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EC 7250: Economic, Social and Ecological Systems

Prof. Todorova

Problem Solving Proposal

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Addressing the Energy Air Pollution Within the Ohio Area

Introduction

Air pollution is the byproduct of the burning of fossil fuels and is a major issue within the Ohio area because of the lack of utilization of renewable and clean sources of energy. We emit tons and tons of pollutants into the environment each and every day, from when we hop in our cars or even when we simply turn on the lights in our homes. Essentially, anything that requires energy can be a cause of air pollution within the ecosystem. However, it may be the case that it is time that we change our ways and try to conserve the environment that we live in. To do so we would have to find a way that could reduce the number of emissions while also maintaining a high level of efficiency. In a book “the case for A Job Guarantee” by Pavlina Tcherneva, she proposes that we adopt a public service employment program that brings society to full employment and puts forward an effort to maintain the ecosystem (Tcherneva 2020). Tcherneva may have the solution to solving the air pollution issue that we have here in Ohio, through a fully employed public service employment program we could bring Ohio into a cleaner and more sustainable state. In this paper, I intend to argue that Tcherneva’s full employment program could contribute to the reduction of air pollutants within the state of Ohio.

To do so, we would have to focus the scope of employment towards the sectors that cause much of the pollution such as energy, transportation, and housing. These particular sectors are the leading cause to much of the pollution that we see in today’s society and all of them are subject to many different forms of inefficiencies. For instance, in Ohio, the city of Cincinnati during the year of 2016 has been said to have had 119 days of elevated particle matter and ozone and has ended up being ranked among one of the ten highest populated states with the

highest levels of population (Rudell 2018). This only accounts for one of the major cities within the state of Ohio too, bad air pollution takes place in all the other major cities within Ohio as well. By pursuing full employment within Ohio and in the major cities within Ohio, we can probably experience a serious reduction in the level of air pollutants throughout the state so long as we employ workers who are willing to help with this mission.

Employing people for this public service of employment program would mean that jobs would be guaranteed to any individual who is capable of working and is willing to do the work that is geared towards more environmental conservation efforts. These jobs would be considered low skilled but still providing a living wage that prevents these workers from falling into subsistence. That will be the beauty of these jobs, they will require practically no real base skill set aside from knowing common knowledge and providing security. Some of the jobs that I suggest in this paper will require some base training but it is nothing too demanding nor not something that someone could learn on the job. However, being as though this field of work will be highly sought after by many people, this will require an intricate funding system. In essence though, to pay for such a program would be through subsidies provided by the government and by taxes on the firms that have created the externalities that the program will be cleaning up. However, this is a big over simplification on how we are going to pay for this program, I will discuss how we will pay for this program more in depth later.

In the next section, I discuss how to address the pollution that is created by the energy industry and the various jobs that can be created because of it. Then I will do the same for the transportation sector afterwards. Then in the fourth section I talk about how we could better prevent from issues like this in the future with better educational programs and their corresponding jobs that they can create.

Ohio's Energy Industry

Ohio's energy industry primarily consists of natural gas and coal with much of these sectors being minimally regulated in terms of the level of pollutants emitted. Both of these forms of energy consist of the burning of fossil fuels and are not necessarily considered a fairly

renewable resource. It is hard to avoid the use of coal within Ohio due to the fact that the state is neighbors with the coal belt south of it. Consisting of the states Kentucky, Virginia, West Virginia, and Tennessee are all a part of this coal belt and primarily use coal to power their states. This, however, can have an implicit effect on Ohio because with them being so close much of the emissions that are taking place outside of state can carry over to Ohio. Anyways, Ohio's energy industries are in need of some improvement and if nothing were to get done than many Ohioans could face the detriment of poor air quality.

