

PLANTING OUR FUEL

A WORLD CAFÉ ON
OUR BIOENERGY FUTURE

FINAL REPORT

NOVEMBER 20TH, 9AM - 3PM
CONCORDIA UNIVERSITY, LOYOLA CAMPUS
CJ BUILDING, ROOM 3.306

1 March, 2011

Final Report: 'Planting Our Fuel: Will Science *Feed* or *Kick* our Energy Consumption?'

Dear Reader,

The following pages encompass a brief report summarizing the World Café '*Planting Our Fuel: Will Science Feed or Kick our Energy Consumption?*'. The report attempts to remain true to what was said during the invited presentations and subsequent afternoon dialogues so as to reflect the group deliberations that occurred during the event. While composing the report, we tried to use the words of participants as much as possible, partly to make sure we stayed true to their words, meanings and values, but also to allow some reflection of each individual attending the event.

We welcome your feedback on this report. Please feel free to send comments via email or letter mail to the following address:

David Secko
Department of Journalism, CJ 3.245
Concordia University
7141 Sherbrooke St. West
Montreal, Quebec H4B 1R6

Email: dsecko@alcor.concordia.ca

Thank you to all those that attended and those helpers that made the event a success. Energy is an issue of our time and we look forward to continuing the conversations started here.

Best Wishes,



Dr. David Secko
Concordia Journalism
www.csjp.ca

Executive Summary

On Saturday 20th November 2010 43 people attended the World Café ‘**Planting Our Fuel: Will Science Feed or Kick our Energy Consumption?**’. The event’s primary goal was to generate discussion from the viewpoint of journalists, scientists, environmental groups, policy makers, students and other members of the audience about societal issues underpinning bioenergy development in Canada.

This primary goal was also augmented with a wider set of objectives on the part of the organizers, who saw the World Café as preliminary steps to (i) discuss strategies for making societal trade-offs related to the conversion of plant material into biofuels and biochemicals; (ii) increase and encourage public discussion of pressing societal issues within the research community and the public; (iii) increase participant understanding of renewable energy debates so as to help enable the separation of legitimate policy concerns from political agendas.

The organizers realize that these are complex objectives that require multiple and diverse discussions, for which one World Café can only provide a starting point. With this in mind, the event raised seven important themes for future consideration and discussion:

1. There is currently no standardized way to talk about issues related to biofuels and bioenergy;
2. The communication and understanding of bioenergy and biofuel issues is currently less than ideal;
3. There is currently a narrow focus on short-term goals in bioenergy and biofuel policy;
4. There is a need to consider if new energy sources will just feed our energy addiction, as opposed to leading to lifestyle changes;
5. There is a need to consider how to best improve the communication and understanding of bioenergy and biofuel issues so as to foster increased collaboration between scientists and journalists;
6. There is need for more honest, public discussion on bioenergy and biofuels that avoids the current segregation of stakeholders;
7. The overarching message was that conversations surrounding bioenergy, biofuels and social issues risk becoming “stagnant”.

Future work needs to move the bioenergy and biofuels conversation forward and amplify the diverse views represented in this report and other work. Participants suggest a future event should: have diverse pre-event information, focus on what bioenergy means and not what it does, provide an even playing field in terms of diverse forms of expert- and experience-based knowledge, invite as diverse a range of perspective of people as possible, provide a post-event discussion forum and focus on ‘communication and understanding’.

These themes and the others discussed in this report arose from two presentations, a panel discussion and the input from a world café involving 31 of the participants of the workshop. The event conversations were diverse and are not all captured in this report. But it is hoped that this brief report stimulates another round of “conversations” in the near future.

The organizers would like to thank Concordia University, the Centre for Structural and Functional Genomics, and the Department Journalism at Concordia for their generous support of this workshop. We would also link to acknowledge the hard work of the staff of the Genome Canada / Genome Quebec funded *Genozymes-GE3LS* project.

Report produced on March 1, 2011.

