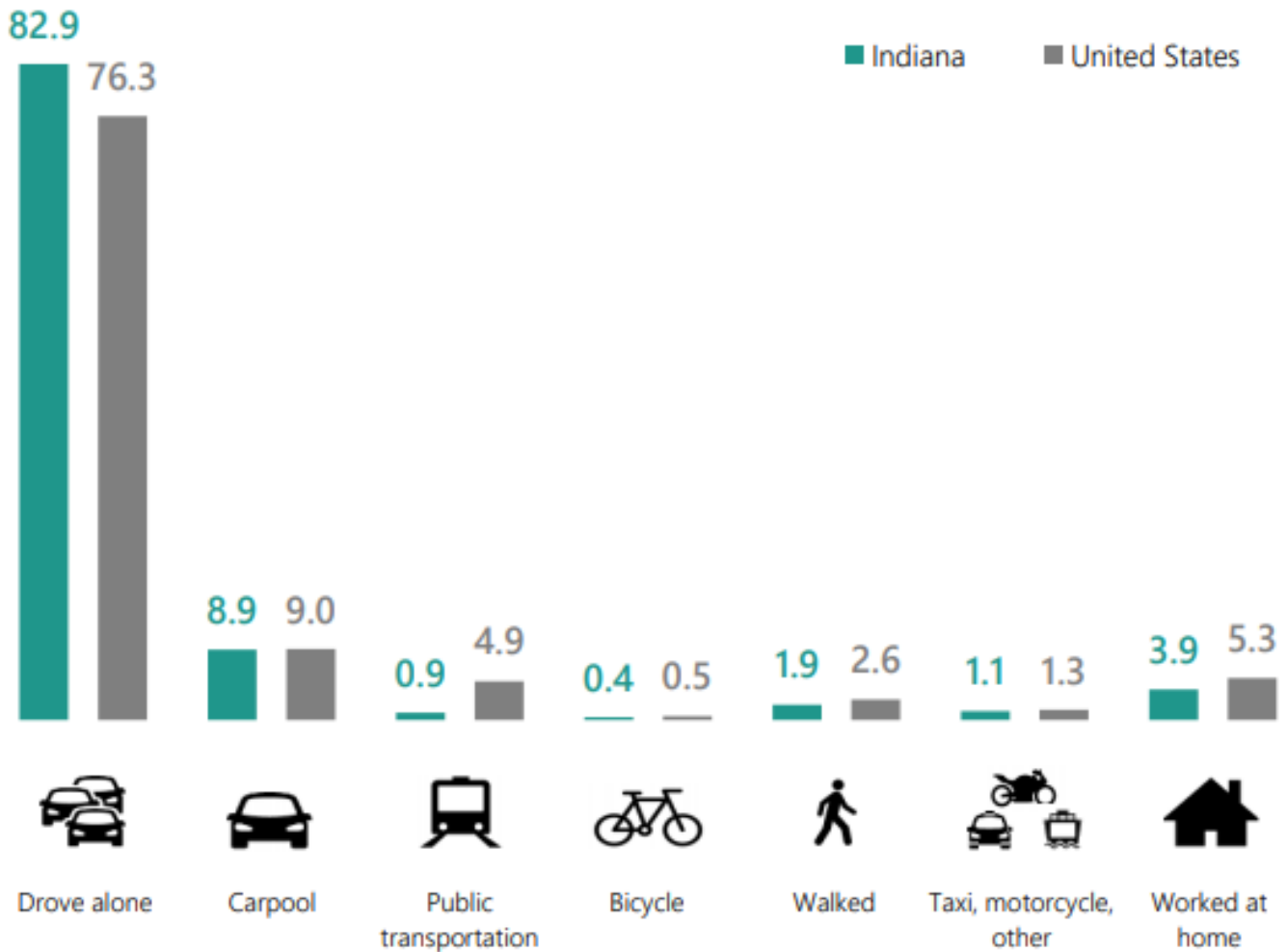
Electric
Charging
Stations



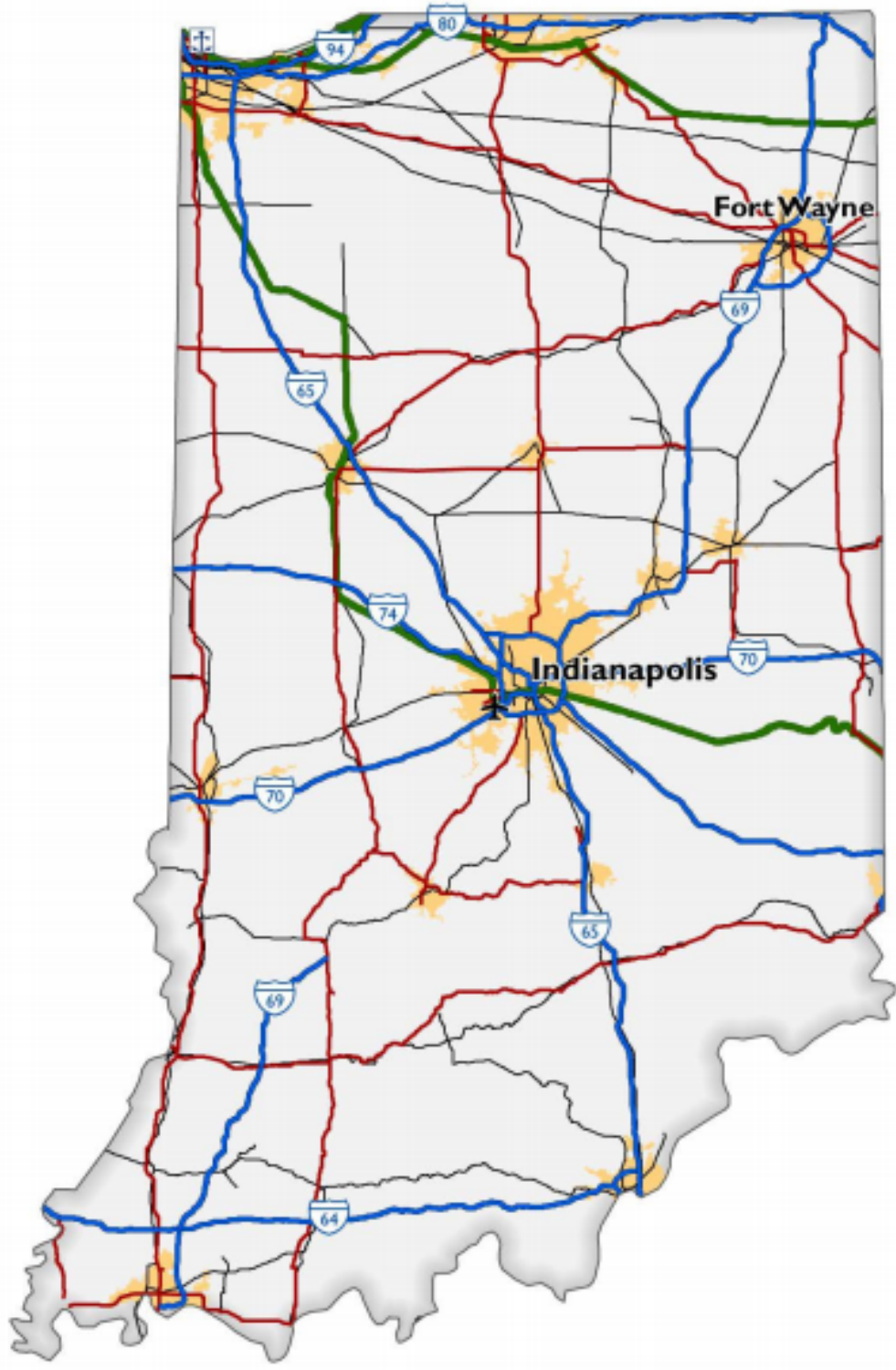
IN: 643
IL: 1,888
CA: 28,858

HOW RESIDENTS GET TO WORK

Percentage of workers over age 16, 2018



Indiana has a higher average of people that are driving alone. There's also hardly any incentives to carpool. The public transportation ratio depicted also depicts the issue with funding for public transportation that will be discussed. This is examining people's travel to work, so it doesn't include travel outside this context. Likely the percentages would be more if it was all travel.



Interstates mapped right next to railroads.

- Interstate
- U.S., state, and county route
- Amtrak rail network
- Railroad network

Pollutants

Photochemical Smog

A brownish haze that develops when certain pollutants react with sunlight. Smog usually forms in cities with high traffic.

CO (Carbon Monoxide)

A combustion product and poisonous gas that impairs the flow of oxygen to the brain and body

SO_x

Irritates the lungs and contributes to forming PM and acid rain.

Air pollution is linked to higher rates of cancer, heart disease, stroke, and respiratory diseases

Hydrocarbons

The incomplete burning of gasoline and fumes that escape when filling the tank and are prime contributors to photochemical smog

NO_x

Present with hydrocarbons that develop damaging compounds like ozone and acid rain - they aggravate respiratory problems and damage aquatic environments.

