

Powered By the Sun Initiative: New Jersey's Future Renewable Energy Source

Overview

As the possibility of an energy crisis due to depleting nonrenewable sources looms closer, it is imperative that New Jersey find a new sustainable and economically safe renewable energy source. The state is far from obtaining its goal of fully renewable energy, with 94% of energy being created by natural gas and nuclear power in 2018 (U.S. Energy Information Administration, Section 1). Current policy in the state is based on a Solar Energy Renewable certificate program, where a certain amount of megawatts equates to a certificate. Utilities are then required to return those certificates which can be either earned by creating their own energy or buying them from independent facilities that produce solar energy. This system provides an incentive to both non-utilities and utilities to create renewable energy to meet the required amount of certificates or face heavy fines. The certificate program feeds into a Renewable Portfolio Standard which governs a mandate on what percentage of energy needs to be renewable annually. As of 2018, New Jersey's solar power provided 4% of the state's electricity, with the RPS requiring 22.5% of the energy produced by renewable energy sources by 2021 (Department of Environmental Protection NJ, Par 1).

Besides solar energy, subsidies for wind farms in the state have been renewed, with wind power certificates being included in the RPS. With a contract being awarded to Orsted Ocean Wind to create a wind farm off the coast of Atlantic City. (Ocean wind Application, Pg ES-14) Offshore wind turbines could potentially generate 430,000 GWh/year from 20,000 km of wind turbines within the boundaries of New Jersey's coast, in comparison to the actual amount of energy used in the state of 75100 GWh, in 2019, this amount is enormous (Lopez, Pg 15). New Jersey has

massive potential in the rise of renewable energy and it is doing remarkable work to ensure that its citizens are safe for the future, but the investiture into research and development should proceed with these massive overhauls to provide greater consistency and potential for the future of the state.

Stakeholders Analysis

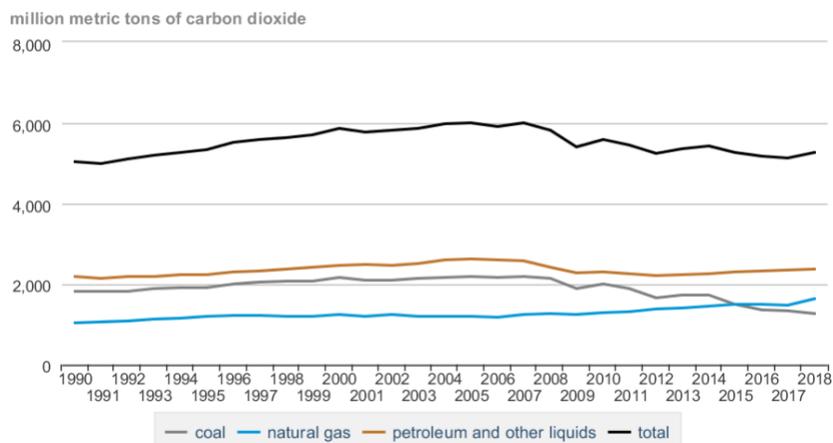
The Department of Community Affairs provides New Jersey residents with an insight into public policy and public projects. Residents are concerned with the cost of Solar energy and equipment and they will want to know how a shift in energy sourcing will affect their disposable household income. Secondary, but still pressing, questions include: how will it affect the air quality of the state, the accessibility of the solar panels, and how to invest in the solar energy market. In order to effectively address the concerns of the residents, there must be a comprehensive understanding of the status of solar energy in the state. Solar energy accounts for approximately three-quarters of the renewable energy production and consumption in New Jersey, but renewable energy only accounts for five percent of the state's energy production ("How Much Do Solar Panels Cost?"). The energy, usually measured in million-watts (MW), created from the solar panels in NJ reached 2,911.1 in 2018. That amount of energy could power 480,000 homes ("How Much Do Solar Panels Cost?"). Increased funding of solar energy will give residents a stake in their energy sourcing and allow them to sell their excess energy back to the utility companies.

Solar panels cost \$18,000 on average (Matasci), which may be a deterrent factor for some homeowners in the state. However, there are incentive programs in place by the federal government as well as burgeoning initiatives by states to help lighten the burden. The Federal government offers an Investment Tax Credit (ITC) which allows residents to deduct 30% of the solar panel installation cost from their federal taxes for the year 2019(Matasci). New Jersey offers

a program called Solar Renewable Energy Credit, in which solar installation that earn a credit for every 1,000 k-wH (Kilowatt Hour). An investment in solar panels by the state may also have a positive effect on the environment. One of the driving factors for environmental instability and climate change is the increasing amount of greenhouse gases that make up the atmosphere of Earth. Carbon Dioxide (CO₂) is the most costly, as it pertains to climate change, of the greenhouse gases that comprise our planet because it is only one of two greenhouse gases that absorb infrared rays. Infrared rays are forms of energy that are interpreted as heat from the sun. Therefore, increased CO₂ in the atmosphere translates to an overall increase in global temperatures. In 2018, the United States experienced a 139 MMmt (Million Metric tons) increase in the CO₂ emissions, moving the aggregate amount of CO₂ released by the US to 5,269 MMmt (U.S EIA, Monthly Report Table 11.1- See Below). 99% of CO₂ emissions from the energy production sector in the U.S comes from the burning of fossil fuels. (U.S EIA, Monthly Report Table 12.1) Since solar panels greenhouse gases, an influx of solar panels has the potential to drastically reduce CO₂ emissions.

The New Jersey State Legislature, headed by Governor Murphy, has drafted an initiative

Figure 3. Energy-related carbon dioxide emissions by fuel, 1990–2018



 Source: U.S. Energy Information Administration, *Monthly Energy Review*, October 2019, Table 11.1 Carbon Diox

looking for an absolute shift from fossil fuels by the year 2050. The plan is multifaceted, and

among many other things plans to decrease transportation emissions by the year 2030, modernize the energy grid, and give low-income communities access to renewable energy. This initiative, known as the Energy Master Plan (EMP), has conditional support from a bi-partisan state legislature. Assembly members from NJ 10th District, a significantly Republican voting portion of New Jersey, offer different ways to address the plan than what is currently being advocated by the Governor. Those who consider themselves to be fiscally Republican will have reservations about the estimated price tag of the transformative project. Studies have placed the cost of the EMP at \$115 billion dollars which means \$40,000 for every household in the state(Cantor). New Jersey is not a monolithic state, so any plans for a costly and time-consuming overhaul would force those Assembly Members in Democrat districts to give concessions for the plan to be signed into law. There is also a voting block within the Governor's own Democratic Party, so-called "Progressives", who argue that the Governor's EMP does not go far enough in its effort to remove fossil fuels as a source of energy for the state.