Report Authors:

Elyse Amend and David M. Secko^{*}
Department of Journalism
Concordia University
7141 Sherbrooke St. West
Montreal, Quebec H4B 1R6

*corresponding author: David M. Secko, phone: (514) 848-2424 ext, 5175; Fax: (514) 848-2473; email: dsecko@alcor.concordia.ca; <http://www.csjp.ca/>

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Final Report

Event Title: Planting Our Fuel: Will Science *Feed* or *Kick* our Energy Consumption?
Participants: 43 people attended the morning and 31 finished the day
Host: David Secko
Speakers: Donald Smith, Bill Kovarik, Adrian Tsang, Terry McIntyre, Blaine Kennedy
Table Hosts: Elyse Amend, Heather Walmsley, Blaine Kennedy, Adrian Tsang, Emily Bourassa
Note takers: Stephany Tlalka, Alamir Novin, Luciana Gravotta, Nicole White, Kelly Grieg

This report summarises the World Cafe on Biofuels ‘Planting Our Fuel: Will Science *Feed* or *Kick* our Energy Consumption?’ that took place on Saturday 20th November 2010 at Concordia University. It notes the workshop’s general organization, major discussion points and participant report-backs from the world café sessions. It concludes with some brief points from the organizers for future consideration.

The report is meant capture major discussion topics for future consideration and to stimulate reader feedback and reflection. No sessions during the workshop were tape recorded, so the report was constructed from notes taken during the day.

The organizers welcome any additional reader comments.

Workshop Agenda

Time	Session
8:30 – 9:00	Registration and Light Breakfast
9:00 – 9:20	Welcome and Introduction to the World Café
9:20 – 10:00	A Vision of Our Bioenergy Future – Vision 1 by Donald Smith, <i>McGill University</i>
10:00 – 10:45	A Vision of Our Bioenergy Future – Vision 2 by Bill Kovarik, <i>Radford University</i>
10:45 – 11:00	Coffee Break
11:00 - Noon	What Can/Should Impact Visions of Our Bioenergy Future? Panel discussion with: <ul style="list-style-type: none"> • Adrian Tsang, <i>Concordia University</i> • Terry McIntyre, <i>Environment Canada</i> • Blaine Kennedy, <i>formerly SDTC</i>
Noon – 1:00	Lunch and Vision Voting
1:00 – 2:30	World Café on Energy Future and Biofuels
2:30 – 3:00	Report Back and Concluding Remarks

Morning Session

The event was designed to consider a broad definition of bioenergy to include renewable energy made from biomass. It did not distinguish between energy systems for heating, power (electricity) generation or transportation, although it was noted that some use ‘bioenergy’ to denote heat and electricity made from biomass and ‘biofuels’ for liquid fuels for transportation. The event was framed as follows:

Scientists at Concordia University are actively involved in developing enabling biotechnologies for biofuel production. Canada has made a significant investment into such research, as biofuel development is becoming a national priority. But is Canada’s investment into advanced energy biotechnology feeding or helping us to kick a deep-rooted cultural obsession with energy consumption?

No doubt there is a pressing desire to move away from fossil fuels to more sustainable energy production. Biofuels may be one of our best options for future energy production. But our choice to turn to biologically derived energy (bioenergy), to essentially plant our fuel, will change how we interact with our land, our water, our economy and our neighbours.

So what is your vision of our bioenergy future?

The event began with two expert presentations that provided two visions of our bioenergy future. The presentations were given by McGill University plant science professor Donald Smith and Radford University professor of communication Bill Kovarik. The speakers were given the freedom to address points they felt were particularly relevant to this topic and were asked to address the audience for approximately 40 minutes.

Donald Smith began the event by giving an overview of the world’s energy picture. He stated that two of this century’s biggest challenges are energy and climate change, both which are linked and interact with the global fuel supply. As the world’s oil supply diminishes and there are fewer places where we can drill for it, Smith said humans are turning to other forms of energy that all come with their own sets of social, economic, and environmental issues. While Smith said it would be beneficial to completely “jump off biofuels,” he highlighted the fact that this will never happen. Instead, it will be a gradual transition and one that we need to keep working toward, he said. (Donald Smith’s presentation slides can be found here: http://genozymes-ge3ls.ca/wiki/World_Cafe)

Bill Kovarik, who gave his presentation via Skype from Virginia, highlighted the history of the debate around biofuels. He said that even in the early 20th century, Henry Ford believed biofuels

were the “fuel of the future,” and that in 1921, a cellulosic ethanol research division was created at McGill University. The historical issues promoting research into biofuels were energy security, public health, and finding an alternative for when oil runs out, however it was cheap oil that pushed ethanol off the market after World War II. Kovarik concluded his presentation by calling on the news media to be more respectful of science in their reporting and getting accurate information to their audiences. (Bill Kovarik’s presentation slides can be found here: http://genozymes-ge3ls.ca/wiki/World_Cafe)