History

Gas powered vehicles and electric-powered vehicles were actually invented and developed during the same time. Gas-powered vehicles were not automatically the most used. However, a couple of reasons led to the lead of gas-powered vehicles over time. They were cheaper to buy. This meant that during an era moving towards equalization in income, cheaper was better. Also, gas-powered vehicles

came to prominence during a cheap oil window. During this cheap oil window of 1930's to 1970's, oil prices made it relatively cheap for people to have cars. This cheap oil window is a primary cause of our reliance on oil currently. Gas-powered vehicles grew in prominence and have stayed ever since.

Roads

A reinforced surface designed for vehicles; it placates the topography, bridges, waterways, pacifies the mud, seals in the soil, and enables trades of time for space.

Up until about 1904, there was only 204,000 miles of federal road. Today, there is over 8 million miles of road managed by federal government. Bicyclists actually initiated The Good Roads Movement for roads that were bike-able. Bicycles were a craze back in the early 1900's, and people wanted roads that they were able to bike easily instead of rocky roads. Eventually, federal management of roads grew and grew until eventually the Dwight D. Eisenhower National System of Interstate and Defense Highways was established. These are better known as interstates. the federal investments in interstate roads was the death knell for intracity streetcar lines and other modes of transport. Few cities could afford both excellent public transportation and great roads.

Suburbs



A mixed-use or residential area, existing either as part of a city or urban area or as a separate residential community within commuting distance of a city

The population grew by more than 200 million people during the 20th century, and approximately 2/3rd's of the people settle in "suburbs". What caused this "great American expansion" to the suburbs? Well, the government stimulating housing development for white people highly encouraged this expansion and racial separation. Developers purchased rural land for cheap prices and stimulated through loan programs and another governmental aid programs to develop housing for the rising population.

There were stipulations put on these programs that encouraged selling to only white people through various techniques that avoided the illegal practice of redlining. This mass migration of white people to suburbs meant that investment to go towards these places instead of the urban centers with majority people of color. Therefore, urban decay is reinforced from these practices. Another detriment to the environment from this expansion is the larger proportion of people that commute to their job from these suburbs.

Transportation Justice



Transportation equity is fairness in transportation that results in equal access and well-being for all people

The US department of transportation has adopted three fundamental environmental justice principles to guide transportation justice efforts

1. Avoid, minimize, or mitigate disproportionately high and adverse health and environmental effects, including social and economic effects, on communities of color and low-income populations
2. Ensure the full and fair participation by all potentially affected communities in the transportation decision-making process
3. Prevent the denial of, reduction in, or significant delay in the receipt of benefits by communities of color and low-income populations

The right to transportation has been a fundamental issue since the invention of modern transportation technology. Think about it. one of the biggest civil rights moments that we teach and remember is Rosa Parks. Rosa Parks did not give her seat on a bus in Montgomery, Alabama fifty years ago because there was equal access to transportation - she did it because it was discriminatory. Public transportation became a prominent stage for the civil rights movement and buses were a mode of transport for the Freedom Riders.



Today, discrimination and inequity in mass-transit is commonplace. An equitable transportation system provides users with access to safe, reliable, and affordable modes of transportation. Walking, biking, and public transit are included in these modes of transit. However, our system perpetuates the fundamental issues that underlie what Rosa Parks was standing against.

Public transit is vital to people of color who own fewer cars and tend to live further away from living-wage jobs than white peers. Black people are six times more likely than white people to rely on public transit. Latinx people are three times more likely than white people to rely on public transit. In the last decade, the proximity of job centers to high-poverty communities has declined by 61%. Low-income people have the highest rates of walking and bicycling to work. The highest rates of those that walk or bike to work are those who make under \$10,000 per year.

East Portland

Pedestrians in East Portland (near a large interstate), are more than twice as likely to be killed in a traffic crash as pedestrians in other parts of Portland. East Portland bears the burden of historic underinvestment in infrastructure, and has poor air quality and limited community resources. East Portland has one of the highest concentrations of communities of color, low-income people, and communities with limited-English proficiency (LEP)

San Francisco

In a lawsuit filed against Bay Area's Metropolitan Transportation Commission (MTC), it was alleged that public monies were spent to expand a "state-of-the-art rails system" into relatively affluent suburban communities, at the expense of a shrinking bus system for low-income people of color. The majority of bus riders are transit dependent, unlike rail commuters who rely on it for 25% of their essential household trips. Public transportation receives a fraction of the government funding spent on highways and roads, and the funding received goes to the affluent white transportation methods.
