What is next After Ethanol

What’s next after ethanol and biodiesel in the biofuel market?

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Abstract

In recent years biofuels have largely become a central topic in the global theatre. The 2002 US-led Iraq invasion and recent events in Libya have driven oil prices to record heights, \$147.27 and \$110.62 per barrel respectively. With worldwide transportation systems closely tied with oil derivatives, the international search for alternative fuels to mitigate the effects of events in the oil supply chain is far more intensive than ever (Tyner, 2008). Additionally, the growing awareness of human impact on Earth has been decisive for the growing support of biofuels. International studies on climate change and greenhouse gas emission show with unfathomable certainty that without energy changes, there will be irreversible disastrous consequences (Warren et al., 2011).

Biofuels refer specifically to a liquid or gaseous fuel produced from biomass for the transportation industry. Currently the two leading biofuels in use are ethanol (C_2H_5OH) and bio-diesel (Bringezu et al., 2009). Ethanol is majorly used in Brazil and the United States and its widespread use as an additive/blend with gasoline is known to produce higher antiknock properties, and lower pollutant emissions than gasoline alone (Wongyao et al., 2011). Biodiesel is synthesized by transesterification of vegetable oil and is also used as a blend with conventional diesel fuel without any requirements of engine modification (IEA, 2007). The key advantage of increasing our use of biofuels offers a future that will help stabilize the turbulent global impacts of greenhouse gases that fossil fuel use has instigated. It also builds on other large areas of weaknesses such as sustainability, security of supply and foreign exchange losses, and may even stimulate regional and social structural development in 3rd world nations (Hunt, 2008).

Tabor College NSW

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Introduction

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In recent years biofuels have largely become a central topic in the global theatre. The 2002 US-led Iraq invasion and recent events in Libya have driven oil prices to record heights, $147.27 and $110.62 per barrel respectively. With worldwide transportation systems closely tied with oil derivatives, the international search for alternative fuels to mitigate the effects of events in the oil supply chain is far more intensive than ever (Tyner, 2008). Additionally, the growing awareness of human impact on Earth has been decisive for the growing support of biofuels. International studies on climate change and greenhouse gas emission show with unfathomable certainty that without energy changes, there will be irreversible disastrous consequences (Warren et al., 2011).

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Despite this, ethanol and biodiesel have begun to attract criticism over technical, economical and environmental unfriendliness (Williams et al., 2009). The production of ethanol and biodiesel directly conflicts with the supply of corn and soy as food, otherwise known as the fuel vs food debate, and therefore directly inflate global food prices and instigates social controversy (Rotman, 2008). A well publicized and controversial article in *Science* argues that the need to grow and cultivate the agricultural land for biofuels requires destruction of precious rainforests and prairies; therefore a complete life cycle assessment of ethanol and biodiesel would indicate higher carbon release and environmental damage than fossil fuels (Plevin et al., 2010). Nevertheless the general consensus is that growing demand for environmentally friendly biofuels cannot be met by ethanol and biodiesel alone (EIA, 2011).

The next wave of biofuels must build on the weaknesses of ethanol and biodiesel, such as indirect and direct environmental concerns, effects on global food supplies and prices (Hunt, 2008). The most promising crop of biofuel prospects is of biohydrogen, Fischer-Tropsch Diesel, cellulosic ethanol and biomethanol (Bringezu et al., 2009). This report will explore each of these potential biofuels and discuss key advantages, disadvantages, recent progress and challenges to entering the market.

Cellulosic Ethanol

Cellulosic ethanol has shown to be a potential next generation replacement for traditional

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starch based ethanol. Unlike its predecessor, cellulosic ethanol uses lignocellulosic biomass: a non-food feedstock drawn from cornstover, switch grass and other forms of agricultural waste (Bringezu et al., 2009). Using lignocellulosic biomass does not affect global food prices, and is cheaper and easier to obtain in comparison to starch-based bioethanol feed stocks (Dwivedi et al., 2009). Studies have also shown that lignocellulosic biomass can be produced from municipal solid waste or even on infertile lands thus eliminating the need for the destruction of rainforests and other wildlife habitats (Chester and Martin, 2009).

