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Chemistry 2, Lesson 11

Kian Ali Agheli

Pre-Write

Research Source	*Publisher*	*In favor*	*Against*	*Reliability*
energy.gov	U.S. Department of Energy	• largest source of clean power in U.S. • about 500,000 U.S. jobs • high wages • Ensures availability of nuclear weapons	• Accidents are devastating • Nuclear waste • Monetarily expensive infrastructure, maintenance, and operation	Partially reliable, being a source with abundant reason for positive bias
e360.yale.edu	Yale School of the Environment	• No carbon directly produced • "Nuclear power releases less radiation into the environment than any other major energy source" • Accidents less bad than otherwise energy disasters	• Three-Mile Island, Chernobyl, Fukuskima accidents	Reliable, argumentative essay written by acclaimed author, published by university
greenamerica.org	Green America		• "The waste generated by nuclear reactors remains radioactive for tens to hundreds of thousands of years" • More nuclear weapons • Increased cancer likelihood	Partially reliable, written by an organization funded by activistic donations, supplying a negative bias

From the sources you have reviewed, summarize 3 major arguments that support and 3 major arguments that oppose the use of nuclear power for generating electricity. For each of the arguments, cite at least one source that supports this fact or point of view.

Nuclear is the largest source of power that does not directly produce greenhouse gases, as published by the U.S. Department of Energy and the Yale School of the Environment. In addition, a large portion of high-wage jobs are provided by nuclear power plants, as published by the U.S. Department of Energy. It is published by the Yale School of the Environment: 'Nuclear power releases less radiation into the environment than any other major energy source ... even the worst possible accident at a nuclear power plant – the complete meltdown and burnup of its radioactive fuel – was far less destructive than other major industrial accidents across the past century'.

Nuclear power plant accidents are a primary public concern, having caused some cancer and death, as published by the U.S. Department of Energy, the Yale School of the Environment, and Green America. The building and maintenance of nuclear power plants is expensive, as published by the U.S. Department of Energy and Green America. The waste produced has no permanent residency, and remains radioactive for thousands of years, as published by the U.S. Department of Energy and Green America.

1. Which of the sources are more trustworthy and why?

The most trustworthy of the sources may be the article written for the Yale School of the Environment, that which was written by an independent author of great acclaim. Less trustworthy than that may be the article published by the U.S. Department of Energy, that which has an abundance of reason for bias in favor of nuclear energy.

2. Which of the sources warrant some scepticism because of bias or insufficient evidence?

Least trustworthy may be the article published by Green America, an organization directly funded by activistic donations, with reason for alarmist bias designed to encourage financial support.

Nuclear power plants are a subject of somewhat controversy. Though they provide an abundance of power, they are not without drawbacks. In some eyes, they set a path to a clean future, in others they are a path to ruin, and in others still the truth lies in a murky middle between each extreme. The opinion of this seat in the House of Representatives may be seen as belonging to the lattermost distinction. Nuclear power plants provide a minimally harmful component of our energy-driven present and future. Though they are flawed, and like any tool, horribly dangerous when mismanaged, there is reason for continued faith in their proper management, and plenty to gain from accepting such a risk. The following explains the rationale behind our decision to facilitate the construction of power plants in our locale.

Production of energy through nuclear means does not by any direct means cause the emission of greenhouse gases. Richard Rhodes wrote the following for *Yale Environment 360:* 'Switching from coal to natural gas is a step toward decarbonizing, since burning natural gas produces about half the carbon dioxide of burning coal. But switching from coal to nuclear power is radically decarbonizing, since nuclear power plants release greenhouse gases only from the ancillary use of fossil fuels during their construction, mining, fuel processing, maintenance, and decommissioning – about as much as solar power does, which is about 4 to 5 percent as much as a natural gas-fired power plant.' Though the initial production of nuclear power plants may necessitate some greenhouse gas emission, the regular operation of such a plant avoids atmospheric damage. This point is one of the clearest positives to be associated with production of energy through nuclear means.

The building, maintenance, and operation of a nuclear power plant brings with it a large influx of well-paying jobs. A subsidiary of the United States Department of Energy, the Office of Nuclear Energy, has written on this subject exactly. 'The nuclear industry supports nearly half a million jobs in the United States and contributes an estimated $60 billion to the U.S. gross domestic product each year. U.S. nuclear plants can employ up to 700 workers with salaries that are 30% higher than the local average.' Further, they have written that nuclear power plants 'contribute billions of dollars annually to local economies through federal and state tax revenues'. Opportunities such as these are well appreciated, and serve to support healthy local economies.

