NIRPC's Air Quality Education and Outreach Program Project Report

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April 25, 2019

Submitted to—
Northwestern Indiana Regional Planning Commission | South Shore Clean Cities

Table of Contents

Executive Summary

The objective of our senior design project is to compile information to communicate with the citizens of Lake, Porter, and LaPorte counties the impact they can have on greenhouse gas emissions in Northwest Indiana. We will use the individual activities of a standard Northwestern Indiana resident to quantify his/her energy usage, money spent, and health risks as it pertains to air quality. The information collected will be presented as a video webinar presentation at the Northwestern Indiana Regional Planning Commission (NIRPC) Environmental Management Policy Committee meeting in February of 2019. This webinar will also be supplemented with a written report as well as an informational, minute-long video to be shown to citizens of Northwest Indiana.

Statement of Problem

Historically, LaPorte, Porter, and Lake Counties have had significant issues meeting air quality standards due to human activity and industry. The Clean Air Act requires the United States Environmental Protection Agency (U.S. EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants that cause or contribute to air pollution which may reasonably be anticipated to endanger public health and welfare.[1] These counties have consistently been nonattainment areas, which are regions within the country where measured concentrations of one or more criteria pollutants exceed the NAAQS or contribute significant amounts of pollutants to an area that measures air quality.[1]

Individual carbon emissions have increased throughout the years, collectively exceeding the carbon emissions allowed by the government in the area. As reported by the EPA in 2016, residential consumption and transportation account for 39% of greenhouse gas emissions.[2] According to a 2016 report by the US Energy Information Administration, Indiana ranks 16th out of the 50 states for per capita CO_2 equivalent emissions from the transportation sector.[3] It is estimated that the transportation sector in Northwestern Indiana accounts for about 5.1 million metric tons of CO_2 equivalent emissions. NIRPC does not want to lose momentum on all the progress made to improve the air quality in the Region, so a public education campaign is being created to inform citizens that their actions can add up to cleaner air. Our project aim is to compile data and recommend solutions pertaining to how individuals impact air quality in Northwestern Indiana, which will serve as a basis for this campaign. The information collected will be geared toward the local community and will be compiled in a written format, as well as presented in video formatting at the previously mentioned NIRPC Environmental Management Policy Committee meeting in February of 2019. The information will then potentially be digested into outreach material in the form of mailers, social media posts, infographics, and other material for NIRPC's and South Shores Clean Cities' website in order to spread the information to the community at large.

Design Objectives

Our team proposed to design an educational and persuasive short film that highlights the benefits of reducing consumer carbon footprints in Northwestern Indiana, focusing on, but not limited to, transportation efforts and vehicle actions. This video will also be paired with an informational document to supplement the presentation. This will ultimately be presented as a webinar on Thursday, February 7, 2019 at the NIRPC Environmental Management Policy Committee meeting. Our objectives are as follows:

(1) Identify and compile human activities that impact air quality

(2) Prepare a presentation detailing how changes in human activities can add up to improved air quality

(3) Compose a written deliverable that coincides with the presentation to be shared with South Shores Clean Cities and the NIRPC Environmental Management Policy Committee

In order to develop an effective design, the first step in doing so is having adequate research that reflects how human behavior contributes to air pollution. By utilizing Department of Energy databases, as well as other energy-related databases provided by our client and EPA data, we will synthesize the influence of various

individual decisions on the overall air quality if it were to be scaled to the local population. After collecting data on best practices for citizens, we will then create a graphic to present how an energy-conscious individual compares to the standard resident in Northwestern Indiana. As proposed by our client, the energy-conscious individual will be called “Regionman,” and we will create a video using iMovie based on a person who specifically considers the economic, environmental, and health impacts of their individual actions and how they add up. These impacts will be compounded over a total year and scaled to the population of the area to display how collective action by individuals can greatly improve air quality in the region.

Finally, after consolidating data and creating informational graphics for outreach purposes, we will then create a webinar presentation to be used by NIRPC and South Shore Clean Cities as a method of communicating the data we found. We will be responsible for writing, filming, editing, and presenting the webinar and video to the Environmental Policy Management Committee, where, optimally, the committee will be able to use these in their social media, as well as in community outreach.

Identifying Client Needs

Our clients, South Shore Clean Cities and the Northwestern Indiana Regional Planning Commission, provided an initial project description including background information, an initial problem statement, and logistic details; however, after meeting in-person, we recognized that some of the objectives had changed. While the focus remains to be on air quality in Northwestern Indiana, we found that South Shore Clean Cities primarily focuses on the pollution from the transportation industry. After speaking to Lauri Keagle of South Shore Clean Cities, we learned that there were issues with getting businesses to commit to participating in Air Quality Action Days, community outreach, as well as challenges in encouraging people who use diesel vehicles to buy ethanol. From there, Lauri communicated that the best approach for changing consumer behavior is to frame the issue from an economic and health-perspective, versus strictly an environmental one.

After meeting with Lauri on October 2, 2018, we continued to hold monthly conference calls with her and Kathy Luther, NIRPC Chief of Staff and Director of Environmental Programs, to determine the scope, format, goals, and deadlines as they evolved throughout the course of the project. Through the October conference call, we decided to identify which human activities contribute the most to air quality, how to highlight economic consequences of compounding those habits over a year, as well as finding effective ways to communicate how individual activity can impair air quality and ultimately, human health. Through the November call, it was decided that primary source of data should be from government databases in order to ensure homogeneity in our calculations. It was also decided that there should be an emphasis on both the positive and negative impacts of individual choices pertaining to air quality in our presentation of data. The focused-on actions should be attainable, such as smaller or low-cost actions, for the average citizen and should focus on environmental, health, and economic benefits.