There are currently two broad production methods for cellulosic ethanol:- hydrolysis and thermo-chemical conversion. Under hydrolysis production, the lignocellulosic biomass are hydrolysed using sulphite (SPORL) pre-treatment to separate solids from liquid, cut through strong physical structures of wood and recover the sugars in cellulose, hemicelluloses and lignin (Zhu et al., 2009) (Cheng et al., 2011). The cellulose recovered from the pre-treatment are fermented using enzymes, usually *Saccharomyces cerevisiae,* which convert the sugars into ethanol (Jeon et al., 2009). The lignin recovered from this process has shown the ability to provide renewable thermal energy for cellulosic ethanol plants and thus eliminates the need for fossil fuels. This is certainly a significant advantage over traditional bioethanol plants which do require fossil fuels for power and electricity (Jones, 2010). In the second production process, thermo-chemical conversion, the cellulosic feedstock is heated via pyrolysis and converted into a gas called 'syngas'. Syngas is a mixture of CO, H, CO_2 methane and nitrogen which is synthesized into ethanol (YongMan and Ping, 2009).

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Life cycle assessments of ten cellulosic ethanol pilot plants across the United States reveal zero biogenic carbon emissions, meaning only naturally captured carbon by plants is released into the atmosphere. The main concerns with current pilot plants surround the

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concentration and release of air pollutants (Menetrez, 2010). Data reveals that higher amounts of particulate matter (PM), SO_x, NO_x, carbon monoxide, volatile organic compounds (VOCs), acetaldehyde and hexane are released into the environment (Jones, 2010). Unless these plants are able to filter and remove the air pollution, they will be subject to heavy air regulations.

One of the most important barriers to the introduction of cellulosic ethanol into the commercial market is its production cost. An assessment of cellulosic ethanol prices shows decreasing costs per gallon on a yearly progression and increasing plant size (Zhuang, 2007) (Huang et al., 2009). Currently the cost per gallon of cellulosic ethanol from pilot plants are $2.25, with the bulk of the cost associated with pre-treatment processes (Woodson and Jablonowski, 2008). The US Department of Energy has set a target to produce renewable cellulosic ethanol at $1.33 per gallon by 2012. At this price, cellulosic ethanol would be cheaper than starch-based ethanol and gasoline (EERE, 2009).

Biomethanol

Biomethanol (CH_3OH) is a liquid alcohol fuel, also known as "woody alcohol", and is usable in internal combustible engines or as a blend with gasoline, which is known to produce much higher octane ratings and CO_2 mitigation in comparison with an ethanol-gasoline blend (Hasegawa, 2010).

The production of biomethanol can be split into two steps. In the first step, the biomass is converted into carbon monoxide, carbon dioxide, water and hydrogen, which is also known as synthesis gas or 'syngas'. The biomass is converted by catalytic

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reforming of feed gas and steam or partial oxidation. In the second step, the biomethanol is catalytically synthesized from 'syngas'. This occurs in a large reactor vessel under extreme pressures and temperatures, where synthesis gas is fed in the presence of a catalyst. The carbon dioxide and hydrogen combine to create biomethanol (Demirbas, 2008).

Residing in the Netherlands, *bioMCN* is the first large scale commercial biomethanol plant in the world . BioMCN's large scale facilities produce 250 million litres of biomethanol from crude glycerin, a sustainable biomass from the fatty acid and vegetable oil industry. Glycerin is the waste product of biodiesel plants and hence bioMCN does not require destruction of forests and prairies for feedstock. Overall lifecycle assessments of biomethanol from *bioMCN* reveal 78% reductions of CO_2 emissions in comparison to natural gas based methanol (BioMCN, 2011).

By converting biomass from agricultural, forest and municipal wastes into biomethanol, countries can gain significant environmental and economical benefits (Suntana et al., 2009). A study by Dr. Kristtiina A Vogt demonstrates there are opportunities to take full advantage of biomethanol in the United States. Within five different states, calculations show that biomethanol can replace almost all or most of the gasoline consumption. When the biomethanol are harnessed into power, fuel cells, they will have the potential to generate 12-25% of electricity consumed on an annual basis and reduce 2-29 Tg of carbon release, a 23-81% decrease (Vogt et al., 2009).