The morning session finished with a panel discussion that asked: What Can/Should Impact Visions of Our Bioenergy Future? The discussion involved Adrian Tsang, director of the Centre for Structural and Functional Genomics at Concordia University, Terry McIntyre, Senior Science Advisor on Biofuels for Environment Canada, and Blaine Kennedy, formerly from Sustainable Development Technology Canada. The three participants discussed their greatest hopes and fears for biofuels. The panelists discussed policy, economy and research issues surrounding biofuels innovation and development, and all seemed to agree that Canada should seek to benefit as an early adopter of biofuels. For example, Tsang said he would like to see more investment into the research and development of biofuels, and also highlighted that there needs to be a change in policy, as industry will be reluctant to make costly investments in biofuels without government support. McIntyre said he would like to see more young people getting involved in order to provide a new set of eyes and opportunities for further innovation. He also added that there currently exists about 40 different life cycle analysis methodologies for biofuels, and that an integrated methodology is needed in order to avoid confusion and obtain consensus. Finally, Kennedy pointed out one of his major fears for our energy future is that the wrong choices are made because of the options and confusion that exist. He also pointed out a number of innovative paths that present opportunities for our energy future, including genomics.

Afternoon Session

In the afternoon, a world café on visions for our bioenergy future was held. Based on the work of Juanita Brown (See: www.theworldcafe.com), world cafés are participatory processes that aim to enable diverse conversations while sitting at “café-style” tables. This method is both a fun and practical way to enhance the group’s ability to collaboratively work through problems. The world café sessions were meant to be conversational and open, with the intention of sharing knowledge and generating potential solutions.

In total, 31 people began the world café and 29 stayed until the sessions ended. There were a total of five café tables in which groups of between 5-7 individuals took part in three rounds of conversation. Each round of conversation lasted 30 minutes; afterward participants were asked to join a new table. In the final round, participants were allowed to rejoin their original table but

were also free to attend another table. The conversation during each round dealt with a question posed by the event host.

GOALS FOR EACH ROUND OF DISCUSSION WERE DEFINED AS...

ROUND 1: “ARE WE MARCHING DOWN A TECHNOLOGY PATH TO BIOFUELS WHILE IGNORING SOCIAL ISSUES?”

ROUND 2: “WHAT ARE THE SOLUTIONS TO THE ISSUES FROM ROUND ONE? WHAT ARE THE PROBLEMS?”

ROUND 3: “WHAT SHOULD THE NEXT EVENT LOOK LIKE?”

The world café was directed towards building on the points raised during the morning session. Table hosts were asked to maintain the discussion at the tables as needed, but to otherwise allow participants to lead. The tables did not need to reach consensus as respectful disagreements were seen as equally valuable. General table etiquette at the world café included:

- Everyone can speak, but there is no requirement;
- Be respectful and listen to others;
- Be open, honest and frank with your views and ideas;
- Challenge one another but be open to change your views.

Below are brief summaries of the discussion that occurred during each of the rounds. These summaries are drawn from notes taken at each table during the world café.

ROUND ONE:

***“ARE WE MARCHING DOWN A TECHNOLOGY PATH TO BIOFUELS
WHILE IGNORING SOCIAL ISSUES?”***

During the first round of discussion, participants were asked to think about and discuss social issues that may be overlooked as research and support for biofuels continues to grow. The “food vs. fuel” debate largely dominated the discussion at all five tables. “Food vs. fuel” also led to discussion about land use (e.g. deforestation), as well as farming and food production. One farming-related conversation rebuked the industrial farming methods used in many parts of North America, and called for a focus on food sustainability. At another table, the conversation focussed on how biorefinery technologies and innovation have redefined how we view waste, what we consider as waste, and how we use waste. One participant at a table where the discussion focussed on farming and food production commented on how many of the social and environmental issues associated with new technologies are ignored, especially when profits are concerned: “New innovations are always implemented under the terms of market strategy and commercial aspects. Maybe we should use environment and social impacts as measures of profitability,” she said. Another participant at this table agreed, and added that the issues are

usually looked at from a North American perspective, which leads to foreign cultural and religious issues being disregarded.

At yet another table, one participant who identified himself as a scientist and researcher addressed the question by saying: “Science is a response to social issues. Otherwise, we wouldn’t be doing the research.” However, after a moment of reflecting on his statement, he added: “I have to admit, I’m not really well informed of the social issues and what they are.”

Outside of the issues themselves, conversation at all five tables branched out into three major themes: “communication and understanding,” “short-term vs. long term thinking,” and “attitude/lifestyle change.”