We will present this information both in a webinar format that will be presented to the NIRPC Environmental Management Policy Committee on February 7, 2019 as well as come up with a written deliverable of our findings to be passed onto NIRPC for outreach purposes. Client needs were mostly identified through these meetings and conference calls, but we also looked more into their survey for the region regarding the

knowledge and perception of air quality among residents in order to better understand the attitudes and thoughts of the people we are trying reach out to.[4]

Identifying Target Specifications

Because this project's objective is to be informational to the citizens of Northwestern Indiana, the specifications for our work are slightly more challenging to quantify. The format for our project will include a webinar and video presentation, but how useful that is, as well as how the community receives the information will be a matter of future data that is gathered. But in order to hopefully create an effective method of communication, our specifications must be tailored to the community we are attempting to reach. The main specification for our project is that it will effectively communicate the information we have gathered in a way that effectively educates citizens on their impact on air quality, and ultimately improve the air quality in Northwest Indiana. This will be achieved through research regarding economics, demographics, political ideologies, as well as general marketing-strategies and consumer behavior.

Outside of simply understanding our audience, we considered the logistics in the methods we have chosen to present our data as it relates to the audience, which has led the following restraints:

The solutions cannot require much money. In a 2017 survey conducted by NIRPC, Region residents were asked about their knowledge and perception of air quality in Northwest Indiana. When asked about barriers to actions that would improve air quality in the area, citizens surveyed and focus groups cited lack of money or financial concerns.[4] A majority of residents were unsure how they could help improve air quality through their own actions. Residents are more likely to accept changes that do not require much effort, may improve health, and could save money. These three factors are also taken into consideration when collecting information and tips to reduce individual footprint.

After identifying 11 issues of concern for Northwestern Indiana, NIRPC found that health and healthcare was the issue of greatest concern for citizens and air quality was the sixth greatest issue of concern.[4] From focus groups, some citizens felt being environmentally-friendly meant "extracting more money" from their pocketbook.[4] Because many people place value on their personal health and their economic well-being above the health of the environment, the presentation of information must be framed in a manner that emphasizes the health and economic benefits of taking these actions to improve air quality. An emphasis will also be placed on individual action adding to collective action as many in Northwestern Indiana feel industry is the only ones who can improve the air quality within the region.

A Gallup Poll found that 54% of Americans do not feel climate change poses a serious threat to the United States.[5] People in the US tend to be skeptical of terms such as "Global Warming" and "Climate Change", so these terms will not be used. Instead the focus will be on financial savings and health improvements. We also must consider the agricultural impacts of the area, and consequently the current reliance on diesel-fuel. While the objective is to encourage ethanol usage, we must develop incentives that appeal to the agricultural community specifically, which would help local farmers.

Generating Design Concepts

Video and webinar design will address the economic and environmental perils of inaction set against a citizen who takes steps to reduce his or her individual carbon footprint. The webinar is meant to appeal to the average citizen without being too overly technical. We incorporated a lot of publicly available data from government entities, such as the Environmental Protection Agency and the Department of Energy.

A list of actions and how they can add up for an individual as well as the data used for the calculations presented in all project deliverables are detailed in Appendix A. This list is not exhaustive and additional actions could be implemented to improve air quality. These actions will be summed over a year and scaled to the population of Northwestern Indiana to show how air quality can be improved by individual actions through collective action.

Selecting Design Concept

While originally the design concept included the creation of a workshop to teach people about indoor air monitors, we had to rule out that decision due to cost of the devices. Thus, after reassessing the problem with our client, we decided that effective communication of information regarding how individuals impact air quality was the missing piece for NIRPC's Environmental Management Policy Committee. Our client requested that we design a webinar and video presentation, as well as specified the parameters for the project, so that it can be used on a variety of platforms, as well as distributed in whatever way our client sees fit. The research and recommendations will serve as the basis for NIRPC's educational outreach campaign for Northwestern Indiana citizens.

We created an educational minute-long video for public consumption, which can be found at https://www.youtube.com/watch?v=W2p84s52ZdY&t=3s, as well as a pre-recorded webinar to be presented to the NIRPC Environmental Management Policy Committee on February 7, as well as this report, documenting the entirety of the information we synthesized throughout the semester. The purpose of these different deliverables is to reach a wide variety of audiences with the level of detail and information increasing from the video to the webinar to the report respectively.

Economic Analysis

There is a great opportunity for savings associated with reduced energy-usage for Northwestern Indiana citizens. If the educational campaign proves to be effective, it can improve the local economy of the area by increasing the spending power of citizens through the cost savings. Examples of individual savings associated with air quality improvement include:

- Not idling at a drive-through in the morning would save $0.05 from used gas each day, adding up to $13.16 saved for a year.
- Not driving somewhere for lunch and packing lunch instead would save $0.53 from used gas each day, adding up to $132.50 saved over the course of a year.
- Combining errands into one trip can save one person an average of $1.53 from used gas each trip, adding up to an average of $97.34 in savings for a year.
- Carpooling to work once a week could save about $4.34 each week on average, which adds up to $216.98 in savings over the course of a year.

- Walking or biking a short distance instead of driving once a week could save $0.53 each trip, averaging $27.65 in gas savings for a year.