Some residents are acutely upset with the building of the North Bergen Liberty Generating Plant that seems to completely contradict Governor Murphy's plan for clean energy by 2050. The energy that will be generated, which will be a product of natural gas that is non-renewable, would be exclusively for New York City and will cost approximately \$1.5 Billion dollars(Fallon). More importantly, the plant is estimated to release a whopping 2.6 million metric tons of carbon dioxide into the atmosphere. Such costly endeavors have left many residents to doubt the genuineness of Governor Murphy's eco-friendly campaign talk. Constituents who view this plan as a possible savior of the environment may be displeased with the Governor and the Democratic Party in New Jersey which may damage re-election bids for legislatures. Several businesses across the state have come forward with a collective warning against the EMP and its ambitious goals. In a written letter

sent to the Board of Public Utilities, 17 companies including New Jersey Builders Association, Commerce & Industry Association, New Jersey Chemistry Council, Consumer Energy Alliance, and New Jersey Petroleum Council banded together in order to contend the implementation of the EMP. Their chief complaint is that the economic impact of EMP has yet to be fully analyzed. They contend that if the EMP takes a negative turn, it could cause unemployment and thus hurt the economy among many other things. If the New Jersey State Legislature is to have any success with the presented recommendation, they will have to take into account the stakes for more than just their district constituents. It is important that they understand what is important to New Jersey residents so that they encompass the eagerness of 100% clean energy, and frugality of those with economic interest.

Utility companies have the most monetary-based stake in the project of solarizing the energy systems in New Jersey. There has been a recent trend around the United States of utility companies shutting down plants and slashing dividends paid to self-generating energy residents who use solar panels. The “Utility Death Spiral,” as described by Lane Sherman, Executive Director of the San Diego Energy District, is when “a utility loses customer revenue from self-generation of electricity from solar or wind or some other technology, it stimulates the utility to raise rates for other customers so as to preserve its revenue base. Higher rates stimulate more customers to self-generate creating an endless ‘death spiral’ (“What Is Accelerating the ‘Utility Death Spiral’?”).

Utility companies operate under the profit-model that urges them to provide semi-sufficient services for maximized profits. The increased participation of residents in solar energy decreases the number of people paying into the energy companies, which inversely forces them to push the supplemental cost onto remaining utility consumers. This reality will disproportionately

affect those of lower-income. Those who are less likely to afford solar panel installation would be forcing them to pay whatever prices the utility company imposes. Utility companies risk a net-zero profit with the loss of customers and having to pay former consumers for the energy they are generating. Companies like Germany's Energy Wiende (Transition) reported a loss of 3.3 billion dollars in the year 2014 alone as a result of Germany's push for 100% clean energy over the next few decades. This is not the standard outcome for utility companies, however, some utility companies in California made upwards of 1.5 billion dollars in profits in that same year ("What Is Accelerating the 'Utility Death Spiral'?")

Solar energy and solar technologies may be a relatively recent development for civilian use of energy creating and preservation, but they have been imperative for space exploration. The National Aeronautics and Space Administration, better known as NASA, has been given the task of studying and exploring space since it began. With no charging stations or portable chargers in space, scientists had to innovate ways to harvest and transport energy from the stars. The very first solar panel to be on a spacecraft was The Vanguard 1 satellite, launched in 1958 (Granath). NASA will have indirect stakes in this endeavor since they are prominent researchers for solar energy and the predominant architect of solar energy technologies. If New Jersey wants to invest in solar energy and such technologies that facilitate its use NASA will be a major source of information. They are the group that most likely have the answers to questions such as how practical the transition would be and what can be done to make said transition more efficient. NASA would also be the best group to assist in revolutionizing the energy grid by assisting in developing advanced technologies.

A massive overhaul of the energy grid in New Jersey will have a huge effect on the job market of the state. The Department of Labor and Workforce Development will be concerned with

the net amount of jobs and the training needed to ensure that the states' current employment rate does not dwindle. They will also be in charge of the continued appropriation of funds needed to pay those employed in solar. Solar jobs in the United States already outpace those employed in the coal market due to the push to clean energy. According to the U.S Department of Energy 2017 Energy and Employment Report, solar jobs increased to 373,807 in that year; coal jobs decreased to 86,035 ("2017 U.S. Energy and Employment Report). New Jersey's current energy structure is made up of 42.1 percent nuclear energy while nuclear only employed 1,600 people directly and 6,700 indirectly (Granath).

Problems Presented:

At present, the state uses fossil fuels and nuclear power as a primary source of energy. According to New Jersey's Department of Science, Research and Environmental Health, "Fossil fuels generate about 45% of New Jersey's in-state electricity while nuclear power generates about half of our in-state electric power generation" (NJDEP). Fossil fuels pose an alarming threat to the environment and the continuous use of crude oil, nuclear energy and its waste is plunging the planet deeper into destruction. Scientific evidence explains that "the first trillion barrels of oil have been enough to disperse toxic substances to every corner of the globe, erode soil on a global scale, permanently deplete underground aquifers, and disrupt the climate and acidify the oceans, all this with huge human costs" (Princen 18).

The extraction of oil combined with the continuous dumping of nuclear waste and fracking wastewater across New Jersey land is linked to the destruction of ecosystems needed to regulate the garden state's climate. According to a study done by the Academy of Natural Sciences of Drexel University, increased density of gas drilling through fracking is associated with the

degradation of ecologically important rivers and streams (Ridlington and Rumpler 16). New Jersey does not have any active fracking operations open currently but the northwest portion of the state sits above a gas reserve. The state of New Jersey is also a dumping site for Pennsylvania's fracking wastewater. Before the Governor launches an initiative grounded in primarily using renewable energy to power the communities of New Jersey, legislation designed to slowly eliminate the use of nonrenewable sources and aimed at safely regulating the containment of nuclear waste must be passed first. It should hold major oil and gas companies funding fracking and other drilling operations accountable for their responsibility in the destruction of the planet.

Moving forward, it is important to note that nuclear energy poses safety and public health concerns for communities living in close proximity to nuclear plants and other fossil fuel extraction and dumping sites. The public health risks associated specifically with nuclear power are directly linked to the radioactive particles and radioactive waste which causes harm not only to the environment but also to all that inhabit the area. According to research, "Nuclear power plants use energy released by the decay of certain radioactive isotopes to produce electricity. While ionizing radiation can cause immediate damage to a person's body, including radiation sickness and death. Ionizing radiation is also a carcinogen, even at low doses; it causes cancer primarily because it damages DNA" ("Accidents at Nuclear Power Plants and Cancer Risk.").

Radon contamination is a statewide problem. Radon gas is a radioactive gas that many people are exposed to in their homes and workplaces. When drilling operations for oil, gas or other nonrenewable sources take place, the uranium in the soil and rocks is uncovered. Evidence explains that "the air pressure in a house is usually lower than the pressure in the soil around a home or building's foundation" ("How Does Radon Enter the Home or Building?"). Because of the difference in this pressure, radon gas rises up through the cracks of the floorboards in buildings,

houses and other structures. Recent data pinpointed how one in six New Jersey homes have elevated levels of radon yet only 30% have been tested and recommended for remediation (Department of Environmental Protection). The public health risks posed by radon contamination specific to nuclear waste are linked to various diseases like lung cancer since it is documented to be the second leading cause of the disease after cigarette smoking (“Radiation Studies- CDC: Radon in the Home”). The waste from nuclear energy production must be stored securely in order to prevent health and environmental disasters and protect people from radioactive contamination.