The “communication and understanding” theme focussed on the public understanding (i.e. non-experts) – or lack of understanding – of science and the issues surrounding scientific research (including policy), as well as how scientific knowledge and information is communicated to the public. At one table, this conversation was spurred when questions about Canada’s mandate for transportation fuel to contain five per cent biofuels by 2010 arose. Participants at this table questioned where this mandate came from in the first place (especially considering “you don’t hear much about it,” as one participant put it), and what research and discussion went into deciding on the five per cent mark. Participants questioned the news media’s role and ability to inform the public about science. In fact, this issue was raised in conversations at four of the five tables in round one of the World Café.

The “short-term vs. long-term thinking” theme was also raised in discussions about the five per cent mandate. Many participants seemed to believe governments focus on short-term goals when it comes to energy policy, but do not take the bigger picture, or long-term implications, into consideration. As one participant put it: “We’re good at crisis management, but terrible at crisis prevention.” One participant from the research community attributed short-term thinking to the research funding process, as funding agencies (specifically governmental) expect to see short-term results from research projects -- otherwise, researchers risk losing their funding. This participant saw inherent problems with this way of thinking: “Science is long-term,” she said. At another table, participants debated the long-term value of investing/relying too much on one particular alternative energy source, such as biofuels. Participants at this table agreed there is no one “magic energy source solution” and that we should focus on many alternative energy sources, such as solar, wind, nuclear, and tidal in addition to bioenergy.

All tables also noted that individuals and industry need to make changes in attitude and lifestyle when it comes to energy consumption. “A different approach to fuel may not help us – there needs to be a lifestyle change,” said one participant. A related discussion involved questions about what alternative sources of energy would be used for. Essentially, the question was: would

new sources feed our energy addiction, or lead to lifestyle changes? Other questions brought up at the tables included what the factor behind change could/should be. “There needs to be a good alternative,” said one participant at a table where the conversation turned to reusable bags to replace old plastic shopping bags. However, another participant at this table pointed out the reusable bags come with their own issues, such as where they are made and how they are transported, what they are made of, and what kind of labor is used to manufacture them. At another table, participants debated whether the driver behind change should be economic, for example offering financial incentives to those who opt for bioenergy.

ROUND TWO:

*“WHAT ARE THE SOLUTIONS TO THE ISSUES FROM ROUND ONE?
WHAT ARE THE PROBLEMS?”*

In the second round, participants were asked to reflect on the issues brought up at their tables during the first round and suggest solutions. Additionally, participants were asked to discuss what problems exist in the search for solutions, and also reflect on what players and questions have not been included in the discussion for far. The conversations at the five tables followed two major themes that were carried over from the first round – “communication and understanding” and “attitude/lifestyle change” – and three additional major themes: “standards,” “global perspectives,” and “transparency/honesty.”

The “communication and understanding” theme in the second round focussed on how we can improve communication of science and the issues surrounding research and technology. While one table did mention the role of community organizations in the communication and information process (specifically EcoQuartier), most of the conversation focussed on news media; problems that were raised included the fact that news media is also an industry that operates within its own set of constraints. “It’s easy to say science journalism is not doing its job, but there’s a lot more to it,” said one participant with a journalism background, apparently as a response to criticisms of science journalism heard during the rounds of discussion. One solution debated was to have more collaboration between journalism and science. “Both have a lot to learn from each other,” said one participant from the political/communications community. However, beyond more communications and science education, conversation about exactly how to foster more collaboration or discussion between scientists and journalists was limited. Most participants, though, seemed to agree that the news media should be used “as a tool to make information accessible and understandable.” As one participant put it: “If the public understands how the process works, they may be more willing to hear consequences.”

The “attitude/lifestyle change” theme focussed on many of the same points as in round one. Specifically, discussion centered on changing people’s habits (again, the reusable bags were brought up often). Three additional points raised during this round were (i) the change needs to

be a world-wide ideological change, (ii) changes need to be implemented at all levels and early on in age, such as having more physical education in schools to promote bicycle use and discourage car use, and (iii) any shift in thinking should focus on “getting a sense of community back.”

The “standards” theme focussed on a main issue: that there exists no one way of analyzing or even talking about the issues related to energy and biofuels production. “There are no standardized ways of looking at social issues or how to mitigate them,” said one participant. Participants at the different tables seemed to agree that some sort of international benchmarking system (including social, environmental, economical, etc.) is needed to ensure basic policies are respected. Other participants brought up the issue that there also exist no standards when it comes to the language and messages surrounding biofuels and energy consumption. “There’s no one message to follow,” said one participant, who pointed out that there are no standardized definitions, and so many studies that contradict each other, and thus no real clarity on the issues. As another participant put it “People are arguing about things, but not about the right things.”