Improved air quality also has the potential to improve human health conditions, meaning that people could save on their medical bills, as well as less time taken off as the result of less pollution in the air. Finally, as the Region begins to gain momentum as a place that is investing in the health, environment, and economy of its people, new businesses, industries, and people will be more enticed to join the area, proving that bettering air quality has the capacity for massive economic improvements as well.

Recommended Design Option

We intended for our research and deliverables to serve a strong basis for NIRPC's public educational campaign. Throughout working on this project, we kept specific goals that the campaign will:

1. Increase community education and awareness regarding air quality issues in Northwestern Indiana
2. Improve air quality, human health, the economy, and the environment for the Region
3. Highlight the benefits of informed decision-making

The main changes to individual behavior recommended are to limit idling time, avoiding driving to get lunch during the work day, consolidating errands, carpooling, and walking or biking when traveling short distances. On average, if one Northwestern Indiana citizen made these changes to their routine…

- Not idling in a drive-through and walking inside would save $13.16 annually and reduce your annual carbon footprint by 0.050 metric tons of CO_2 emissions (equivalent to taking 0.01 cars off the road for a year)
- Packing your lunch would save $132.50 in gas costs annually and reduce your annual carbon footprint by 0.505 metric tons of CO_2 emissions (equivalent to taking 0.11 cars off the road for a year)
- Consolidating errands would save $97.34 annually and reduce your annual carbon footprint by 0.369 metric tons of CO_2 emissions (equivalent to taking 0.08 cars off the road for a year)
- Carpooling would save $216.98 annually and reduce your annual carbon footprint by 0.824 metric tons of CO_2 emissions (equivalent to taking 0.18 cars off the road for a year)
- Walking/biking short distances would save $27.65 annually and reduce your annual carbon footprint by 0.105 metric tons of CO_2 emissions (equivalent to taking 0.02 cars off the road for a year)

These five actions add up to $487.63 in savings on gas over the course of a year and would reduce an individual's annual carbon footprint by 1.853 metric tons of CO_2 emissions, which is equivalent to taking a car driven by the average driver off the road for almost 5 months out of the year. In an extreme case of one person in each Region household (291,750 individuals) changing their habits to match these recommendations, the annual carbon footprint of Northwestern Indiana would be reduced by 540,613 metric tons of CO_2 emissions, which is equivalent to taking 117,525 cars off the road for

an entire year. These changes have the potential to increase the spending power of Northwestern Indiana citizens by $142 million by spending less money at the gas pump and more elsewhere.

The above-mentioned changes are not the only ways Northwestern Indiana citizens can improve the air quality in the Region. The following are other tips that will add up to not only cleaner air, but also economic and health benefits for individuals:

- Conducting routine car maintenance
- Ensuring your tires are properly inflated
- Using public transportation when possible and available
- Following gasoline refueling instructions for efficient vapor recovery
- Getting gas when it is cool outside
- Mowing the lawn after 7 pm
- Avoiding refueling, mowing your lawn, excessive idling, etc. on IDEM-issued Air Quality Action Days

In effectively communicating the data we have collected, we can help the Region take small steps to address all three facets of the "Triple-Bottom-Line": economy, environment, and society. If we are able to produce content that appeals to the citizens of this area, we have the ability to meet our goals of educating citizens and improving the overall air quality in Northwestern Indiana, helping individuals save money on energy and health bills, and decreasing Northwestern Indiana's overall contribution to climate change.

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Appendix A: Actions NW Indiana Citizens Can Take to Improve Air Quality & Data for Basis of Recommendations

- Typical passenger vehicle emits 4.6 metric tons of CO_2 annually (4,600 kg)[6]
- Gasoline produces 8.887 kg CO_2 / gallon; Diesel produces 10.180 kg CO_2 / gallon; Average American travels 11,500 miles per year; the average fuel efficiency of a passenger vehicle is 22 MPG[6]
- Average gas price in Indiana is $2.34 / gallon[7]
- Carpooling[8]
    - Lake County
        - Average Travel Time: 28.2 minutes
            - Average Distance = 21.15 miles (assuming avg. speed of 45 mph)
        - 83.7% (175,682 / 209,791 workers) commute alone
        - 8.2% (17,1777) carpooled
    - Porter County
        - Average Travel Time: 27.1 minutes
            - Average Distance = 20.325 miles
        - 86.7% (66,792 / 77,010 workers) commute alone
        - 5.3% (4,091) carpooled
    - LaPorte County
        - Average Travel Time: 22.6 minutes
            - Average Distance = 16.95 miles
        - 84.3% (39,222 / 46,551 workers) commute alone
        - 7.5% (3,770) carpooled
    - The Region
        - Average Travel Time = 27.2 minutes
            - Average Distance = 20.4 miles
        - 85.4% (284,696 / 333,352 workers) commute alone
        - 7.5% (24,978) carpooled
    - Carpooling once a week…
        - One Person
            - 0.824 metric tons less of CO_2 into atmosphere = 0.18 cars off the road for a year
            - $216.98 in savings from gas
        - Fifty People
            - 41.2 metric tons less of CO_2 into atmosphere = about 9 cars off the road for a year
        - 25% of Region workers (83,338 workers)
            - 68,671 metric tons less of CO_2 into atmosphere = 14,928 cars off the road for a year
- Idling
    - Average wait time at a Starbucks drive-through is 4.5 minutes[9]
    - Idling uses about 0.3 gallons / hour[10]
    - Going to Starbucks drive-through every day in a work week…
        - 18.75 hours spent idling each year
        - 5.625 gallons used
        - Costs $13.16 from gas used
        - About 50 kg of CO_2 emitted into air, adding 0.01 car to the road