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Fischer-Tropsch Diesel

Fischer-Tropsch Diesel is a synthetic diesel fuel chemically similar, substitutable

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and compatible with biodiesel and conventional diesel fuels. Their use in diesel engines has shown to exhibit lower pollutant emissions and environmental benefits in comparison to biodiesel (Lapuerta et al., 2009, Gill et al., 2010).

FT diesel is synthesized by taking advantage of the existing Fischer-Tropsch process which involves gasification of feed stocks and converting the mixture of carbon monoxide and hydrogen, essentially 'syngas', into liquid hydrocarbons as described in the equation below (1) (Dry, 2002).

$$_{n}CO + (2_{n} + 1)H_2 = C_nH_{2n+2} + {}_{n}H_2O \qquad (1)$$

The Fischer-Tropsch process has been used with coal and natural gas since the 1940's in Germany and currently is employed for large scale production in China, India and Qatar. Biomasses-to-liquid methods are more novel and expensive, however, still based on the same concept: gasification of biomass and converting the CO and H2 into liquid diesel (Osa 2011).

'SUNdiesel' is a German-made commercially available Fischer-Tropsch diesel produced from woodchips. Studies have shown to exhibit lower THC,CO, NO_x, PM, (NG et al.) aromatic and sulphur content in combustible engines in comparison to traditional diesel fuel(Gill et al., 2010, Vliet et al., 2009). This indicates that Fischer-Tropsch Diesel builds on both the weaknesses of biodiesel: environmentally friendliness and effects on global food prices.

Biohydrogen

Biohydrogen is considered a very important biofuel for the next generation of transport.

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It has unique ability to store and release, via fuel cells and burning, electric energy without any release of carbon dioxide and therefore has the lowest GHG emissions in comparison to other biofuels (Meher Kotay and Das, 2008). This fact has led to the term "hydrogen economy" where energy processes in the future are powered by biohydrogen fuel.

Despite this, less than 1% of the current world's hydrogen production is produced from biomass (Tomczyk, 2009). The majority of electricity harnessed in novel hydrogen fuel cell technologies are heavily drawn from natural gas, hydrogen carbons and coal, thus a lifecycle assessment hydrogen production would indicate high greenhouse gas emissions due to its feedstock (Ogden et al., 2004). Hydrogen production produced through thermal and chemical methods are heavily energy intensive and expensive. Biohydrogen from biomass could provide energy-saving, cost cutting and environmentally friendly solution (Strahan, 2008).

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Currently there are two methods of biohydrogen production from biomass: photo and dark fermentation. Both methods involve bacteria or algae fermenting organic substrates to produce hydrogen in large quantities. Photo fermentation, frequently *cyanobacteria or Rhodobacter sphaeroides*, utilizes sunlight as the source of energy(Akroum-Amrouche et al., 2011). Dark fermentation involves fermentation of sugars in order to create organic substrates and hydrogen with anaerobic bacteria such as *clostridium* (Skonieczny and Yargeau, 2009).

The methods discussed above are only suitable for laboratory or small scale production. Industrial level production methods of photo and dark fermentation do not currently exist due to high investment requirements, low research funds, low infrastructure and lack of political incentives (Balat and Kirtay, 2010). Recently the

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Obama administration cut funding for biohydrogen research from the federal budget in 2010 and reasoned biohydrogen would not be a cost-efficient viable green technology within the next 20 years (Service, 2009). The idea of a biohydrogen economy may be exceptionally optimistic at this moment of time; nevertheless when that day comes, biohydrogen will be classed a superior biofuel due to its ability to completely mitigate all fuel-related environmental effects on our planet.

Challenges with the next generation of biofuels

Bioethanol, biomethanol, fischer-tropsch diesel and biohydrogen are, without doubt, the next biofuels to make a large impact on the fuel market. However there still remain a large number of challenges to be overcome. The majority of production methods discussed in the report are limited by scalability largely due to lack of investments for research and development. Construction of a large-scale commercial biofuel facility, such as *bioMCN*, may cost over $700 million USD and in the current economic climate, a large proportion of investors remain uncertain over the market successfulness of untested biofuel products (Huber, 2009, Weber, 2009).