Conversations around the “global perspectives” theme took into account that technology may mean different things depending on location, and that different parts of the world have different issues that need to be considered. Another question under this theme raised was how we could promote change in different places of the world where we have no influence or prerogative to do so.

Finally, all tables mentioned that there needs to be more “transparency/honesty” in debates about energy and biofuels. Participants would like to see more transparency, especially on the part of industry, and would also like to see other interest groups involved in the conversation in order to avoid the “segregation of stakeholders” we are seeing right now. “We need honest discussion...so there can be honest public engagement,” said one participant. Similarly, another participant at another table said more honesty and transparency are needed in order to have a space “where challenges can be made, and understanding and learning can take place... so we can move past ignorance in order to get to the right end point.”

ROUNDS 3:

“WHAT SHOULD THE NEXT EVENT LOOK LIKE?”

In the third round, participants were asked to use what they took away from the conversations in the first two rounds and make suggestions about what a future public engagement event on biofuels should look like. At the end of this round, each of the five table hosts reported back to the large group on what the event designed by the participants at his or her table would look like.

Discussion at the five tables focused on six main aspects to such an event: “pre-event,” “event focus,” event format,” “participants,” “post-event,” and “event goal.”

Many participants would like to have more information before the event takes place in order to inform themselves on the issues to be covered. As suggested by the participants at one table, such “pre-event” information could be posted online and take the form of research abstracts, links to the speakers’ websites, research, publications, etc.

Suggestions about the “event focus” included health issues related to biofuels, our levels of consumption, the move towards a bioproduct economy, community-specific issues, and readapting the way we look at energy. As one participant put it: “Instead of focusing on what the technology does, there should be a focus on what it means.”

As for “event format,” some participants mentioned the format for that day’s World Café event was “top-heavy,” with expert presentations and the panel at the beginning, and then discussion afterward. However, there were only two concrete suggestions given about how the format for a future event could be different. One table suggested the possibility of having a “field trip,” for example to a sustainability farm. A participant at another table said it might be interesting to hold an event where people had to defend points of view they did not agree with. “I went to an even like that and it really helped me learn a lot,” she said. Although some criticized the format as involving expert presentations at the beginning, many suggested that more “expert-knowledge” at a future event in order to become informed. Some also found the panel to be too short, and would have liked to see more debate between the panellists. As one participant put it: “I would like to see more expert information – more facts to become informed.”

As for “participants” at a future event, this world café’s participants seem to want a more diverse range of people from many different backgrounds. Some suggestions that were given include people from science, industry, politics, journalism, philosophy, sociology, anthropology, education, etc. Participants also would like to see people who could give global perspectives on the issues, as well as community representatives and local experts, such as small farmers. Finally, there was also some talk about including people with more “radical ideas” (“vegan dumpster diver” was the example given). An interesting point raised by a number of participants was that all ideas, knowledge and backgrounds would/should be considered equal at such an event (instead of valuing expert information over any other form of knowledge).

Some of the participants at the five tables would like to see some sort of “post-event” forum where the discussion brought up during the event could continue. This forum would likely be an online one.

As for “event goal,” communication and understanding seem to be the overarching theme. Some participants also mentioned that such an event should not be about finding solutions, but instead about “amplifying views.” One participant mentioned that the conversation surrounding energy and biofuels seems to be “stagnant,” and that such an event should aim at moving the conversation forward. Finally, another participant suggested such an event focus on getting people to start thinking about energy in the long-term.

Conclusion

In conclusion, the World Café ‘Planting Our Fuel: Will Science *Feed* or *Kick* our Energy Consumption?’ elicited discussion about the need for more honest, public discussion on bioenergy and biofuels. Among the diverse topics covered, seven themes stand out:

1. There is currently no standardized way to talk about issues related to biofuels and bioenergy. There is thereby a need for international benchmarking on social, environmental and economic issues to ensure diverse policies are meeting common goals.
2. The communication and understanding of bioenergy and biofuel issues is currently less than ideal. There was debate over the role of the media in building understanding of issues related to biofuels. It was seen as ultimately unclear on how to foster more collaboration between scientists and journalists.
3. There is currently a narrow focus on short-term goals in bioenergy and biofuel policy, instead of taking the bigger picture, or long-term implications, into consideration.
4. There is a need to consider if new energy sources will just feed our energy addiction, as opposed to leading to lifestyle changes. It was suggested that we need to discuss such issues globally, longitudinally, and with a sense of local community.
5. There is a need to consider how to best improve the communication and understanding of bioenergy and biofuel issues so as to foster increased collaboration.
6. There is need for more honest, public discussion on bioenergy and biofuels that avoids the current segregation of stakeholders.
7. The overarching message was that conversations surrounding bioenergy, biofuels and social issues risk becoming “stagnant”.