each year

- Walking/Biking Short Distances Instead of Driving
    - Assuming distances of 5 miles or less…
    - If one person biked/walked instead of driving once a week…
        - You can save $27.65 each year
        - 0.105 metric tons less of CO_2 into atmosphere each year
- Buying local groceries[11]
    - Ingredients for a meal travelled an average of 1,550 miles
    - If these ingredients were bought from local sources, they would've traveled 45 miles
    - One person buying a fully local meal once a week…
    - 124.5 metric tons CO_2 less into atmosphere (equivalent to taking 27 cars off the road for a year)

Appendix B: Presentation Script

“Hello and thank you for coming to our presentation! We are a team of Environmental Engineering students from Purdue University in West Lafayette. Over the past few months, we have been working with South Shore Clean Cities on behalf of NIRPC to form the basis for an Air Quality Education campaign. This campaign seeks to inform citizens on how they impact the air quality in Northwest Indiana. In this presentation we are going share our findings and recommendations for pollution prevention.”

"As many of you may know, Northwestern Indiana has historically had issues meeting air quality standards. That being said, we have learned about all the great strides the Region has made in air quality improvements over the past few years, but there is still room for improvement. The Region has been a hub for industry, particularly steel mills, refineries, and other heavy manufacturing, which contributes to air pollution in the area. On top of industry, individual choices and actions of Region citizens can add up to make a major impact on the air quality. Indiana ranks 16th in the US in per capita emissions from the transportation sector. It is estimated that Lake, Porter, and LaPorte county drivers contribute to about 5.1 million metric tons of carbon dioxide equivalent emissions.”

“Contrary to popular belief within the Region, individual actions can add up to make a big difference in the area’s air quality. In February 2016, emissions from America’s cars, trucks, and airplanes surpassed that of power plants, making this sector the leading source of emissions. This means how we decide to use our cars and trucks collectively impacts the Region’s air quality more than power plants and industry. Throughout 2018, NIRPC learned through interaction with residents at a number of pop-up events that their number one concern is the environment, yet they feel industry is to blame for issues related to air quality, not them. In reality, individual citizens do make a difference. Because of this misconception, NIRPC wants to embark on a public education campaign to show individuals how just one person’s activities can add up over time to impact the air quality within Northwestern Indiana.”

”Because NIRPC doesn’t want to lose momentum on all the progress made so far, a public education campaign is in the works to inform citizens that their actions can add up to cleaner air. Our team consists of Abby, Caroline, Ryan, and Audrey (respectively), and we are senior environmental and ecological engineering students from Purdue University. For our capstone project, we have worked with Lauri Keagle of South Shore Clean Cities, to compile data and propose solutions pertaining to air quality in Northwestern Indiana to serve as a basis for this campaign."

"As we worked with South Shore Clean Cities, and learned more about the mission of the Northwestern Indiana Regional Planning Committee, we identified a few objectives. First, we wanted to gather data and compile the ways in which human activity impacts air quality. From there, we wanted to present our findings with numerical analysis of how collective action, as it pertains to the Region specifically, can add up to improve air quality. Finally, we decided to create a written supplement to go with our presentation to be shared with the NIRPC Environmental Management Policy Committee."

"South Shore Clean Cities is a

- NIRPC Subrecipient & our mentor for this project
- Nonprofit organization, funded by the DOE

- Designed to reduce petroleum consumption in the transportation sector in Northwest Indiana
- Manages Northern Indiana Green Fleet Program for NIRPC"

"As the result of our capstone project, our group is hoping to increase community education, improve air quality, human health, the economy, and the environment, highlight the benefits of informed decision-making, and encourage new development in the area."

"Our group aims to accomplish our plan of action by creating a deliverable of a webinar, which you are viewing now, as well as a short video at the end of this presentation. We also will compile our data into a list of marketable statistics, as well as present our project to our professor and peers."

"From the beginning of this project, we developed a fairly consistent schedule of speaking with Lauri, ensuring continued movement in the right-direction with our research and presentation. This included bi-monthly phone calls, in and out of class research, out of class video production, and group planning and editing. From our meetings, we were able to determine the best platform for our webinar, video, and data."

"There are many reasons why this project has valuable data for the citizens of LaPorte, Lake, and Porter counties, and in particular, because air quality has a direct impact on human health. Ozone and particulate matter can irritate the respiratory system, reduce lung function, inflame and damage the cells that line the lungs, aggravate chronic lung diseases such as emphysema and bronchitis, and cause permanent lung damage."

"While there are many ways that one could seek to reduce his/her individual contribution to air quality, the most feasible methods include conscientious decision making as it pertains to transportation, such as carpooling, consolidating trips, and limiting idling time."

"Transportation is one of the largest contributors to air pollution, making decisions pertaining to transportation especially important. There are many ways to reduce pollutions within transportation, but for the average person who requires a car on a daily basis, carpooling and consolidating trips are two ways to reduce air pollution without compromising lifestyle. Carpooling can reduce 0.824 metric tons of CO2 per year and save $217. If 25% of Region workers were to carpool, that would be roughly 68,671 metric tons of CO2 removed, or roughly 15,000 cars off the road."