The use of nuclear and gas plants to power New Jersey’s energy grid has immensely contributed to the poor air quality in low-income neighborhoods across the state. For example, the Newark Energy Center has a natural gas power plant that is one of the main sources of air pollution in a poor, environmentally burdened area. The pollution from the energy center will increase climate change impacts, flooding and air pollution problems in the city because natural gas releases more methane than other power plants. According to the New Jersey Sierra Club, “Methane emissions are 87% more potent than carbon dioxide as a greenhouse gas”. The state of New Jersey is advised to transition from its use of nuclear energy to alternative sources like solar energy in order to ensure a safe future for its residents.

Another issue with shifting New Jersey’s energy sources from non-renewable to renewable is the lack of access for numerous low-income families and communities across the State. According to evidence from the US Census (2011-2016), “the national average energy burden for low-income households is 8.6%- 3 times higher than for non-low-income households. Of all the households, 44% or about 50 million are defined as low income in America” (“Low Income Community Energy Solutions”). There are multiple barriers that low-income households face when accessing renewable energy technologies and sources. A number of them are rooted in socio-

economic issues such as lack of qualifying credit scores, not being able to pay for energy upgrades and living in poor communities where landlords may not be motivated to make energy improvements.

It is advised that some sort of program is designed to combat the high costs that many low income communities are burdened with when switching over to renewable, environmentally friendly sources of energy. Government legislation can require landlords to upgrade homes in order to comply with clean energy requirements, especially in low-income communities where most families do not have the means to pay for these utilities integral to their wellbeing on their own. The clean energy initiative is not complete if families in impoverished communities are not included in the conversation given that they make up a large amount of the population and are essential to the Governor's goal of releasing a statewide low cost renewable energy plan.

One of the major problems with shifting the state's energy to a completely solar powered initiative is the high cost associated with the proposed policy. Solar energy has been the leading renewable source used throughout the country in order to replace fossil fuels and other non-renewable sources of energy. Historically, New Jersey has been determined in its mission to install solar power and currently has the sixth-largest installed solar capacity out of all U.S states ("New Jersey State Energy Profile"). One of the issues that comes with a state-wide transfer from nonrenewable to renewable energy like solar is the unreliable nature of the energy source. While the price of installing solar energy has decreased since 2006, a large scale transfer to a solar energy powered electricity grid remains economically challenging.

This fickleness of solar energy also makes it difficult to convince major stakeholders to invest in it, especially when compared to more reliable and tested types of energy such as nuclear and natural gas. According to research, "one reason for this is that energy generated from solar

energy technology cannot easily be stored or transported, and must be consumed close to where it is generated” (Hansen et al. 3). Therefore, any solar energy that is transported from its place of origin immediately increases in cost, which is cumbersome at best and economically devastating at worst depending on the distance and amount of solar energy that is moved. Even then, solar energy cannot be moved large distances and it can be difficult to defend the cost for such a short distance.

One must utilize alternative sources like lithium batteries or another energy storage system but those come at an additional cost to an already expensive initiative. Another reason for the high costs are due to generous state and federal subsidies enacted to transition US markets away from nonrenewable sources of energy by providing them with an incentive when they shift to solar. Due to specific state and federal policies that are contributing copious amounts of money to keep the solar industry afloat, the illusion of solar energy being extremely cheap can hinder stakeholders from understanding the economic impact and cost associated with solar energy. While it may be a tedious process to create mediums to contain and store the energy that also transfers it to a newly powered grid, it is imperative that our leaders employ new sources of energy in order to deter our country from plunging deeper into climate change. In order for the state of New Jersey to be able to move into a completely solar future, the economic issues surrounding the implementation of the grid must be resolved.

Potential Solutions:

Although the cost of solar energy has decreased significantly in the past few years with the cost of solar energy being 85% less than it was in 2009, the cost of solar energy is still unable to compete with the low prices of nonrenewable energy sources such as nuclear energy (O’Boyle &

Blumental, 2018). The higher cost of solar energy should not discourage the government and the public from pursuing solar energy since the benefits of renewable energy greatly outweigh its costs and ongoing technological advances continue to reduce the cost of solar energy. In the meantime, however, there are many steps that can be taken to expand current solar energy generation in the state of New Jersey, which include state funding of research on solar energy battery technology to promote and increase the speed of technological advancements that will lower the cost of solar energy and work towards the goal of solar energy becoming the leading energy source in New Jersey. Other possible solutions to combating the higher cost of solar energy include the creation of municipal programs sponsored in part by the state government that focuses on creating communities fully sustained by solar energy by requesting that municipalities cover some of the costs associated with developing and installing a community solar energy field. In addition, allowing existing nuclear power plants to remain open to support the state's energy needs while renewable energy source infrastructures are being planned and developed should be considered.

Up until 2015, nuclear power accounted for New Jersey's largest share of electricity generation. Since then natural gas has succeeded nuclear power in popularity, accounting for more than half of the state's energy generation (New Jersey - State Energy Profile Analysis - U.S. Energy Information Administration (EIA)). Due to the amount of work that needs to be done to improve the state's renewable resource infrastructure, the state's transition to being powered primarily by solar energy will not occur overnight. Existing nuclear power plants should be allowed to remain open to support the state's energy needs while renewable energy source infrastructures are being planned and developed. There are very few disadvantages in keeping these nuclear power plants since nuclear power is practically a zero emissions energy source (New Jersey - State Energy Profile Analysis - U.S. Energy Information Administration (EIA)). In addition, allowing existing

nuclear power plants to remain open will allow low-income communities who might not have enough funding initially to develop a community solar energy field to have sufficient access to energy during their transitioning period in switching to a fully solar powered energy infrastructure. This will also satisfy the business needs of big utility companies that rely on nuclear power, preventing any political lobbying against the expansion of solar energy programs at the state level. Although the ultimate goal is to create a state fully run on renewable energy sources, keeping the existing nuclear power plants in our state is a practical solution to ensure that the transition to solar energy is as smooth as possible.

The initial cost of developing and installing a community solar energy infrastructure will hinder many communities from transitioning to solar energy due to a lack of capital to invest in a community solar energy field. To address this issue, the state government can develop programs sponsored in part by the state government that focuses on creating communities that are fully sustained by solar energy by requesting that municipalities cover a portion of the cost associated with developing and installing a community solar energy field. Not only will this plan give financial aid to low-income communities that lack the funding to develop community solar energy fields, but will also prevent high tax revenue communities from bearing the cost of funding community solar energy fields for communities other than their own. A solar energy program funded solely by the state government would be impractical since it would raise taxes for the whole state, which could discourage residents from transitioning to fully powered solar energy communities altogether.