Future work needs to move the bioenergy and biofuels conversation forward and amplify the diverse views represented in this report and other work. Participants suggest a future event should: have diverse pre-event information, focus on what bioenergy means and not what it does, provide an even playing field in terms of diverse forms of expert- and experience-based knowledge, invite as diverse a range of perspective participants as possible, provide a post-event discussion forum, and focus on ‘communication and understanding’.

It is hoped the café will prompt deeper reflection and sharing at a further conversation at Concordia University. Many of us agreed that energy is the issue of our time and that there is a pressing desire to move away from fossil fuels to more sustainable energy production. We, however, noted several tensions over whether bioenergy and biofuels will prove to be sustainable, over who will have a say in their governance, and over whether we can creatively learn together to think globally, longitudinally, and with a sense of local community on energy issues. There is still much to discuss and we look forward to continuing these conversations.

Appendix 1

Participant Evaluations of the Event (Aggregate Comments Only)

Starting the world café = 43

Finishing the world café = 31

Total evaluations received = 16

Questions 1: Global Satisfaction (How would you rate the overall success of this event?)

4.5 out of 5 (scale: 1 = poor, 5 = excellent)

Questions 2: Speaker Satisfaction (How would you rate the morning panel session?)

4.1 out of 5 (scale: 1 = poor, 5 = excellent)

Questions 3: World Café Satisfaction (How would you rate the world café?)

4.3 out of 5 (scale: 1 = poor, 5 = excellent)

Question 4: Descriptors (What words best describe your feelings about this event? Select as many as you like)

informative	11
organized	8
enjoyable	8
stimulating	11
well-balanced	2
inspiring	4
challenging	6
repetitious	0
too short	1
too long	2
poorly-balanced	0
overly complex	1
other: fun/interesting	0
disorganized	1
boring	0
overly simplistic	0

Appendix 2

Throughout the event, participants were asked to write down their ideas about our bioenergy future on Dotmocracy sheets (<http://dotmocracy.org/sheets>) handed out during the morning session. These sheets were then posted in the World Café area during lunch. Participants were encouraged to record their level of agreement with the statements by filling in one dot per sheet to represent strong agreement, agreement, neutrality, disagreement, strong disagreement, or confusion. In addition to their levels of agreement, participants were able to include additional comments on the Dotmocracy sheets concerning the statements' strength/opportunities and concerns/weaknesses. Using the Dotmocracy method allowed participants to speak up anonymously in writing and also provided a way to record and represent the level of support for each recorded statement and the group's collective opinion on ideas concerning our bioenergy future. The following are the results from the 33 sheets filled in during the World Café event:

1. *If greater energy demand and an unsustainable obsession with our transportation system are causing unsustainable energy consumption, why aren't we focusing our technological intellect/innovation on reducing energy demand?*

- Strong agreement: 1
- Agreement: 2
- Neutral: 1
- Disagreement: 2
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities:

- It is happening but not enough

Concerns & Weaknesses:

- You don't make money from reduction. We have no lobbies!

2. *National political leadership is the key to encouraging the population to engage in scientific debates and education. Increased investment in science education at primary and secondary levels is also essential.*

- Strong agreement: 2
- Agreement: 1
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities:

- Get 'em young... this has at least worked in the high schools I know of... the younger generation is hyper-aware of environmental issues whether or not they are taking action.

Concerns & Weaknesses: --

3. *Turn trivia society to open acquisition through radical opening of data and connections, collaborative consumption and (re)cycle.*

- Strong agreement: 1
- Agreement: 0
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses: --

4. *Who was missing from the debate this morning? Who else has a part to play in biofuel futures?*

- Strong agreement: 0
- Agreement: 0
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses: --

5. *Do we need government policy not just for regulation of petro/biofuel, but also for consumer information about their energy usage and energy options.*

- Strong agreement: 1
- Agreement: 3
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses:

- There are clearly some programs for this. Energy guides, programs to evaluate how you can save energy in your house (with financial incentives)...

6. *Public understanding about biofuels does not ensure public acceptance of bio-fuels.*

- Strong agreement: 0
- Agreement: 3

- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses:

- But ignorance doesn't help either!