Moreover, the critical step to using biomass as a feedstock highly depends on the pre-treatment processes that exist to transform biomass into a usable material in biofuel production. Current pre-treatment processes are inefficient and recovery of usable material remains extremely low and uneconomical (Zhu et al., 2010). In particular the Fischer-Tropsch process, discussed earlier, used to produce biomethanol and Fischer-Tropsch diesel requires highly selective biomass. For example, the production of *SUNdiesel* is only possible from woodchips. New pre-treatment processes must be able

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to deal with larger ranges of biomass properties and compositions in order to reduce costs and improve economic feasibility.

Additionally the cost of transporting biomass from their source to processing facility to production plant is a major economical barrier for new biofuels. At present 'CoolPlanetBiofuels', funded by Google Investments, is developing a thermal/mechanical transportable plant capable of processing biomass such as woodchips and crop wastes (Fehrenbacher, 2011). This solution may possibly reduce costs, lower emissions and increase yield for biofuel plants that require biomass feedstock.

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Conclusion

The next generation of biofuels has great potential to alleviate the concerns fossils fuels have brought upon the international society for many years to come. Using sustainable non-food biomass will reduce the dependency of the global community on major oiling nations, improve security of energy supplies, diminish effects on vital food supplies and, most importantly, reduce human environmental impact. With constant improvement across science and increasing global political support, it will only be a matter of time before biofuels will overcome its current challenges and begin to benefit and, perhaps, save our species.

REFERENCES

1) AKROUM-AMROUCHE, D., ABDI, N., LOUNICI, H. & MAMERI, N. 2011.

Expert Assignment Help

Effect of physico-chemical parameters on biohydrogen production and growth characteristics by batch culture of Rhodobacter sphaeroides CIP 60.6. *Applied Energy,* 88, 2130-2135.

2) BALAT, M. & KIRTAY, E. 2010. Major Technical Barriers to a "Hydrogen Economy". *Energy Sources Part A: Recovery, Utilization & Environmental Effects,* 32, 863-876.

3) BIOMCN. 2011. *BioMCN - Driven By Nature* [Online]. Europe. Available: http://www.biomcn.eu/ [Accessed].

4) BRINGEZU, S., SCHÜTZ, H., O´BRIEN, M., KAUPPI, L., HOWARTH, R. W. & MCNEELY, J. 2009. Assessing Biofuels. United Nations Environment Programme.

5) CHENG, K.-K., WANG, W., ZHANG, J.-A., ZHAO, Q., LI, J.-P. & XUE, J.-W. 2011. Statistical optimization of sulfite pretreatment of corncob residues for high concentration ethanol production. *Bioresource Technology,* 102, 3014-3019.

6) CHESTER, M. & MARTIN, E. 2009. Cellulosic Ethanol from Municipal Solid Waste: A Case Study of the Economic, Energy, and Greenhouse Gas Impacts in California. 43, 5183-5189.

7) DEMIRBAS, A. 2008. Biomethanol Production from Organic Waste Materials. *Energy Sources Part A: Recovery, Utilization & Environmental Effects,* 30, 565-572.

8) DRY, M. E. 2002. The Fischer-Tropsch process: 1950-2000. *Catalysis Today,* 71, 227-241.

Expert Assignment Help

9) DWIVEDI, P., ALAVALAPATI, J. R. R. & LAL, P. 2009. Cellulosic ethanol production in the United States: Conversion technologies, current production status, economics, and emerging developments. *Energy for Sustainable Development,* 13**,** 174-182.

10) EERE 2009. Energy Efficiency and Renewable Energy: Biomass: multi-year program plan. *In:* (USDOE), U. S. D. O. E. (ed.). Washington D.C, USA.

11) EIA 2011. Annual Energy Outlook 2011 with Projections to 2035. *In:* EIA (ed.) *Annual Energy Outlook.* US Energy Information Administration.

12) FEHRENBACHER, K. 2011. *Google Backs Biofuels, via CoolPlanetBiofuels* [Online]. USA: Reuters. Available: http://www.reuters.com/article/2011/03/17/idUS370391007820110317 [Accessed 19/05/11].

13) GILL, S. S., TSOLAKIS, A., DEARN, K. D. & RODRIGUEZ-FERNANDEZ, J. 2010. Combustion characteristics and emissions of Fischer-Tropsch diesel fuels in IC engines. *Progress in Energy and Combustion Science.*

14) HASEGAWA, F. 2010. Methanol or ethanol produced frmo woody bioomass: Which is more advantageous? *Biosource Technology,* 101.