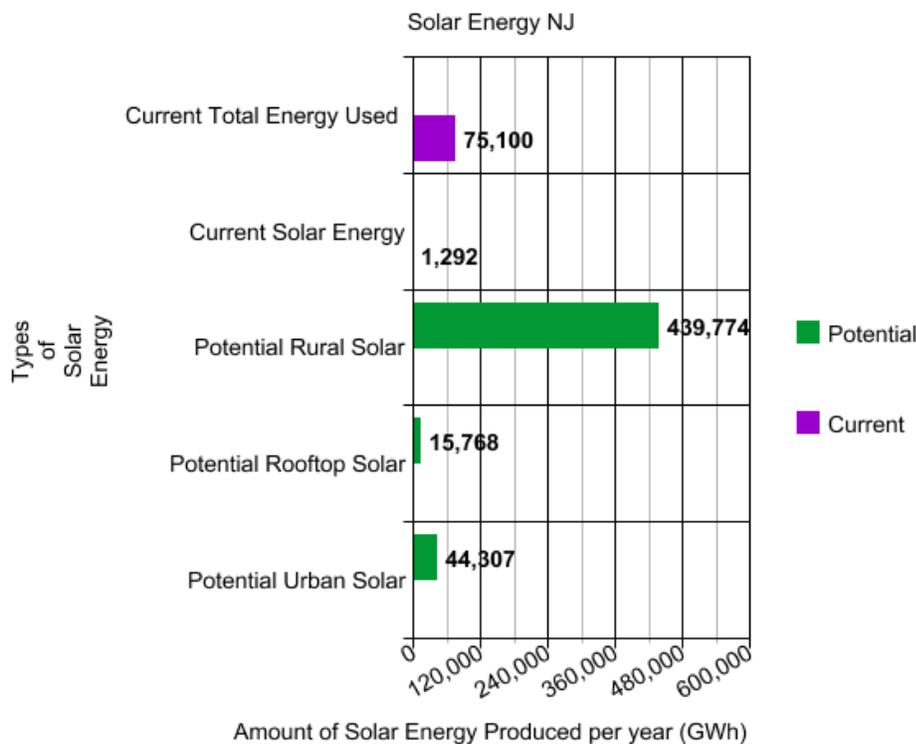
Solar power is New Jersey's leading renewable energy source (New Jersey - State Energy Profile Analysis - U.S. Energy Information Administration (EIA)). Unfortunately, solar power in New Jersey is produced at a small scale since the current solar energy technology makes it difficult

for solar energy to be easily stored or transported, and it must be consumed close to where it is generated (Hansen et al. 3). To address the technological limitations that drive the high cost of solar energy, the state government should fund research on solar energy battery technology at Rutgers University or other research institutions to promote and increase the speed of technological advancements that will lower the cost of solar energy, which will work towards the goal of making solar energy the lead energy source in New Jersey. Not only will technological advancements help the state of New Jersey in becoming fully powered by a renewable energy source, but it will also contribute to the success of solar energy initiatives nationally and globally. Having a successful and sustainable solar energy program in New Jersey will set a precedent for any state interested in creating their own renewable energy programs.

Methods of Evaluation:

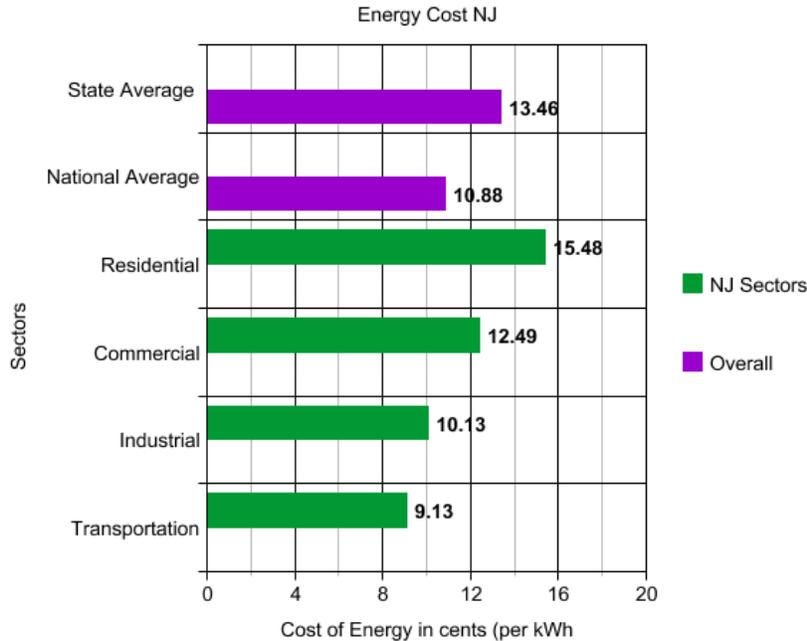
The method of evaluation for this proposal will be composed of two forms, the first being a comparison of professional standards, these standards being the Department of Energy's expected potential levels for renewable energy within the state of New Energy. The second being a cost analysis on the state level comparing renewable and nonrenewable and the hearing/report from the state Department of Energy on progress of solar technology that would lead to the decrease of prices for both consumers and state endeavors in the field of renewable energy. Currently the State of New Jersey can potentially produce 1292 GWh of solar energy annually based on the current amount of photovoltaic systems installed (U.S EIA, Electric Power Monthly). The potential amount of energy produced could be 44,307 GWh in just urban areas, in addition to rural areas within the state can produce upwards of 439,774 GWh, and 15,768 GWh from Solar generated on rooftops (Lopez, 10). Currently in the state of New Jersey around 75100 GWh is used

annually (Mgryczon, Quick Facts in NJ). With the two reference points, addressed the expectation is that by 2050 the state of NJ would be 100% renewable. Considering these two points the generation of energy should reach the necessity of 75100 GWh, if it was not then the potential would be the standard. At 2035 half of the state’s energy being produced by solar would be the expectation for the evaluation of our report. With 2050 reaching the total, from the graph you can observe the fact that a huge amount of energy could be captured in the rural areas of the state vs energy consumption.



The second intention of the proposal that will need to be evaluated is in regards to the cost of the energy that is being produced within the state and bought by either companies or residents. The standard for this cost would be based on two points, one would be with the intention that the price should be less than what it is while nuclear and natural gas are our main providers within the state. The current cost within the state of NJ is 13.46 cents per kWh averaged amongst residential, commercial, and industrial sectors. with almost 2% of electricity produced by solar (US EIA,

Electric Power Monthly). The expectation would be to lower this cost as best as possible. The determination of success would be to create the cheapest energy within the country or at least come close to that mark, currently that mark is 7.67 cents per kWh which is held by Idaho (US EIA, Electric Power Monthly). Based on the previous end goal of reaching 100% solar by 2050, then the goal would be to have the same conclusion, by 2050 the state of NJ would want to sell electricity at around 8 cents, taking into consideration inflation. With the halfway point being by 2035 to have the price reach 10.88 cents, which is the national average, which would show marked success in the short-term.



Now with these two points in mind, the state will have the data on the outcome of whether or not the recommended policy will reach their desired outcome. In the situation that either these reports do not give us the designated goals, at the halfway point, then a hearing/point must be administered with the State Department of Energy and National Department of Energy to determine the possible problems with the recommendations that were made. Specifically, for the goal for creating better technology to facilitate lower prices, this would constitute a report be made

by the Bureau of Engineering Services within the NJ Department of Energy, to determine if the current technology had advanced enough to meet the proposal's goal. This would be assisted by the Bureau of Revenue Requirements and Bureau of Rates and Tariffs to determine the economic problems that could be faced by these companies and if the prices were changed fairly based on investment.