7. *There are comments that using corn and other agricultural products for biofuels result in a shortage of food products especially in underdeveloped countries.*

- Strong agreement: 1
- Agreement: 1
- Neutral: 1
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities:

- A better formulation would be to say that there is a lack of info about whether this is really the case.
- Also applicable in "developed" countries.

Concerns & Weaknesses: --

8. *Science communication needs to assume that its audience is not technically versed and needs to be as clear and as focused as possible.*

- Strong agreement: 0
- Agreement: 2
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities:

- Can school education play a role in generating knowledge school curriculum ?

Concerns & Weaknesses: --

9. *The large number of individuals and networks of institutions needed to promote and create bio-fuels is its greatest problem.*

- Strong agreement: 0
- Agreement: 0
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 1

- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses:

- The more inclusive, the better – or is the concern that this will never happen?

10. Genomics will provide the tools to enhance biofuel yields.

- Strong agreement: 1
- Agreement: 0
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses: --

11. Only adequate tax policies will ensure massive adoption of biofuel over fossil fuel.

- Strong agreement: 0
- Agreement: 0
- Neutral: 0
- Disagreement: 1
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses:

- Also need price of carbon

12. Troubled industries, especially forestry/pulp & paper, will transform and increase cellulosic ethanol.

- Strong agreement: 0
- Agreement: 2
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses: --

13. Citizens need to understand different technologies and their benefits and risks. They must stop being complacent, and inform themselves, and then pressure government.

- Strong agreement: 1

- Agreement: 1
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses:

- How?

14. *Although I do understand the importance of biofluids, I can't help but wonder how meaningful (+/- significant) it is, environment wise, for a country which is responsible for only 2-4% of global gas emissions. Are we expected to show the way and simply expect others to show good faith and follow? Has this worked historically?*

- Strong agreement: 0
- Agreement: 1
- Neutral: 0
- Disagreement: 1
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses:

- Canada has the largest per capita carbon footprint, we shouldn't be more environmental responsible so that others will follow, but because we are the problem.

15. *The media needs to better explain the concept of sustainability*

- Strong agreement: 2
- Agreement: 0
- Neutral: 0
- Disagreement: 1
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities:

- Media can enable public interest and comfort in acquiring new knowledge.

Concerns & Weaknesses:

- The media should stop using the word "sustainability".

16. *Our dependency on foreign oil will switch to a reliance on foreign ethanol (eg. Brazil).*

- Strong agreement: 0
- Agreement: 0
- Neutral: 2
- Disagreement: 3

- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities:

- Yes, if we leave it up to other countries to develop it.

Concerns & Weaknesses:

- Bioethanol can be produced from many products (unlike fossil oil) available anywhere.
- We do not depend on foreign oil, we have Alberta and Saskatchewan.

17. *Canada should leave the production of biomass for biofuels to countries with climates more suitable for cultivation.*

- Strong agreement: 0
- Agreement: 0
- Neutral: 0
- Disagreement: 1
- Strong disagreement: 2
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses: --

18. *Journalism is also a bottom-line industry (increasingly more so) that is required to mediate/communicate within and between multiple fields of knowledge, an incredible task. Government agencies and industry are shirking their responsibilities to their own field and public by hiring talking heads- P.R. agencies!*

- Strong agreement: 4
- Agreement: 2
- Neutral: 1
- Disagreement: 1
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities:

- Saying journalists need to “do better” is easier said than done, especially with the media industry’s current problems.
- The Canadian government needs to make data and information more easily accessible. Open Data!
- Scientists need funding to collaborate with journalism schools to help promote lay discourse to the public.
- Scientists need to make more of an effort to communicate to the public.

Concerns & Weaknesses: --

19. *Bioenergy development can be a risk to biodiversity and our forests.*

- Strong agreement: 1
- Agreement: 2

- Neutral: 1
- Disagreement: 1
- Strong disagreement: 1
- Confusion: 0

Comments:

Strengths & Opportunities:

- See example of the rainforest in Indonesia

Concerns & Weaknesses:

- We've already chopped down most of them and resorted to mono=culture – how can it get any worse?

20. *#1 Policy priority – we need to reduce consumption of fuels, not simply substitute biofuels/energy for petro/hydro. Investing scarce RD \$ to support current consumption levels/lifestyle is unacceptable. Any commitment towards RD in bio must also target less consumption and waste.*

- Strong agreement: 5
- Agreement: 1
- Neutral: 0
- Disagreement: 2
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities:

- Cities have a role to promote sustainable development and active/public transportation.

Concerns & Weaknesses:

- We do not have the moral authority to dictate other countries in reducing energy consumption.
- Never mind other countries, people in our own as well!