As with any method of energy production, there are undesirable side effects. Accidents occur in any industry, with nuclear energy production being no exception. Understanding and accepting this, and further accepting that our need for energy only grows, nuclear power plants are a minimally risky solution. Richard Rhodes wrote: 'There have been three large-scale accidents involving nuclear power reactors since the onset of commercial nuclear power in the mid-1950s ... even the worst possible accident at a nuclear power plant – the complete meltdown and burnup of its radioactive fuel – was yet far less destructive than other major industrial accidents across the past century'. Accidents will happen, even when utmost caution is applied. The extremely occasionally accidents that may be expected of power plants are lesser in fallout than that which may be expected from other popular methods of mass energy production. Successful operation has otherwise negligible impacts on surrounding environments. In particular, 'nuclear power releases less radiation into the environment than any other major energy source'. The replacement of current energy production methods with nuclear ones may ensure the continuing physical health of our communities.

Our future is one in which our energy needs increase dramatically, and there are only so many methods of sustainable energy production we may take advantage of. Of the methods known to us now, nuclear is an optimal choice. Nuclear power plants will provide us with continuing sources of energy, and in doing so allow for our continued technological advancement. We have faith in the success of the power plants to come, and we appreciate the opportunities they may provide us. Our future holds many advancements, and though the path we have selected is not perfectly paved, close inspection may provoke a conclusion as such: nuclear power plants will support us on our certain, perhaps slightly bumpy journey to a great future.

Revise

1. Review your writing. What strengths does your essay show?

   My essay does well to stay focused, and to address the target audience.

2. List ways that you would like to improve your essay.

   My essay may benefit from further reference to the U.S. Department of Energy.

Nuclear power plants are a subject of somewhat controversy. Though they provide an abundance of power, they are not without limitations and drawbacks. In some eyes, they set a path to a clean future, in others they are a path to ruin, and in others still the truth lies in a murky middle between each extreme. The opinion of this seat in the House of Representatives may be seen as belonging to the lattermost distinction. Nuclear power plants provide a minimally harmful component of our energy-driven present and future. Though they are flawed, and like any tool, horribly dangerous when mismanaged, there is reason for continued faith in their proper management, and plenty to gain from accepting such a risk. The following explains the rationale behind our decision to facilitate the construction of power plants in our locale.

Production of energy through nuclear means does not by any direct means cause the emission of greenhouse gases. Richard Rhodes wrote the following for *Yale Environment 360:* 'Switching from coal to natural gas is a step toward decarbonizing, since burning natural gas produces about half the carbon dioxide of burning coal. But switching from coal to nuclear power is radically decarbonizing, since nuclear power plants release greenhouse gases only from the ancillary use of fossil fuels during their construction, mining, fuel processing, maintenance, and decommissioning – about as much as solar power does, which is about 4 to 5 percent as much as a natural gas-fired power plant.' Though the initial production of nuclear power plants may necessitate some greenhouse gas emission, the regular operation of such a plant avoids atmospheric damage. This point is one of the clearest positives to be associated with production of energy through nuclear means.

The building, maintenance, and operation of a nuclear power plant brings with it a large influx long-term and well-paying jobs. A subsidiary of the United States Department of Energy, the Office of Nuclear Energy, has written on this subject exactly. 'The nuclear industry supports nearly half a million jobs in the United States and contributes an estimated $60 billion to the U.S. gross domestic product each year. U.S. nuclear plants can employ up to 700 workers with salaries that are 30% higher than the local average.' Further, they have written that nuclear power plants 'contribute billions of dollars annually to local economies through federal and state tax revenues'. Opportunities such as these are well appreciated by individuals and governments alike, and serve to support healthy local economies.

As with any method of energy production, there are undesirable side effects. Accidents occur in any industry, with nuclear energy production being no exception. Understanding and accepting this, and further accepting that our need for energy only grows, nuclear power plants are a minimally risky solution. Richard Rhodes wrote: 'There have been three large-scale accidents involving nuclear power reactors since the onset of commercial nuclear power in the mid-1950s ... even the worst possible accident at a nuclear power plant – the complete meltdown and burnup of its radioactive fuel – was yet far less destructive than other major industrial accidents across the past century'. Accidents will happen, even when utmost caution is applied. The extremely occasionally accidents that may be expected of power plants are lesser in fallout than that which may be expected from other popular methods of mass energy production, and will become continually lesser. According to the Department of Energy, they are 'working with industry to develop new fuels and cladding known as accident tolerant fuels', those which bring with them lesser operating costs and lesser waste. During the successful behavior of a nuclear power plant, minimal negative impacts on surrounding environments may be expected. In particular, as researched by Richard Rhodes, 'nuclear power releases less radiation into the environment than any other major energy source'. The replacement of current energy production methods with nuclear ones may ensure the continuing physical health of our communities.

Our future is one in which our energy needs increase dramatically, and there is a limited set methods of practical and sustainable mass energy production we may exploit. Of the methods of energy production known and readily available to us now, nuclear is an optimal choice. Nuclear power plants will provide us with continuing sources of energy, and in doing so allow for our continued technological advancement. They are minimally harmful, and provide several genuine economic benefits to the communities that contain them. We have faith in the success of the power plants to come, and we appreciate the opportunities they may provide us. Our future holds many advancements, and though the path we have selected is not perfectly paved, close inspection may provoke a conclusion as such: nuclear power plants will support us on our certain, perhaps slightly bumpy journey to a great future.