Recommendation:

It is recommended that the state focus on improving the retention rate of batteries used for solar power. Not to do so goes against New Jersey's best interest since solar power is the leading renewable energy and the state's capacity for it is sixth in the nation. ("New Jersey State Energy Profile"). Supporting things such as the Department of Energy's SunShot Initiative and The Rocky Mountain Institute New Jersey demonstrates conviction for sustainable and clean energy. It would truly secure the state a spot as a leader in the energy shift and set a precedent for other states who might want to follow a similar path. Success in this pursuit gives New Jersey a certain amount of clout and gives more credibility to the incorporation of clean energy on a national level. This is especially crucial now as the current national government is steering away from such initiatives both domestically and internationally, as seen by the recent withdrawal of the Paris Agreement. A steady push towards solar energy would also leave the state in good standing with environmentalist groups, which in turn means publicity and monetary support as a way to aid the continuation of the program. Coupled with a battery made out of cheaper materials that works better and the boost that local solar power companies get, this route is economically beneficial on a long-term scale.

So long as the clean energy movement continues - and considering the political climate and scientific data that forecasts impending doom if things do not change soon- there will be a

strong base of people who want to help out with this initiative. This then becomes a matter of morality and the desire to make sure that the world can be inhabited by future generations. The legacy that the administration can create if this is done correctly is directly tied to this. In the immediate future, the governor's popularity as well as that of his party will receive a boost. On a personal level this could help the governor attain another higher level position that he might be vying for or if he so pleases to no longer occupy a political position success means leaving the office on a high note. The party gets to claim the accomplishments and benefits of the initiative which in turn can be used to publicize the competency of their candidates - past, present, and future- and could mean the ability to push forward other agendas that otherwise would have been difficult to present to the public before.

A well-implemented and well-received program is equal to a more sympathetic voter base who is more likely to listen to accept other proposals that are given. As it stands right now, most states and government groups are moving towards clean energy sources. However, this is not a change that happens overnight and groups such as the military will take a big hit as they adjust to this. This is because the United States military is one of the world's largest consumers of fossil fuels, mostly used in vehicles such as tanks and airplanes (Union of Concerned Scientists). They are likely to be resistant to the change and could create polarization in the general populous as the military will attempt to frame their use of fossil fuels as noble and necessary for public safety and defense. This can be counteracted by telling the public that this energy shift is not supposed to impose of the military since it is more a state matter than it is a national one. Therefore, only the military bases that are located in New Jersey will have to deal with the change, not the whole institution as a whole. This could also be a chance to show them a way to lower their carbon footprint as well as push for the creation of more eco-friendly technologies.

Summary:

As a leader in the transition into a cleaner future, it is important that New Jersey be careful about the next steps that it takes. As of now, New Jersey is doing well since it prefers to use natural gas and nuclear energy over coal and fossil fuels for electricity. There are also several clean energy initiatives currently being pursued such as the Energy Master Plan and Solar Energy Renewable certificate program which gives incentives to move towards cleaner energy production. This, however, is not enough if New Jersey wishes to be a true champion of renewable energy. Do so means that the state must stop its dependency on those previously mentioned nonrenewable energy sources. Continued support of natural gas and nuclear will impede and discredit this initiative. In order for New Jersey to successfully implement the plan it must first analyze the contributions and opposition of several stakeholders.

The Department of Community Affairs will constantly want to be informed of the progress and steps that are taken as they are the ones that relay this information to the citizens. The New Jersey State legislature should also be considered as they are the ones whose reputations are at stake and depending on who they represent will either help facilitate or obstruct the program. Depending how the initiative is implemented, utilities companies will have to adjust their brand and product to keep with this change, especially if it goes more local because that could mean a large loss of customers. Aid in research can be found in groups such as NASA, who are on the cutting-edge of technologies such as solar, and other research institutions.

There are a number of reasons as to why there is some hesitation from politicians to go ahead with this initiative that generally boils down to economic concerns. First, it is expensive to replace the current system and to implement a new one. A large amount of time and money is needed to be invested for the program to work. Second, renewable energies are more unreliable,

thus making it a risky investment if it fails. It is difficult to convince stakeholders to put their trust in a source that does not have the stability of other more tried sources. Finally, due to the nature of some of these renewable sources there is a need for people to be near where the energy is being produced. This is especially problematic for those that live in rural areas or impoverished ones as their distance and economic position makes it hard for them to afford solar power. While these are problems to contend with, there are ways to potentially solve them. To help ease the transition between the two systems there must be a period in which nuclear energy continues and slowly fades away as the new system grows more stable. From here the task of setting up and maintaining these solar grids rests on the local community. This drives down costs and makes the implementation of solar power quicker than if it was done at a federal level. The federal government can also give funds to municipalities to support communities who would otherwise struggle on their own to afford solar energy.

Besides that, it is essential that the state focus on making solar energy as inexpensive or even less so than their competitors such as natural gas and nuclear. To achieve this goal, New Jersey must make solar energy worth about 10.88 cents by 2035 and around 7 cents by 2050. It is then that solar energy will finally have a competitive edge in the market. Money can also be funneled into research with the end goal of creating a more efficient and effective battery. Batteries with higher retention rates and made out of cheaper materials will also help decrease the cost of solar power because it would mean more energy and less reliance on having to be at the location of where it is produced.

The governor should be acutely aware of what is being asked of him. Many opponents will complain about the price of the initiative, how is cumbersome and create setbacks to the economy. The governor should understand that these complaints are only looking at the short-term situation.

In the long run, an aggressive push to renewable energy means a better quality of life for future inhabitants of New Jersey. This is an investment for the children and grandchildren of the current generation. It is in the governor's hands to decide what type of legacy he wants his administration to leave. It is advised that the governor heed the recommendation given to ensure a better, cleaner, and more affordable New Jersey.

Works Cited

1. NOAA National Centers for Environmental information, Climate at a Glance: Global Mapping, published September 2019, retrieved on October 10, 2019/

The purpose of this site is that it allows the user to view the climate status for the entire world with monthly breaks. It shows the overall climate change for that month in comparison to the month prior, allowing important info on climate change overall.

The organization behind the site is NOAA or the National Oceanographic and Atmospheric Association, which is one of the 6 uniformed services in the United States and aid the federal government in regards to determining weather and overall environmental changes. It is highly credible and is a major reference point in most meteorological sciences.

The importance of this site is in what it lets us determine to be important in regards to whether or not the United States or more specifically New Jersey is facing climate change, and if we should react.

2. Leibensperger, E. M., Mickley, L. J., Jacob, D. J., Chen, W.-T., Seinfeld, J. H., Nenes, A., Adams, P. J., ... Rind, D. (September 05, 2011). Climatic effects of 1950-2050 changes in US anthropogenic aerosols - Part 2: Climate response. *Atmospheric Chemistry and Physics Discussions*, 11, 8, 24127-24164.

The purpose of this work is to give insight on one of the major cooling/warming elements that the east coast faces. Which is anthropogenic aerosols which is unnatural particles that enter the atmosphere, such as haze and smoke that is caused by humans and the study then relays to us the effects it had.