15) HUANG, H.-J., RAMASWAMY, S., AL-DAJANI, W., TSCHIRNER, U. & CAIRNCROSS, R. A. 2009. Effect of biomass species and plant size on cellulosic ethanol: A comparative process and economic analysis. *Biomass and*

Expert Assignment Help

bioenergy., 33, 234-246.

16) HUBER, G. W. 2009. The Potentials of Biofuels. *Department of Energy*.

17) HUNT, S. 2008. Biofuels, Neither Saviour nor Scam. *World Policy Journal (MIT Press),* 25, 9-17.

18) IEA 2007. Biofuel Production. *In:* IEA (ed.) *IEA Energy Technology Essential.* IEA.

19) JEON, E., HYEON, J. E., SUH, D. J., SUH, Y. W., KIM, S. W., SONG, K. H. & HAN, S. O. 2009. Production of cellulosic ethanol in Saccharomyces cerevisiae heterologous expressing Clostridium thermocellum endoglucanase and Saccharomycopsis fibuligera [beta]-glucosidase genes. *Molecules and Cells,* 28, 369.

20) JONES, D. L. 2010. Potential Air Emission Impacts of Cellulosic Ethanol Production at Seven Demonstration Refineries in the United States. *Journal of the Air & Waste Management Association (1995),* 60, 1118-1143.

21) LAPUERTA, M., ARMAS, O., HERNANDEZ, J. J. & TSOLAKIS, A. 2009. Potential for reducing emissions in a diesel engine by fuelling with convential biodiesel and Fischer-Tropsch diesel. *Fuel,* 89, 3106-3113.

22) MEHER KOTAY, S. & DAS, D. 2008. Biohydrogen as a renewable energy resource—Prospects and potentials. *International Journal of Hydrogen Energy,* 33, 258-263.

23) MENETREZ, M. Y. 2010. The Potential Environmental Impact of Waste from Cellulosic Ethanol Production. *Journal of the Air & Waste Management*

Expert Assignment Help

Association, 60, 245.

24) OGDEN, J. M., WILLIAMS, R. H. & LARSON, E. D. 2004. Societal lifecycle costs of cars with alternative fuels/engines. *Energy Policy,* 32.

25) PLEVIN, R. J., O'HARE, M., JONES, A. D., TORN, M. S. & GIBBS, H. K. 2010. Greenhouse Gas Emissions from Biofuels' Indirect Land Use Change Are Uncertain but May Be Much Greater than Previously Estimated. *Environmental Science & Technology,* 44, 8015-8021.

26) ROTMAN, D. 2008. The Price of Biofuels. *Technology Review.* Technology Review, Inc.

27) SERVICE, R. F. 2009. Hydrogen Cars: Fad or the Future? *Science,* 324, 1257-1259.

28) SKONIECZNY, M. T. & YARGEAU, V. 2009. Biohydrogen production from wastewater by Clostridium beijerinckii: Effect of pH and substrate concentration. *International Journal of Hydrogen Energy,* 34, 3288-3294.

29) STRAHAN, D. 2008. Whatever happened to the hydrogen economy? *New Scientist,* 199, 40-43.

30) SUNTANA, A. S., VOGT, K. A., TURNBLOM, E. C. & UPADHYE, R. 2009. Bio-methanol potential in Indonesia: Forest biomass as a source of bio-energy that reduces carbon emissions.
Applied Energy, 86.

31) TOMCZYK, P. 2009. Fundamental Aspects of the Hydrogen Economy. *World*

Expert Assignment Help

Futures: The Journal of General Evolution, 65**,** 427-435.

32) TYNER, W. 2008. The US Ethanol and Biofuels Boom: Its Origins, Current Status, and Future Prospects. *Bioscience,* 58**,** 646-653.

33) VLIET, O. P. R. V., FAAIJ, A. P. C. & TURKENBURG, W. C. 2009. Fischer-Tropsch diesel production in a wheel-to-wheel perspective: A carbon, energy flow and cost analysis. *Energy Conversion & Management,* 50**,** 855-876.