Consolidating trips is also a good option for reduction of air pollution. Consolidating a typical errand run can save about .8 gallons of gas. If everyone in the region were to consolidate trips, that would be ~282,707 metric tons of CO2 removed, and a total of 61,458 cars off the road."

"One major cause of air pollution in transportation comes from cars idling. An idle car uses roughly 0.3 gallons / hour. If a person were to go through a drive-through every day in a work week, that's roughly 19 hours spent idling in a year, 5.6 gallons lost, and roughly $13 hour. If a person were to simply walk inside, that would be roughly 50 kg of CO2 removed from the air per year. If the entire region were to walk inside instead of idling cars, that would amount to roughly 38,000 metric tons of CO2 removed from the air, and 8,300 cars

off the road.”

"Naturally, an excellent alterative for transportation related, health, financial, and environmental issues is to walk or bike. For five miles or less, if a person walked/biked once a week, they would save roughly $28 per year, and reduce their CO2 emissions by 0.105 metric tons, which would add up to 80,000 metric tons for everyone in the region."

"There are actions can be taken to improve air quality on the consumer level. Buying local groceries for one meal a week can eliminate 124.5 metric tons of CO2 from the atmosphere. This is equivalent to 27 vehicles being taken off the road for one year. If every household in the Region did this, it would remove 33 million metric tons of CO2 from the atmosphere.

- One household buying a fully local meal once a week…
- 124.5 metric tons CO2 less into atmosphere (equivalent to taking 27 cars off the road for a year)
- Every household in the Region doing this would remove 33 million metric tons of CO2"

"Other transportation tips include using public transportation when available, using good practices to reduce runoff from gasoline refueling stations, keeping cars, boats, and other engines properly tuned, as well as ensuring that tires are properly inflated. Driving on tires that are underinflated reduces efficiency by .2% for each pound of pressure they are under. Properly inflated tires can save up to 11 cents per gallon of fuel, resulting in $53 of savings each year."

"Air Quality Action days are days when ground level ozone pollution or fine particulate matter could build to unhealthy levels in the outdoor air. These days are most likely to occur in hot, stagnant weather. On these days you can help improve air quality by making small choices like waiting to mow the lawn, refueling your vehicle after dusk, and reducing the number of trips you take in your vehicle.”

"In 2016 there were 6 air quality action days in Lake county, 2 in La Porte County, and 7 in Porter county according to the EPA.
To be notified when an air quality action day is occurring, you can sign up for Air Quality Action Day notifications at IDEM or Airnow.gov."

"As a result of this project, we hope to help the Region take small steps that address all three facets of the “Triple-Bottom-Line," economy, environment, and society, through NIRPC’s educational outreach program. From our perspective, we have been impressed with how serious NIRPC is about tackling the air quality issue and have learned a lot about the impacts of collective action throughout this process. We hope to take the knowledge and experience we gain with us in our endeavors beyond college.”

“After compiling the data, our team came up with a concept for a video to help educate Region residents about how their individual actions make a difference in the air quality.”

"We thank you for your time and we hope you enjoyed our presentation. Are there any questions?"

Appendix C: Presentation Slides

NIRPC's Air Quality Education and Outreach Program

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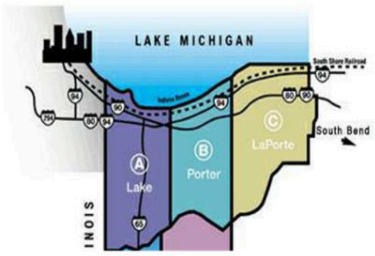
Northwestern Indiana Regional Planning Commission

Northwestern Indiana Air Quality



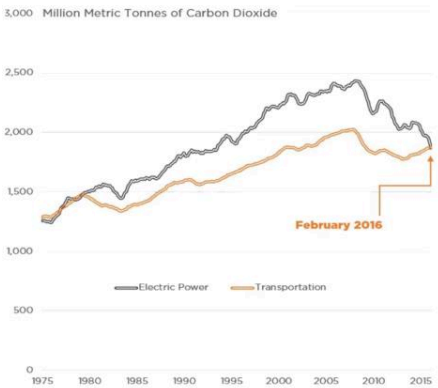
The Region:

- Industrial Manufacturing
- Agriculture
- Commuters
- Diesel vehicles

According to 2016 Department of Energy Report:

- Indiana ranked **16th out of the 50 states** for per capita CO_2 equivalent emissions from the transportation sector
- The transportation sector in the Region accounts for an estimated **5.1 million metric tons** of CO_2 equivalent emissions

Individuals DO make a difference



- Transportation is now the leading source of emissions nationally
- Individual choices regarding how we use our cars add up to impact air quality

U.S. EIA, U.S. DOE

Team Objectives

- Identify & compile human activities that impact air quality
- Prepare a presentation detailing how changes can add up to improve air quality
- Compose a written supplement for presentation to be shared with the NIRPC Environmental Management Policy Committee

South Shore Clean Cities

Initiatives include:

- reducing the nation's dependence on imported oil
- improving air quality
- supporting local jobs
- driving economic development
- promoting improved quality of life

South Shore Clean Cities, Inc.
NORTHERN INDIANA

Recommended Plan of Action

- Increase community education
- Improve air quality, human health, the economy and the environment
- Highlight the benefits of informed decision-making
- Encourage new development in the area

Deliverables & Target Audience

- Webinar and video
- Data to be used for marketing materials for digital and potentially print platforms
- A written supplement for the NIRPC Environmental Management Policy Committee
- Two-fold Audience:
  - The NIRPC EMPC on February 7
  - Public education campaign for the citizens of Lake, Porter & LaPorte counties

Health Concerns

Ozone, particulate matter, and other pollutants can...