The paper does not have any particular organization backing its prospect, but was written by a dozen scientists focused around ecology with many of them holding notable positions at Universities such as Cambridge and Harvard. The reputation of the paper could be questioned due to bias, but is unlikely due to the possibility of loss of tenure.

This paper gives insight into the reasoning behind switching away from non-renewable resources that cause many of aerosols as byproduct. This also gives us a timeline on when the effort should be put forward to make that difference on New Jersey's energy resources.

3. Mgryczon. "Energy Master Plan: EMP Documents." Energy Master Plan | EMP Documents, State Government of New Jersey, 10 June 2019, www.nj.gov/emp/docs/.

This work gives a general overview of the Energy Master Plan in New Jersey. It discusses the current state of energy and the plans and strategies that will be implemented to ensure the success of the program.

The purpose of the document is to set clear and concise goals that need to be completed to achieve the desired goals. It serves a guideline for future politicians on what to do. It is also a testament to New Jersey's desire to only depend on clean energy so as to spare the environment.

This is the most updated document on the Energy Master Plan. It gives us a better insight into what politicians believe is the best course of action. The document also includes feedback and the data collected, both important to understand why the document came to the conclusions that it did.

4. *Ending the Fossil Fuel Era*, edited by Thomas Princen, et al., MIT Press, 2015. ProQuestEbookCentral, <https://ebookcentral.proquest.com/lib/rutgers-ebooks/detail.action?docID=3433778>.

This purpose of this work is to show how the continuous use of Fossil fuels has caused irreparable damage to the environment. It delves into the historical context around the use of fossil fuels and the negative impact of the industry itself throughout the span of its existence.

The author is specifically writing about resisting against the use of fossil fuels by rejecting the extreme extraction of natural resources like crude oil and coal. Princen discusses how countries can exit the industry and move towards a post-fossil fuel era. His findings show how six different countries have taken monumental steps to move away from the use of fossil fuels.

This source provided the groundwork for the problems presented portion of the policy proposal. It allowed us to define how the problem with fossil fuels specifically causes damage to the planet and communities that are situated next to the extraction sites.

5. “U.S. Energy Information Administration - EIA –Independent Statistics and Analysis.” New Jersey - State Energy Profile Analysis - U.S. Energy Information Administration (EIA), <https://www.eia.gov/state/analysis.php?sid=NJ>.

This source gives an overview of the state of energy in the state of New Jersey. It presents an analysis of every energy source that is used to power the state and statistics regarding their usage. This source provides insight on the leading energy sources in New Jersey.

Since this work is a report on energy sources consumed in New Jersey conducted by the federal government, it is very credible and accurate. In addition, this source includes an extensive bibliography to support its claim. The sources discusses how natural gas and nuclear energy are the leading energy sources in the state. In addition, it covers the state of renewable energy in New Jersey as well.

This source provides relevant background knowledge of the current energy statistics in the state of New Jersey to help base our potential solutions and problems associated with increasing the consumption and usage of renewable energy sources in the state. This source also provides an objective analysis of the energy profile in New Jersey.

6. New Jersey (State). Legislature. Senate. Establishes and modifies clean energy and energy efficiency programs; modifies State's solar renewable energy portfolio standards, 2018. New Jersey State Legislature. 2018, Web.

This source gives an initial explanation of how the Renewable Energy Portfolio is and the current requirements that it has for utility companies in the state. It then shows the changes and the state will move forward with policy objectives aimed at increasing solar and the potential solutions that have been suggested.

This work is directly from the New Jersey Legislature and is a passed resolution its credibility is undeniable. The source discusses what the legislature has done in the past with references to other pieces of legislature and the congressmen working on them.

Giving insight on what the higher level leadership of the state believe towards the situation in the state and how we can improve the states infrastructure and what it means for the future.

This source provides relevant background knowledge of the current energy statistics in the state of New Jersey and the requirements made by legislature to compare, and what the long term goals are for the state. It also includes some information on how utilities would be charged and the impact it will have on the consumer.

7. Hart, David M. "Making, Breaking, and (Partially) Remaking Markets: State Regulation and Photovoltaic Electricity in New Jersey." *Energy Policy*, Elsevier, 10 July 2010, <https://www.sciencedirect.com/science/article/pii/S0301421510004994>.

This work focuses on the general history of photovoltaic electricity, more commonly referred to as solar power, in the state of New Jersey. It gives an in depth analysis of how this market has performed in the past decade. It is geared towards policy analysts and politicians how wish to understand how this energy has fared and what can be done to harness this power in a more effective and efficient manner.

This article was written by David M. Hart, a professor at George Mason University's School of Public Policy. It was published by ScienceDirect, a website that hosts scientific and medical journals, books, and research.

This particular article offers information on the economic reasons as to why solar power has been so slow to be incorporated into the New Jersey energy system. The article mainly blames the subsidies given to other sources as well as the budget crisis for the boom and decline in progress and uses Spain as an example of a similar situation. The author also details other similar obstacles that the implementation has faced, such as the inability to justify the high rates for little production and restructuring of administration of companies such as T&D. Despite all of this, and the less than ideal path towards the use of photovoltaic electricity, New Jersey is still a leader in the area whose capacity is only matched by states such as California who are larger and have more area.

8. O'Boyle, Mike, and Barbara Blumental. "New Jersey Is Now The United States' Hottest Clean Energy Economy." *Forbes, Forbes Magazine*, 18 June 2018, <https://www.forbes.com/sites/energyinnovation/2018/06/18/new-jersey-is-now-the-united-states-hottest-clean-energy-economy/#6529dcff334f>.

This source provides an overview of recent renewable energy legislation that was signed into law by New Jersey Governor Phil Murphy and an overview of current renewable energy

initiatives and their goals for the future. It also provides important facts and statistics regarding renewable energy sources such as solar and wind energy.

This is a credible source since it is a news article by a reputable business magazine. In addition, it gives insight on existing renewable energy infrastructures in New Jersey and the goals of the governor for expansion of renewable energy source projects in the state. This source also discusses the record low cost of solar energy in recent years, which is beneficial in increasing the amount of renewable energy sources consumed in New Jersey.

Overall, this is an informative and credible source of information that can be used to lay the framework for a plan to make the State of New Jersey more environmentally friendly in its energy consumption. This article also gives insight on current renewable energy initiatives that the state government already has in place.

9. Lauber, Volkmar. *Switching to Renewable Power : a Framework for the 21st Century* . Earthscan,2005.Retrievedfrom<https://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=20715620&site=ehost-live>

This source provides an overview of how fossil fuel reserves are being depleted and the importance of switching to renewable energy sources. The source also argues in favor of nuclear power since it was significantly less harmful than other fossil fuels.

This is a credible source since it is an article in an academic journal. In addition, the source uses evidence to support their claims by citing all their sources adequately. It also provides statistics to support its claims. This source gives a clear overview of the current risk of a fossil fuel shortage in the future. The source explains why it is necessary to switch to renewable energy for the sake of the environment and energy stability.

10. “Accidents at Nuclear Power Plants and Cancer Risk.” *National Cancer Institute*, <https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/nuclear-accidents-fact-sheet>.