34) VOGT, K. A., JOGT, D. J., PATEL-WEYNAND, T., UPADHYE, R., EDLUND, D., EDMONDS, R. L., GORDON, J. C. & SUNTANA, A. S. 2009. Bio-methanol: How energy choices in the western United States can help mitigate global climate change. *Renewable Energy,* 34**,** 233-241.

35) WARREN, R., PRICE, J., FISCHLIN, A., DE LA NAVA SANTOS, S. & MIDGLEY, G. 2011. Increasing impacts of climate change upon ecosystems with increasing global mean temperature rise.
Climatic Change, 106**,** 141-177.

36) WEBER, J. 2009. THE BIOFUEL BUBBLE. *BusinessWeek***,** 64-64.

37) WILLIAMS, P. N. D., INMAN, D., ADEN, A. & HEATHS, G. A. 2009. Environmental and Sustainability Factors Associated With Next-Generation Biofuels in the U.S.: What Do We Really Know? *Environmental Science & Technology,* 43**,** 4763-4775.

38) WONGYAO, N., THERDTHIANWONG, A. & THERDTHIANWONG, S. 2011. Performance of direct alcohol fuel cells fed with mixed methanol/ethanol solutions.

Expert Assignment Help

Energy Conversion & Management, 52, 2676-2681.

39) WOODSON, M. & JABLONOWSKI, C. J. 2008. An Economic Assessment of Traditional and Cellulosic Ethanol Technologies. *Energy Sources, Part B: Economics, Planning, and Policy,* 3, 372-372.

40) YONGMAN, C. & PING, L. 2009. Mechanism of Ethanol Synthesis from Syngas on Rh(111).

Journal of the American Chemical Society, 131, 13054-13061.

41) ZHU, J. Y., PAN, X. J., WANG, G. S. & GLEISNER, R. 2009. Sulfite pretreatment (SPORL) for robust enzymatic saccharification of spruce and red pine. *Bioresource Technology,* 100, 2411-2418.

42) ZHU, J. Y., XUEJUN, P. & ZALESNY JR, R. S. 2010. Pretreatment of woody biomass for biofuel production: energy efficiency, technologies, and recalcitrance. *Applied Microbiology & Biotechnology,* 87, 847-857.

43) ZHUANG, D. 2007. Potential and Development of Cellulosic Ethanol. Asia Pacific: Novozymes.

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Criterion	Levels of achievement		
	Exemplary	**Good**	**Poor**
Writing style and presentation are clear			
• Title	Title is concise and informative so readers can anticipate the contents of the contribution and interested people look forward to reading it.	The title gives a general indication of the material covered in the contribution, but have to read the document to fully appreciate what is covered. Some potential readers may be lost because they can't clearly anticipate the material covered by reading the title.	The linkage between the title and the text is not clear. Reader may skip the contribution because they don't appreciate its relevance.
• Introduction	Introductory statement clearly indicates the main purpose of the contribution and suggests the plan of organization, so the reader can anticipate the text that will follow.	Introductory statement indicates the main purpose of the contribution in general terms, so the reader has some idea of what will follow.	The introduction does not give an overview of the contribution so the readers are not sure what to expect as they read the text.

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• Main Body	Main body of contribution makes connected points that clearly build the argument so the text flows from introduction to conclusion in a logical manner, thereby helping the reader to follow the thinking behind the text.	The main body presents a number of points that allow the reader to understand the argument, but lapses in the writing may force the reader to make some connections between the parts.	The text is not well structured so the reader must stop reading at times to try to makes sense of the text.
• Conclusion	The main point of the contribution is clearly indicated and reinforced so the reader can clearly remember it.	The main point of the contribution is indicated, but may be stated in an unconvincing manner.	The concluding section does not reinforce or revisit the main point so the reader is unsure about it and likely to misinterpret or forget it.
• Written expression	Sentences and paragraphs are well structured and clear so the reader can focus on what is written. Each	Minor lapses in sentence structure, such as run-on sentences and unnecessarily complex sentence structures, force the reader to pause and	Many sentences are poorly structured so the reader must stop often to reflect on the meaning of the

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	paragraph has a topic sentence that indicates the subject matter.	reflect on the meaning of the text. Paragraphs present a complete argument, but may not flow so well.	text. Many paragraphs lack topic sentences or have poor flow so the main points and linkages among explanatory text are not clear.
• Grammar, punctuation and spelling	Grammar, spelling and punctuation are flawless, which allows the reader to focus on the message.	Some minor errors in grammar, spelling and/or punctuation detract from the quality of the text, but do not impair the communication.	Many errors in grammar, spelling and/or punctuation make reading the text difficult and communication is impaired.
Concepts and arguments are well developed			
• Accuracy	All information is accurately reported using appropriate terminology so the information is reliable.	The information is largely accurate but imprecise language could lead a reader to misinterpret aspects of the text	Although the gist of the information is correct, there are problems with the interpretation of it. A reader can be misled by the text.