- Irritate the respiratory system
- Inflame lungs and reduce their function
- Make lungs susceptible to infection
- Aggravate asthma, emphysema, and bronchitis

Areas for Action

- Carpool
- Consolidate Trips
- Don't Idle
- Walk or Bike Short Distances
- Buy Local

Carpool

One person carpooling once a week for a year

- Saves 0.824 metric tons of CO_2
- Saves $216.98 in gas

If 25% of Region workers carpool for one year

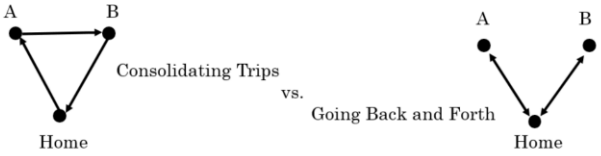
68,671 metric tons of CO2 are saved
(or 14,928 cars off the road)

U.S. EPA, U.S. EIA, and IN Department of Workforce Development

12

Consolidate Trips

- Consolidating a typical errand run can save about 0.8 gallons of gas per vehicle
- Doing this every week would remove 0.37 metric tons of CO2 annually from the atmosphere



U.S. EPA

13

Don't Idle

Idling in a drive-through every day in a work week equals

- 18.75 hours spent idling a year
- 5.625 gallons used
- Costs $13.16

Not idling and going inside saves

- About 50 kg CO_2 removed from the air
- Which equals 0.01 of a car off the road

If everyone in the Region went inside instead of idling

- 38,204 metric tons CO2 removed from the air
- Which equals 8,301 cars off the road annually

U.S. DOE

14

Walk or Bike Short Distances

For distances 5 miles or less

If one person biked/walked instead of driving once a week

- Save up to $27.65 in a year
- 0.105 metric tons of CO_2 less into atmosphere annually
- If everyone in the Region did this, 80,228 metric tons of CO2 less into the atmosphere (equivalent to 17,440 cars off the road)

U.S. EPA

15

Buy Local

- Ingredients for a meal travelled an average of 1,550 miles
- If these ingredients were bought from local sources, they would've traveled an average of 45 miles

*to scale

U.S. EPA

16

Other Tips

Follow gasoline refueling instructions for efficient vapor recovery

- Be careful not to spill when refueling and always tighten your gas cap
- A yellow gas cap means your car can use ethanol, supporting IN corn farmers and the local economy

Be sure your tires are properly inflated

- Driving on underinflated tires costs about 0.2 percent in efficiency for each one pound of pressure they are under the recommendation
- Properly inflating your tires can save you as much as 11 cents per gallon on fuel
- Doing so can save one driver up to $53 each year

Use public transportation when possible and available

U.S. EPA, U.S. DOE

17

On Air Quality Action Days

How you can help...

- Avoid excessive idling of your automobile
- Reduce the number of trips you take in your vehicle
- Work from home to reduce vehicle emissions, if your employer provides the option

IDEM

Get Notified

Link to sign up for Air Quality Action Day notifications

- https://www.in.gov/idem/airquality/pages/smogwatch/index.htm

For locations in the rest of the US:

- https://www.airnow.gov/index.cfm?action=airnow.main

Conclusion

Through collective action, we can...

- Reduce the overall air pollution in NW Indiana
- Help individuals save money on energy and health bills
- Decrease Indiana's contribution to climate change

Appendix D: Regionman Video Script

"A Day in the Life of Regionman" Script

Cast: RegionMan – Ryan Gansemer
Film: Caroline Peeters
Editing& Script: Audrey Whitmire / Abby Osborn

Opening "A Day in the Life of RegionMan" Graphic

Voiceover: Rise and shine! It's time to get ready with RegionMan!

Alarm clock rings & displays 7:30am

RegionMan yawns
Voiceover: Good morning, RegionMan!

RegionMan makes coffee
Voiceover: Today, RegionMan is making coffee instead of idling his car at a coffee shop.

RegionMan packs his lunch
Voiceover: RegionMan packs his lunch to avoid driving to lunch later in the day.

RegionMan snaps fingers and is dressed

RegionMan takes out toast & unplugs appliance

Alt 1
RegionMan turns down thermostat & turns off lights
Voiceover: RegionMan is conscientious of small things that use energy and cost money.

RegionMan walks outside and notices long grass, then shakes his head
Voiceover: RegionMan will wait to cut his grass, because it's an Ozone Action Day

RegionMan gets into a car with neighbor and pulls out a map of generalized locations
Voiceover: RegionMan carpools with friends and plans his routes.

Alt2 in case of snow: ***OPTION USED IN FINAL VIDEO***

RegionMan sits down to eat toast and opens his planner.

RegionMan writes down list of errands that need to be done.
Voiceover: Planning out errands for the week in advance helps to plan trip chaining.
(maybe popup bubble defining trip chaining on side)

RegionMan pulls out phone, notices email of Ozone Action Day notification & marks mow lawn & refuel car off to-do list

RegionMan phone buzzes on table showing text from coworker that they are in the driveway

RegionMan turns down thermostat & turns off lights
Voiceover: RegionMan is conscientious of small things that use energy and cost money.