21. *What are the obstacles to bringing real science into public discourse? What are the drivers in shaping change to science policy?*

- Strong agreement: 1
- Agreement: 1
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities:

- Canada does not have a science policy. Policy makers are not well informed, this is in part the problem with our political system.
- Science rocks!

Concerns & Weaknesses: --

22. *We need the oil industry to play ball!*

- Strong agreement: 4

- Agreement: 1
- Neutral: 1
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities:

- The oil industry has capacity to develop distribution networks, invest in new technology and production facilities

Concerns & Weaknesses:

- Maybe we need to regulate their playing.

23. *While moving toward biofuels may present an opportunity to reduce our oil dependence, it will raise other problems, such as water shortages, land-use issues, etc.*

- Strong agreement: 0
- Agreement: 2
- Neutral: 0
- Disagreement: 1
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses:

- It may, but not if it is done right.
- But all these effects must be compared to current usage of these resources by traditional fuel production methods.

24. *We need to develop inclusive discussion on what biofuels will do for society, as opposed to, just seeing biofuels appear at my gas station one day when I have no idea why?*

- Strong agreement: 4
- Agreement: 2
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities:

- People need to understand what the different fuels are and the processes of making and using them to know what choices they and their governments are making -this discussion needs to be on a mass scale.
- Perhaps a policy that gas stations must advert certain benefits of biofuels much like tobacco fuels mention cancer.

Concerns & Weaknesses:

- But we come back to the question of whether being better-informed will have any influence on behaviour.

25. *Is the “Valley of Death” for new biofuels technology a result of deficient venture capital (austere capital financing) in Canada? How can science policy realistically address this?*

- Strong agreement: 0
- Agreement: 1
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses: --

26. *I think we also have to consider the effect of a switch to production of biofuels on the fresh water resources.*

- Strong agreement: 3
- Agreement: 5
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities:

- Yes, takes a lot of water to grow corn for biofuels (Canadians 5% target based mainly on corn, I understand).
- We can't live without water

Concerns & Weaknesses:

- As opposed to traditional fuel processing and extraction methods.

27. *The greatest potential for improving our energy problematique will not come from science and technology but rather civil society*

- Strong agreement: 0
- Agreement: 0
- Neutral: 0
- Disagreement: 2
- Strong disagreement: 1
- Confusion: 1

Comments:

Strengths & Opportunities:

- We are a science-based society, the push must be based in science and motivated by policy.

Concerns & Weaknesses:

- It may start there, but up the end technology will be tool to get there
- What is civic society? We live in a bottom-line, capitalistic society. Difficult to even pull people away from their “stories”.

28. *A variety of energy sources may be the most practical solution. Why should a few companies hold a fuel monopoly? Creating a free market of energy possibilities may lower fuels costs.*

- Strong agreement: 0
- Agreement: 0
- Neutral: 1
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses:

- Huge capital investment required would restrict the number of players.

29. *Journalists and businessmen trying to simplify analysis of scientific terms and ideas.*

- Strong agreement: 1
- Agreement: 1
- Neutral: 0
- Disagreement: 1
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses:

- We need simple concepts so average people can grasp what scientists are trying to convey.
- Simple concepts = simple mindedness?
- What constitutes the “average person”? How simple/complex do things need to be?
- Isn’t science communication that was discussed in the panel an argument for simplifying science info for the public?

30. *Should we be looking at alternatives to transportation fuels instead of continuing to focus on liquid fuels?*

- Strong agreement: 1
- Agreement: 0
- Neutral: 1
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities:

- Perhaps looking at alternative transport, alternative shipping, alternative urban design...

Concerns & Weaknesses:

- Yes, we should. But replacing all the existing cars and infrastructure will take time.

31. *Should food prices be taken into account if biofuels may raise or lower prices?*

- Strong agreement: 0
- Agreement: 1
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses: --

32. *Better relationships between energy companies and the scientific community (also better coverage of integration between those two groups.)*

- Strong agreement: 0
- Agreement: 1
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities:

Concerns & Weaknesses:

- Already relationships there. Some are negative (industry sponsoring anti-climate change scientists).

33. *How much crop yield does it take to produce energy? Would biofuel be economically feasible for farmers? (ex: to power one house? one city?)*

- Strong agreement: 0
- Agreement: 0
- Neutral: 0
- Disagreement: 0
- Strong disagreement: 0
- Confusion: 0

Comments:

Strengths & Opportunities: --

Concerns & Weaknesses: --