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• Relevance	Connections between the contribution and the main topic of the discussion are clearly indicated.	Connections between the contribution and the main topic of the discussion are indicated or implied, but the reader needs to pause to clarify those connections.	Although the text is relevant, this is not clearly indicated, so the reader must guess how the text relates to the main topic.
• Significance	The reason why the contribution is important to the overall discussion is clearly described and discussed so the reader takes the contribution seriously.	The reason why the contribution is important is touched on but not elucidated, so the reader must make some interpretations about the author's view of the contribution's significance.	The contribution may include significant material but this is not indicated, so the reader must guess it.
• Clarity	The main points and new technical terms are clearly described and/or explained so the reader is left with no ambiguity about what was written.	Although the text is clear to informed audiences, unexplained points may leave room for alternative interpretations of the text.	Key points and new technical terms are not explained so the reader is confused.
• Independence	The contribution is completely self-contained so the reader	The text is sufficiently clear that the reader can understand the main point without further	The text is written in a manner that presumes

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	does not have to read other contributions or published materials to understand what was written about.	reading, but some parts of the text are not clear without consulting earlier contributions or other sources of information.	considerable prior knowledge, so the reader must have a thorough knowledge of what has been written about the subject in order to understand the main point of the contribution.
Contribution is responsive to another contribution	The writer links ideas submitted by others to their own contribution in a manner that substantially strengthens the group's efforts to resolve the main problem. This linkage can include elaboration of what was previously written, a critique or questioning of it, demonstration of linkages among two or	The writer makes references to earlier works that are a starting point for new ideas but, apart from the reference to the earlier work, not much information is incorporated	The text mentions other contributions but neither explains the reference nor substantially adds to it, so there is no clear benefit to the resolution of the main problem from citing the earlier contribution.

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	more earlier contributions, and/or utilization of an earlier contribution as a foundation to build your own.		
Text is supported by references			
• Sources indicated	All information and ideas that are not commonly know are supported with references to sources, so the reader has confidence that the information is not based on hearsay or the writer's opinion or assumptions alone.	Most sources are indicated, but in only a few cases the sources are not given or are ambiguous, so the reader has to check some of the sources.	Sources are cited for some specific parts of the contribution, but no references are supplied for information and ideas that are clearly not the author's, so the reader has no idea of the validity and authority of the information.
• Relevant references	Information, concepts and opinions are	One or a few references are used to support the text. Thus	Information comes from Web sites or

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	supported with references to published literature, especially primary (original) sources of information, rather than review articles or textbooks. This allows the reader to independently review the cited sources. More than one reference is cited to support key points, which adds strength and authority to the argument.	the contribution is supported but this may be an idiosyncratic source. Some general references to textbooks are made that could have been replaced by primary references which are more thorough and authoritative.	other sources that have no recognized authority, so the validity or strength of the source is unknown.
• Citation style	References cited appropriately in the text, and the correct format is used in the text when citing information, so the reader clearly knows which information is attributable to which source.	Minor lapses in citation format do not prevent the reader from finding the sources in the reference list at the end of the contribution.	Citation format incorrect or poorly placed in the text, so citations distract from reading.

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• Bibliographic information	The reference list contains complete bibliographic information (author's name(s), publication date, title, source, date web page accessed), so a reader can easily find the references for their own research. The authority of sources can be evaluated by checking them.	Bibliographic information largely complete, but some information missing so the reader may have difficulty finding some references. Most sources can still be easily checked.	Not all references are listed, information in the reference list is incorrect, or important information is missing from the reference list, so the reader is unable to find the same sources of information and the authority of sources is almost entirely unknown.

Comments: The essay has used a tone to present the writers attitude along with well cited references that given a kind of authenticity to the essay.

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