RegionMan leaves to get into car with neighbor
Voiceover: RegionMan carpools with friends

Scene with statistics
Voiceover: By planning his day and making a few small decisions in the morning, RegionMan saved money and reduced his Carbon Footprint. You're our hero, RegionMan!

1. Not idling
    a. $0.05 saved and 0.2 kg less of CO2 emissions
    b. In a year, $13.16 saved and 50 kg of CO2 emissions
2. Packing lunch
   $0.53 saved and 2 kg less of CO2 emissions
    a. In a year, $132.50 saved and 505 kg less of CO2 emissions
3. Trip chaining
    a. $1.87 saved and 7.1 kg less of CO2 emissions
    b. In a year, $97.34 and 369 kg less of CO2 emissions
4. Carpooling
    a. $4.34 saved and 16.48 kg less of CO2 emissions
    b. In a year, $216.98 and 824 kg less of CO2 emissions

Voiceover: If Region Man made small choices like this for a year, he could save $460 on gas and reduce his carbon footprint by 1.75 metric tons. That's like taking 1 car off the road for 4 and a half months. *Iconic exclamation*

Link to video: https://www.youtube.com/watch?v=W2p84s52ZdY&t=3s

Appendix E: Resumes

Audrey Whitmire

114 West Stadium Ave.

West Lafayette, IN 47906 audreywhitmire@gmail.com 574.607.7491

EDUCATION

Purdue University, West Lafayette, IN

Bachelor of Science in Environmental and Ecological Engineering

Graduation: May 2019

RELEVANT EXPERIENCE

Purdue University Campus Master Planning & Sustainability, West Lafayette, IN Current

Sustainability Intern

- Developed Renovation & Maintenance Policy for LEED O+M credits for campus buildings
- Organized and assisted in Purdue's Farmer's Market and Tailgate Recycling Team

Infrastructure & Energy Alternatives, Corpus Christi, TX May 2018-August 2018

Project Engineering Intern

- Worked on civil and environmental phases of developing a 63 turbine wind farm
- Utilized BMPs to ensure site passed environmental site assessments
- Gained industry experience in renewable energy and project management

Wightman & Associates, Benton Harbor, MI May 2017-August 2017

Environmental Engineering Intern

- Performed Phase I, Asbestos, and other onsite environmental testing services

- Gained a better understanding of state and federal environmental compliance standards

Deluxe Sheet Metal, South Bend, IN May 2016-August 2016

Engineering Intern

- Worked on logistics, structural analysis, and cost-benefit analysis of a city renovation project
- Worked with industry experts to enhance building design and function to meet the needs of the local community

LEADERSHIP EXPERIENCE & INVOLVEMENT

Purdue Crew, Vice President August 2015-current

Study Abroad, Krefeld, Germany Summer 2013

Marketing and Design, Purdue Institute of Industrial Engineers August 2015-May 2016

Camp Counselor, Granger Student Ministries May 2011-May 2016

TECHNICAL SKILLS

- LEED Green Associate
- Microsoft Office, Adobe Creative Suite, MATLAB, OpenLCA, C
- Storm Water Inspector Certified

Ryan Gansemer

206 W Lutz Ave rganseme@purdue.edu
West Lafayette, IN 47906 260.446.6839

EDUCATION

Purdue University, West Lafayette, IN May 2019
Bachelor of Science in Environmental and Ecological Engineering, Honors College
GPA: 3.89/4.0
Honors: Trustee Scholar, Murdock Scholar, Indiana Partners for Pollution Scholarship, Dean's List, Semester Honors

RELEVANT EXPERIENCE

Bechtel Corporation, Plant Vogtle Units 3 & 4, Waynesboro, GA June 2018-August 2018
Environmental, Safety & Health Intern

- Assisted in developing an improvement plan for NPDES stormwater management program in NQA-1 setting
- Carried out weekly regulatory hazardous waste, erosion & sediment control, and SPCC inspections and worked to correct issues to reduce environmental oversights by craft workers
- Assisted with preparation of Title V quarterly report by compiling generator emissions data
- Implemented updates to Project Safety Data Sheet database of 3,000 SDS's to ensure federal compliance
- Conducted environmental impact assessment of dredging operation by researching local ecosystem features

Purdue University Environmental and Ecological Engineering, West Lafayette, IN
Senior Design Project August 2018-April 2019

- Worked with Northwest Indiana Regional Planning Commission to educate citizens for upcoming air quality education campaign by developing outreach materials for public presentations and citizen consumption
- Researched, assessed, and recommended cost and energy saving strategies for citizens to implement as a way to improve air quality in Northwest Indiana

Undergraduate Research Assistant August 2017-May 2018

- Evaluated semiconductor facility resource utilization, energy production, and ecosystem impacts using ArcGIS
- Used satellite data to develop qualitative analysis of environmental impact
- Compiled and added findings to comprehensive global database of semiconductor facilities

University Residence Support Center, West Lafayette, IN
November 2015-Present
Student Associate/Office Sustainability Head

- Interacted with students and fellow employees to ensure a studious setting while developing interpersonal skills
- Coordinated school supplies recycling drive to reduce center's waste and to save $500

LEADERSHIP EXPERIENCE & INVOLVEMENT

Purdue Engineering Outreach, Purdue University August 2016-Present
External Vice President

- Managed scheduling of club meetings and events to improve efficiency in communication
- Used project management skills by overseeing development of chemical car and maglev projects