This is a fact sheet that provides detailed description of the safety and health concerns around nuclear energy. It provides concrete scientific evidence describing how the threat that nuclear energy poses directly affects communities in the area and the environment.

The leading organization behind the information is the National Cancer Institute which works in liaison with National Institute of Health. The scientific evidence provided by this source provide crucial background knowledge for the problems presented section. It further provides background for the policy solutions advocating for the shift from nuclear energy to solar energy.

11. “Low Income Community Energy Solutions.” *Energy.gov*, <https://www.energy.gov/eere/slsc/low-income-community-energy-solutions>.

The purpose of this work is to highlight the problems that many low-income communities around the world face when trying to obtain renewable technologies in their own neighborhoods.

The information is taken from the Office of Energy Efficiency and Renewable Energy and is credible source given that much of the information is derived from government records and fact sheets.

The source provides a clear pathway on issues plaguing low income household and has provided evidence needed for the policy problems presented and background information on the policy solutions proposed.

12. “Renewable Portfolio Standard.” *NJDEP-Air Quality, Energy & Sustainability*, <https://www.state.nj.us/dep/ages/oepa-renewable-portfolio.html>.

The purpose of this work is to consolidate all the resources and different links to government sponsored websites and groups whose mission is directly linked to ensuring New Jersey’s commitment to renewable and sustainable environmental policy.

The organization that created this portfolio is the New Jersey State Department of Environmental Protection. The sources, links and information gathered on the site is credible given that it is government-run and funded. It is a testimony of New Jersey’s historical commitment to environmental protection.

This source provides integral information because it allows the reader to understand the different programs and policies that New Jersey already has in place when it comes to utilizing renewable energy. It even outlines future goals so that constituents have a better understanding of where the state’s environmental goals will take us in the coming years.

13. Lopez, Anthony & Roberts, B. & Heimiller, Donna & Blair, Nathan & Porro, G.. (2012). *U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis*. Contract. 303. 10.2172/1047328.

This purpose of this work is to show the possibility of how much energy can be created in the United States broken down by state, and into categories of what type of energy. It includes an analysis of how each source of energy work and the potential for the greater country.

The organization that created this portfolio the National Renewable Energy Laboratory is a subdivision of the Department of Energy. The information is credible based on the numerous sources used, including both private and public entities. The findings of the article point to a huge

amount of potential in the way of energy usage, but with limitations on the amount of energy that can be used at any given time. Giving enough information to encourage the growth of the renewable energy industry.

This source gives information on the potential of the state of new jersey as well as showing the amount of industry that is currently in use in the state.

14. “Ocean Wind Application for Offshore for Wind Renewable Energy Certificates.” *Orsted* Submitted to the New Jersey Board of Public Utilities, 28 December 2018.

This source gives an overall explanation of the initiative/ contract that orsted has taken to create a large offshore wind farm. Included is an extension to the renewable energy portfolio, where they request wind power certificates.

The credibility of the report can be questioned, due to the fact that this is a business with the motivation of earning money from the government. This can be rescinded by the fact that the New Jersey government has accepted the application, and gone through a thorough process of examination. The majority of the document deals with the amount of energy that is potentially going to be produced by the company and that the work they have started in the state.

This source provides relevant background knowledge on the current offshore wind generation in New Jersey, allowing for an outside perspective or a financial institution. This source also provides relevant information on the potential project the company would take.

15. Matasci, Sara. “Solar Panel Cost: Avg. Solar Panel Prices by State in 2019: EnergySage.” *Solar News*, EnergySage, 31 Oct. 2019, <https://news.energysage.com/how-much-does-the-average-solar-panel-installation-cost-in-the-u-s/>.

The purpose of this work is to explain the costs behind solar panels in the United States based on what kind of system a consumer would like to install in their. The key takeaways from this source highlight how much it costs per solar panel, the decrease in the costs and links the reader to other sites that provide various different solar panels at different costs.

The organization that wrote this is EnergySage whose mission it is to make the process of going solar as easy as other mundane tasks like booking a flight or ordering a new filter for your fridge. It is an online marketplace for all parties who are buying and selling solar energy and is supported by the U.S Department of Energy along with other credible organizations.

This source provides integral information needed to understand how solar panels are affordable when it comes to a community centered initiative but it also gives insight on essential price numbers needed for the proposed solutions in this policy proposal.

16. “What Is Accelerating the ‘Utility Death Spiral?’” *San Diego Energy District*, <http://www.sandiegoenergydistrict.org/what-is-accelerating-the-utility-death-spiral.html>.

The purpose of this work is to explain the phenomenon of the “Utility Death Spiral” which is when a utility loses money from a self-generating source of electricity like solar and is forced to raise rates for other customers in order to preserve its revenue base. The high rates feed into a cycle of profit driven policies that mostly benefit the utility companies and make it even harder for most people to access self-generating sources of solar power.

The organization behind this is the San Diego Energy District Foundation which is a non-profit committed to a 100% clean electricity future, especially one that starts from counties in California.

This source provides integral information about the role that utilities company play when it comes to the implementation of solar energy. Due to the issues that many run into, they can raise the prices on purpose in order to raise their profits. It provides statistics on how utilities keep their profits high even if it comes at the expense of consumers and the environment. It is essential to the policy proposed given that these utilities companies must be held accountable for their profit driven agendas that are negatively affecting communities that are trying to push for clean energy initiatives.

17. Granath, Bob. "Energy Awareness Month to Focus on Solar Power." *NASA*, NASA, 28 Sept. 2017, <https://www.nasa.gov/feature/energy-awareness-month-to-focus-on-solar-power>.

The purpose of this work is to explain how NASA's Spaceport Integration and Services has set October as the month of Energy Awareness. It delves deeper into how NASA has moved towards establishing new power facilities solely running on solar energy and supports the use of solar energy as a low-cost, environmentally friendly and sustainable solution to nonrenewable energy.

The organization behind this is NASA's Kennedy Space Center in Florida. The website is a credible source and the information provided is directly written by NASA officials and sponsored by the government of the United States.

This source provides insight into one of the key stakeholders in the policy proposal and how they are moving forward with their work in solar energy. The policy solution proposed will heavily rely on working with major agencies like NASA to move the state of New Jersey from the use of nonrenewable sources of energy to solar power.

18. “2017 U.S. Energy and Employment Report.” *Energy.gov*, <https://www.energy.gov/downloads/2017-us-energy-and-employment-report>.

The purpose of this work is to highlight how the Traditional Energy and Energy Efficiency sectors created new jobs for the economy. The solar workforce has increased drastically over the years and thousands of workers have been employed through other initiatives created to shift the country from nonrenewable energy to renewable energy.

The organization behind this is a government run organization that releases annual reports with credible statistics and facts aimed at providing the public with updated knowledge on how jobs in the energy field provide a boost for the economy.

This source provides integral information necessary to implement the solution of the proposed solution and to provide an in depth analysis of the stakeholders. A variety of people will lose their jobs as nuclear power plants are scheduled to shut down. But with this evidence and report, the policy proposal will ensure that more jobs in the clean energy initiative will provide an opportunity for those who are struggling to work in the transition.