Some of the power plants that are located within Ohio are usually located within poorer neighborhoods, and it has been known that people who are located close to these types of power plants are more likely to experience asthma attacks and premature death (NGCA 2016). The sheer location of these power plants is no accident, we know that these power plants create health problems but yet there is still the persistent land locking of minorities to these types of locations. The reason why people tend to experience health issues from the habitation of the surrounding area of these power plants is because of the particle matter that is emitted from the power plants, more specifically the fine particle matter (PM 2.5). Emissions with a particulate size of 2.5 micrometers, have the capability of travelling further into the lungs where they can do severe damage to the respiratory system and can even surpass certain filters. So, it would be in our best interests to try and reduce these types of pollutants.

To lower the levels of pollution within the energy industry would be to lower the flow of carbon dioxide emitted from these plants. One way of doing this is by doing what is called "carbon capture," which is essentially separating the carbon dioxide (CO₂) from the flow of the emission and turning them into a concentrated form then burying it deep underground (EIA 2020). Another way to reduce the level of emissions within the state of Ohio would be through the planting of forests throughout the state. This would be a good move to handle carbon emissions in the long run because it creates more carbon sinks and replenishes the fresh air in the ecosystem for many years after they have been planted. Furthermore, an additional way that we could reduce the level of emitted pollutants within Ohio is by pushing for the construction of more clean and renewable sources of energy such as wind or hydro energy. In the case for

Cleveland, hydro power would be a significant and a wholly better choice to adopt instead of their current use of power which is coal.

The Case for Avon Lake's Coal Power Plants

Avon Lake's power plants are notorious for their toxicity towards the members of their surrounding community, they are the deadliest power plant within Ohio. It has been found that these two plants in particular had been operating out of compliance with the Clean Air Act requirements for a at least three years (NGCA 2016), causing them to create a plethora of health problems such as asthma attacks, respiratory issues, heart attacks, and bronchitis. This plant alone has been said to have the second highest levels of sulfur dioxide emissions within the country and has created 512 premature deaths during the year of 2015 (NGCA 2016).

This is a clear problem and needs to be addressed, most recently I found out on the Global Energy Monitor Wiki¹ that one of the plants has been retired but one is still operating but with only considerations made towards the emission of mercury. In light of this, there should be a cleanup effort as well as an effort to prevent this plant from causing more destruction. To do so there could be a public service employment program that could be open to the public to allow them to help clean up the plant and the water surrounding the plant. Due to its location right by the water, Lake Erie, the plant will have likely polluted the water too. Bodies of water that are located within proximity of coal power plants are likely to have levels of lead, arsenic, and other pollutants that could deem the water unsafe to drink by the EPA (NGCA 2016). This alone could require a whole company of people to setup next to the job site and decontaminate the water, Lake Erie is already a big source of fresh water it would be bad to let pollution contaminate it.

Additionally, there could be the creation of filtration and carbon capture methods right next to the plants that could create jobs for them to place on their chimneys. So long as the plant is up, this would create a consistent need for these filtration systems or capture systems that could purge pollutants out of the emission and store it in another location, more than likely underground. Moreover, there could be the creation of a carbon sink around this job site so any

¹ https://www.gem.wiki/Avon_Lake_Power_Plant#cite_note-5

of the pollutants within the area can be properly processed through the carbon system and out of habitats that are necessary for life. This could be as simple as planting forests around the coal plants and letting the trees properly grow to handle the level of emissions and process them in tandem. Avon Lake is only one of the major plants that is creating problems for Ohio's ecosystem, there are many more major power-plants that are located near big cities such as Miami Fort or Gavin that create similar problems for those who live near them. That is why it is important to try and address these problems in ways that can sustain our ecosystem and our economy for our future generations.

Furthermore, another solution that could definitely reduce the level of emitted pollutants in Avon Lake would be to create more renewable energy sources. Since they are located right next to water, they could go ahead and build a hydro power plant. Hydro plants are capable of utilizing the body of water that is Lake Erie to generate power for this town. This would still create jobs that could be applicable to those who work in the power industry already and could ease their transition away from the fossil fuel industries. There would not only be the creation of construction jobs but also there could be the creation of air quality and water quality inspectors that would be checking on the levels of contaminants created by the development of organizations with a mission to maintain the ecosystem of Ohio. Such an organization would create a sense of agency for the people inhabiting the areas surrounding these power plants and could create platforms for the people of Avon Lake to discuss the issues surrounding the emission of pollutants.