- Oversaw team of students in building a presence to promote events to Purdue students and community members

Boiler Gold Rush, Purdue University

Team Supervisor November 2016-August 2017

- Worked with other supervisors and professional staff to create a plan for Purdue Orientation Programs
- Participated in intensive professional development and situational trainings to hone leadership skills

Team Leader March 2016-August 2016

- Facilitated a group of 15 new students' transition into college life by guiding them through the program

Tau Beta Pi – Indiana Alpha Chapter, Purdue University

January 2017-Present

Internal Affairs Committee

- Aided in providing information about events/opportunities to streamline communication to members

TECHNICAL SKILLS

- Experience with Python, MATLAB, Visual Basic, and C languages and JMP Statistical Software
- Certified in EPA Reference Method 9 & 22 for visible emissions

Abagail Osborn

231 Pierce Street Osborn24@purdue.edu
West Lafayette, IN 47906 870.530.0732

EDUCATION

Purdue University, West Lafayette, IN May 2019
Bachelor of Science in Environmental and Ecological Engineering,
Minoring in Chemistry

EXPERIENCE

Anchor Packaging, Jonesboro, AR May 2016-August 2016
Engineering and Safety Intern

- Conducted an electrostatic discharge study to address a significant operator shock safety hazard, recommended a solution for 11 machines across two plants, implemented the solution on 4 machines, and submitted plans and purchase requisitions for the remainder of the project.
- Gained proficiency with startup, operation, maintenance, and shutdown of Thermoforming machines, and documented setup and operating manuals
- Collaborated with thermoforming machine operators to create uniform operating procedures and training manuals
- Documented power sources to update Lock-out Tag-out procedures
- Proposed plan for uniform OSHA Pipe Labelling standards

Colson Casters, Jonesboro, AR
Customer Service Assistant May 2015-August 2015

- Defined order shipment method based on destination weight and need date
- Maintained customer master and customer shipping data

Engineering Assistant May 2014-August 2015

- Prepared Item Master, Bills of Materials, Process Routings and Buyer/Planner Data
- Implemented a company-wide paper recycling program to reduce the company's environmental impact

Purchasing Assistant August 2013-May 2014

- Issued Purchase Orders and Debit Memos
- Worked on Supplier Corrective Actions
- Documented shipping liability contracts for more than 300 vendors

LEADERSHIP & INVOLVEMENT

Purdue Libraries Digital Program, Purdue University March 2018-Present
Student Employee

- In charge of converting documents saved as HTML files to text using Abbyy FineReader

Chemical Engineering Study Abroad to Australia, Purdue University
Student May 2017

- Gained cultural experience while visiting companies and colleges to learn about distillation processes, sugar refining, coal extraction, and various research opportunities.

Habitat for Humanity, Purdue University August 2016-May 2017
Service Project chair

- Planned spring break trips for 36 students to assist four Habitat for Humanity affiliates

Sigma Delta Tau Sorority, Purdue University August 2014-May 2018
Internal PR Committee, New Member Committee, Treasurer Committee,

- Held one position at a time aiding the chapter in designing and ordering apparel, educating new members, and creating a budget and assigning dues

TECHNICAL SKILLS

- Experience with MATLAB, SimaPro, Kintecus, and Abbyy FineReader

Caroline Peeters

5726 Tremont St. Dallas, TX 75214 (214) 850-8859
cpeeters@purdue.edu

EDUCATION

Purdue University Expected graduation: 2019

Major: Bachelor of Science in Environmental Engineering

Minors: Sustainable Engineering, Natural Resources and Environmental Science, Environmental Policy

RELEVANT EXPERIENCE

Wilke Undergraduate Research Intern

- Conducted research on state climate policy strategy and policy implementation success
- Composed a policy brief which will soon be published

Marketing Intern at Purdue Engineering Professional Education
Fall 2016-2017

- Designed social media strategy to market and highlight graduate programs
- Coordinated campus outreach and advertisement of Purdue's online MS programs

U.S. EPA Environmental Engineering Intern
Spring 2016

- Performed permit review and renewal under The Resource Conservation and Recovery Act
- Managed databases and migration with ReTRAC and RCRAInfo
- Supervised GIS mapping techniques, groundwater sampling, and data analysis
- Studied and monitored manufacturing companies producing PFAs in region 6
- Navigated regulations and compliance violations through ECHO

Hawkins Hall Student Office Staff at Purdue
2014-2016

- Performed clerical work and served as a liaison between residents and administration

Lab Assistant at Purdue's Engineering Computer Network (ECN)
Summer 2014

- Assisted students with network issues, login troubleshooting, computer maintenance

LEADERSHIP & INVOLVEMENT

Alpha Phi Omega national co-ed service fraternity member (current VP of Service)
2015-2018

- Completed over 550 hours of community service since fall 2015
- Volunteered across campus and in the greater Lafayette community

Purdue University Student Soybean Product Innovation Competition
2016

- Developed a soy-based asphalt emulsion for industrial purposes
- Competed in a national competition and delivered product to market

SKILLS

Languages

- French- native speaker, Spanish- working proficiency

Leadership Development

- Created multiple programs to help peers and members of my fraternity with public speaking and professional development

Adaptability

- Able to work with any and all types of people, whether it is to assume a leadership position or follow directions as needed- flexible team player that thrives in group environments

Programming/technical proficiencies

- Matlab, Visual Basic for Applications (VBA), AutoCAD, ArcGIS, Microsoft Office