19. Jacobs, Mike. “Solar vs Nuclear: The Tale of Two Energy Sources.” *Union of Concerned Scientists*, 16 Feb. 2017, <https://blog.ucsusa.org/mike-jacobs/solar-vs-nuclear>.

This source gives a general overview and understanding of the uses for Solar and Nuclear Energy. It details the advantages of Solar in terms of job creation and training, as well as the portability of solar energy.

This source was written by a senior energy analyst with expertise in electricity markets, transmission and renewables integration work.

The article offers a clearer understanding of how Nuclear power is harvested and the difference and price scale. It provides scientific evidence and background knowledge specific to the two energy sources.

20. “Clean Energy Is Building a New American Workforce.” *Environmental Defense Fund*, 16 Oct. 2019, <https://www.edf.org/energy/clean-energy-jobs>.

This website presents a brief national overview of the progress that is being made towards more eco-friendly solutions. It discusses the current workforce and the areas they work in such as renewable energy, more advanced energy distribution technologies, high efficiency rates, and improving the transportation system. It acknowledges the uncertainties of the future but assures the public that these measures will only help them.

The article was written by the Environmental Defense Fund is a non-profit organization whose main goal is environmental advocacy. Its headquarters can be found in New York, NY and is known to be highly active in raising awareness for climate change and how it affects both nature and humanity alike. They use scientific research and methodology to find solutions that are cost-effective and beneficial to their cause.

This article gives data on the current state of eco-friendly initiatives on a national level. This is integral to know as it shows how effective employment-wise the initiatives have been, as one of the prominent arguments against this shift is how it negatively affects employment. It also shows how dedicated the country is to make eco-friendly solutions a reality and the norm.

21. Ridlington, Elizabeth, and John Rumpler. “Fracking by the Numbers: Key Impacts of Dirty Drilling at the State and National Level.” *Environment America Research & Policy Center*, Frontier Group, Oct. 2013, <https://environmentamericacenter.org/>.

The purpose of this work was to highlight the key environmental impacts of fracking. It went into detailed description of what fracking was and where it has been happening in the U.S. It delved even deeper into the environmental implications of fracking and how it is not only wreaking havoc on the planet but also on the citizens of the United States.

The organization that created this is a policy center called Environment America Research and Policy Center which is committed to protecting our air, water and open spaces. They investigate problems related to these topics among in order to provide toolkits and reports that inform citizens and those interested in knowing more about the specific environmental issues.

This source provides integral information in regards to statistics, case studies, maps and basic background information on how Fracking and the extraction of fossil fuels is detrimental to our future given that it is destroying the planet in a multitude of ways.

22. “Radiation Studies - CDC: Radon in the Home.” *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 26 Dec. 2018, https://www.cdc.gov/nceh/radiation/brochure/profile_radon.htm.

The purpose of this work is to create a summary and website where the medical effects of radon contamination in homes is listed and explained. Some key points include the diseases that are directly linked to radiation and tips on what can one do about radon contamination if diagnosed with radiation sickness or other related health issues.

The organization behind this source is the Center for Disease Control and Prevention whose mission is to provide necessary information on public health risks and concerns.

This source provides integral information on Radiation and its effects on one's health. It is used to highlight the fact that radioactive particles from nuclear waste are directly linked to cancer and a plethora of other diseases and health problems.

23. Department of Environmental Protection, State of New Jersey. "2015 New Jersey Radon Potential Map." *NJDEP-Bureau of Environmental Radiation*, <https://www.nj.gov/dep/rpp/radon/radonin.htm>.

The purpose of this work is to highlight the various levels of radon contamination in different parts of the state. It also offers government run services that can help individuals who live in spaces with high radon levels. It recommends that all homes should be tested and mitigated if deemed in the top two tiers of radon contamination.

The organization behind this source is New Jersey's Department of Environmental Protection whose mission lies at the foundation of collecting data quantifying how many people in the state are affected by Radon contamination and which communities are at high risk.

This source provides integral information explaining which municipalities in New Jersey have high, moderate or low potentials of radon concentrations. It provided a very concise and easy to follow map along with other statistics on how widespread radon contamination really is in New Jersey. This is essential when providing context for the problems presented in the policy proposal.

24. Sierra Club, NJ Chapter. "More Dirty Air for Newark with DEP Permit." *Sierra Club*, 16 Feb. 2018, <https://www.sierraclub.org/new-jersey/press-releases/0670>.

The purpose of this source is to highlight how the Newark Energy Center is worsening the conditions of Newark by creating even more pollution with their new air pollution control permit that was introduced in the Department of Environmental Protection's hearing in 2016.

The organization behind this source is New Jersey's Chapter of the Sierra Club which is focused on emphasizing how poor, black and brown communities are already subjected to the worst conditions and effects of climate change. The organization is an environmental organization that seeks to influence public policy.

This source provides context into how nuclear plants directly disempower and uphold structures of environmental racism depleting the resources of the earth and causing even more damage to human lives and poor, black and brown neighborhoods. It is integral to understanding problems presented in the policy brief and provides key background information for one of the solutions proposed above.

25. "How Does Radon Enter the Home or Building?" *Welcome to Radon Testing Lab*, <http://www.radontestinglab.com/enterhome.asp>.

The purpose of this work is to provide a concise and easy to understand summary of the key components of radon testing and what encompasses the problems related to radon gas in homes and buildings.

The organization that created this is a credible source that is a certified radon testing lab. The source is also a company website created to promote the radon testing kit and to expand upon the company's radon remediation services.

This source explains integral information focused on providing accurate data of what radon gas is, how it gets into our homes and what can essentially be done about it in terms of remediation. It is important to the problems presented in the policy brief.

26. "The US Military and Oil." *Union of Concerned Scientists*, 1 June 2014, www.ucsusa.org/resources/us-military-and-oil.

This article and video give a brief overview on the current state of military technology with a special attention to its energy usage. It discusses the mass amount of fossil fuels it uses and how this makes it susceptible to changes in the market. Despite this, the military has made efforts into making vehicles more eco-friendly.

Union of Concerned Scientists is a non-profit organization composed of around 250 scientists, analysts, and experts whose main goal is to combat the stigma against science and to offer their readers factual and researched facts on a variety of topics.

This article serves to show how dependent we are as a country on fossil fuels and how a dip in the market can hurt the military, our main form of defense and arguably biggest institution. It gives exact numbers and data on the energy the military consumes annually. It also acknowledges that the military is aware of this and is attempting to find ways to lower their dependency on oil.

27. Matasci, Sara. "Why The Solar Tax Credit Extension Is A Big Deal In 2019 | Energysage". *Solar News*, 2019, <https://news.energysage.com/congress-extends-the-solar-tax-credit/>.

This article is informing potential solar energy generators of the government incentive of investing in the clean energy economy. It discusses a Solar Tax Credit that allows you to deduct up the 30 percent of the solar panel installation cost from your federal taxes. The article breaks down the logistics of what it takes to qualify for the credit as well as decrease the tax credit will be seeing in the near future.

This is article was meant to show some of the potential incentives the governor could promote while trying to get this idea through the state legislature in addition to New Jersey's own incentives.