Ohio's Public Transportation Industry - Dayton

Transportation is another key factor that contributes to the level of pollutants within the ecosystem, because of its direct association with the burning of fossil fuels to power these vehicles. Public transportation, however, is in direct control by the state governments and can be readily manipulated so that it can accommodate certain societal parameters. According to a study done by Harford, they found that public transportation sometimes utilizes inefficient inputs in their strategic implementations (Harford 2006). Routes will tend to be overran, transport will sit idle for too long, and workers will tend to be overpaid for their contributions. Here there is

plenty of room for improvement in this system because these systems are fairly malleable and centrally controlled. In terms of the public transportation within Ohio, the Dayton area was found to be the most inefficient public transportation system out of all of the observed cities within the United States according to Harford's study (Harford 2006).

The Dayton public bus system has been known to have a very troubled past with records of the prevention of picking up high school students to save money and behaving as a privatized bus system with respect to their costs (Townes 2017; Poiner 2020). For any major city, you do not really want these types of circumstances going on in the public transportation system especially for those who are reliant on that system to get them to and from work or wherever they need to go. Nevertheless, there is a way to possibly fix this problem with implementing a public employment service program that could make the public transportation system here in Dayton less wasteful and more efficient. A public employment service program would create jobs that would guarantee anyone with a willingness to work a chance at maintaining these public transport systems, driving or operating these systems, and contribute to the discovery of new and more efficient routes or infrastructure. What I mean by this last point more specifically is to try and have people working towards the construction of better trolley systems that can reach important geographics or building bus stations and the such to allow for better coverage of the metropolitan area.

By doing so, we could encourage the people of Dayton to use more public transportation and lower the level of pollutants within the atmosphere over the Dayton area. When we hire more people to join the labor participation of the public transportation in Dayton, we are essentially creating a more consistent system that the people of Dayton could reliably count on being there when they need it. However, when hiring too many people that could create a paradox where the public transportation system experiences diminishing marginal returns when there are too many people working for this program and not enough capital to make them equally as productive as others. This would create the push for the creation of new types of sub jobs that could be considered instead of the usual jobs that are more than likely to be filled with the implementation of the program. Such as security guards for buses and bus stops or the creation of janitorial and maintenance staff that oversees the bussing system.

As for Dayton's trolley system, there could be more routes that can be created that could reach more locations of densely populated areas so they too can utilize the perk of public transportation. There is also an important consideration that should be made for Dayton's trolley system, and that is it should be ran on clean renewable energy. The project of reestablishing the power grid for the trolley system with clean energy should be a small task, but the infrastructure construction for a sustainable and adequate capacity, if they were to expand the system, would be a relatively big task. This would require the creation of more wind turbines in the countryside of Dayton or even solar panels on the top of the Dayton buildings to power these expanding trolley systems.

Additionally, there is the issue of how all of this will be paid for, which will predominantly be funded by subsidies and tax revenues from state government budget allocations. There may also be increases in the price of some of these services, but depending on the budget allocation to the public transportation systems, that may drive the price down to reasonable levels where an individual is more willing to pay. In Tcherneva's book, she mentions that much of the funding that is carried out by the government is not necessarily tax revenue but is more of just board members messing with the numbers of the accounts (Tcherneva 2020). The government essentially has the power to spend its own currency and is able to buy whatever it so chooses, if they were to spend more money on a bigger stimulus during the 2008 financial crisis they definitely could have. During the time period of Covid-19, you are seeing evidence of that claim with the persistent trillion-dollar stimulus bills being passed by congress. If the government were to spend some of that money towards these kinds of programs, then we would have less unemployment of our resources and have the currency backed with forms of labor. In turn, also a more sustainable ecosystem with less emissions in the long run.

Considering other governmental suggestions for reducing the level of emissions, the EPA actually advocates for a different use of fuels because this will stop emissions at the source (EPA). This can simply be the switch from natural gas and crude oil over to more organic compounds that can mimic the effects of fossil fuels in terms of the creation of energy which could create jobs in the refining process. Although, being probably the most effective route of

reducing the levels of pollutant emission levels this could probably be accomplished within the private industry. Ultimately, requiring advanced research and development of new fuels that can be mass produced and efficient relative to its levels of pollution. General reinvigoration of our current technology is definitely something that can gradually shave off costs as well as improve the functionality of these vehicles over time. Being as though this is one of the major culprits of fossil fuel burners, we should also consider other variants of emission creators, such as homes a primary source of energy consumption. Many people do not know that, so there is definitely a need to improve Ohio's ecosystem through better informing its people.

The Case for Better Education on Sustainability in Ohio

An important consideration that needs to be distinguished if this type of program were to unfold and that would be to plant the seed of knowledge of why we should work towards the goals of sustainability. Education is the essential tool that can keep later generations moving towards a consistent effort of improving society to better utilize its resources and to conserve the ecosystem. Robertson calls for an educational system that makes people better understand systems and their interconnectedness, that includes all citizens making them a viable contribution to the learning that needs to be done aside from only scholars and researchers, and an educational system that teaches people how to learn about these particular phenomena (Robertson 2013). A push for this kind of program in primary schooling and higher education will be integral in providing individuals with the human capital necessary to save the environment. By doing this we could create teaching jobs that can better educate the youth of Ohio to better understand the necessary behaviors that need to be adopted to ultimately save the atmosphere from being overly polluted. Although, this does not have to strictly be kept to issues regarding air pollution, there can even be course work on how water pollution is created or the intricacies of recyclable plastics.

There is much that educating the youth can bring to fruition because the youth of Ohio is just full of potential. Investing in their education will pay large returns in the long run and it would be a relatively cheap investment. This program would not necessarily require an intricate license on teaching nor the ability to do hour long lectures, these can be carried out through

seminars or small presentations done throughout a school week. It would also be somewhat beneficial if this program were to have someone from waste management come in a show pictures of what landfills look like and how our behavior towards products impacts those landfills or even having someone from air quality inspection services come in to schools to show the impacts of air pollution first hand. There could even be a presentation on how many of the things that these kids will come across that will more than likely deteriorate in the future, i.e., planned obsolescence, and teach them about the repercussions of buying those sorts of goods (Elsner et al 2016).

Much like how a police officer comes in and talks about why drugs are bad for D.A.R.E., this could be a somewhat similar program but instead talking about the importance of ecology. Similar also to how there is a presenter on sexual education for middle schoolers and high school students but again discussing the importance of why students should be more conscientious in their behavior towards the ecosystem. Simply encouraging behavior of car-pooling, recycling, turning off the lights when leaving a room, and showing the joys of gardening etc. will be the small behaviors encouraged but relaying a bigger message within those sessions.

Conclusion

All of these programs that I have mentioned: power plant clean up with creation of carbon sinks and filtration systems, the public transportation reinvigoration of Dayton by hiring workers to improve infrastructure to cleaner alternatives along with efficient routing, and Ohio youth ecological education, would be integral in reducing the levels of pollution within the Buckeye state. By cleaning up the power plants throughout Ohio and encasing them in forests along with better methods of handling their carbon emissions, this would prevent them from imposing deadly social and economic costs on those who decide to live next to them which has been found to be predominantly lower income persons. Also, by employing more workers to better the Dayton public transportation system, we could create sustainable systems that wreak less havoc on the environment and would incentivize more Daytonians to use public transportation instead of taking their personal vehicles everywhere. Lastly, by educating the

youth of Ohio we would create a generation of young individuals that can be ready and better equipped to face the forthcoming ecological problems that earlier generations have created.

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