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Proceedings Report

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Executive Summary

The Ontario Climate Consortium (OCC) and York University hosted the 5th Ontario Climate Symposium on May 11th and 12th, 2017. This event is the premier forum for sharing cutting-edge climate change research and initiatives from across Ontario and beyond. This year's symposium, centered on the theme of *Just Transformations: The Next 150*, brought together speakers and attendees from academia, all levels of government, the private sector, and civil society organizations to discuss pathways towards low carbon and climate resilient communities over the next century and beyond. The following is a proceedings report of the two-day event. For each panel, we included summaries for each presentation that are organized according to the panels that took place during the symposium. Ahead of each panel summary are two to three key takeaways that represent some of the central themes discussed.

The Keynote Panel on May 11th included speakers that presented on a number of overarching themes related to climate justice, including energy justice, indigenous perspectives, citizen engagement and community transformation. The Keynote Panel on May 12th featured a variety of perspectives from Ontario and beyond on topics like the implementation of the Pan-Canadian Framework on Climate Change, and the implications of a the Trump administration on climate policy in the United States.

On May 12th, we hosted a number of concurrent panel sessions that engaged speakers from the public sector, academia, and private sector. The overarching themes of the concurrent sessions are as follows: sustainable energy, climate justice, planning and implementation, the future of the water system, Ecohealth, community mobilization, the transportation sector, and Indigenous perspectives.

The panels that explored topics related to sustainable energy (Workstream A) featured speaker from the public, non-profit, and energy production sectors. The panel also explored important questions related to the implementation of sustainable energy at the local level, the future of energy systems, frameworks for energy storage technologies, and the future of energy efficiency in Ontario.

The sessions that explored topics related to climate justice (Workstream B) featured discussions on recent developments in climate change litigation and advocacy, the connection between climate change and marginalized communities, industrial chemical effects on indigenous communities, environmental racism, gender equity in the renewable energy industry, energy literacy, and approaches to energy conservation.

Our panels in the planning and implementation workstream (Workstream C) covered topics like the planning challenges related to climate change, low-income communities, cap and trade, the importance of retrofitting social housing, the potential of smart grids, the moral implications of flood risk measurement, strategies for measuring emissions reduction successes, and methods for evaluating sustainability.

The sessions in the fourth workstream examined topics related to the future of the water system and Ecohealth. The panel featured discussions related to flood impact and engineering challenges of heavy rainfall, animal habitats, new stormwater policies,

mitigating public health risks, the ecological determinants of health, and the role of greenspace in addressing health and air pollution.

Finally, Workstream E examined 1) Indigenous perspectives on climate change in Ontario; 2) community mobilization; and, 3) the transportation sector. The first panel included a dialogue on the way climate change has affected First Nations communities in Ontario along with the adaptation efforts they are undertaking. In the community mobilization session, the major themes that speakers explored included municipal-level climate action that has been coordinated with multiple stakeholders, using social capital to build alliances, and community-led climate activism. The final panel in this workstream on the future of transportation included presentations on supply chain transportation, public transit, and new disruptive technologies in microtransit.

Keynote Panel Day 1: The Next 150 Years: Envisioning Just Transformations

Key Takeaways

- Successfully combatting climate change will likely require us to rethink our current economic growth model.
- Success will likely require a cultural shift in how we use energy.
- We shouldn't assume technology will save us.

Panel Overview

The Day 1 keynote panel featured speakers that examined the overarching themes of the symposium. Moderated by David Miller, the former Toronto Mayor and current CEO of the World Wildlife Fund (WWF) Canada, the panel discussed topics ranging from energy justice, indigenous perspectives, citizen engagement and community transformation.

Kyle Powys Whyte: Indigenous Rights & Reconciliation in Times of Climate Change

Timnick Chair in the Humanities at Michigan State University, Kyle Powys Whyte spoke about the connection between indigenous rights and climate change. Reflecting on his own heritage, Whyte noted that his Anishinaabe ancestors were forcibly relocated from the Great Lakes Region to Oklahoma, United States in the 19th century. This is consistent with the long-standing history of Indigenous populations being moved to areas that are more vulnerable to climate change.

Whyte wants Indigenous communities to create self-sufficient renewable economies based on traditional Indigenous values. As Whyte went on to explain, there are a number of cases, like in Oklahoma, where Indigenous communities signed agreements with extractive industries to provide jobs for members of the community. Unfortunately, this dependency on the extractive industry has made the switch to renewable approaches challenging and has contributed to colonialism.

Whyte argued that new models of reciprocity between governments and indigenous communities could be developed if traditional Indigenous knowledge systems are respected and legitimated.

Imre Szeman: Energy Justice in the Anthropocene

Imre Szeman, the Canada Research Chair in Cultural Studies at the University of Alberta, discussed modern Western society's cultural dependence on energy use, what he calls a 'petroculture'. A 'petroculture' is one that accepts the need for energy consuming technologies as a given. As Szeman provocatively asks, what if, instead of talking about shifting from gas to electric cars, we questioned the need for cars in general?

The solution to climate change is often thought to be a technological one, but what Szeman wants us to think about is how cultural change might contribute to this change. By many measures, switching one energy technology for another won't be enough which means that our use habits will likely need to change.

Szeman imagines the shift from a 'petroculture' in two phases. First, we would see a reduction in energy use by shifting to locally controlled energy councils that collectively determine energy uses. Second, an 'ecologization' of the energy economy by shifting the profit model to one that emphasizes ecological well-being.

Catherine Abreu: Seizing Canada's Climate Moment

As Executive Director of the Climate Action Network, Catherine Abreu had a lot to say about Canada's current climate change context. While Canada is only responsible for 2 percent of global emissions, it is one of the world's top eight polluters – we produce double the amount of greenhouse gas emissions as the 145 least emitting countries. The fact that Canada is involved in international agreements, such as the Paris Climate Accord, is a positive step. However more concrete action and commitment is needed.

There are five main challenges to achieving emissions reduction objectives as Abreu sees it:

- Appropriately integrating reconciliation with indigenous communities into climate change mitigation efforts;
- Relying more on territorial and provincial solutions creating a bottom-up framework;
- Trump's unwillingness to cooperate on climate change mitigation is a major challenge, especially in the context of trying to stay competitive;
- Overcoming the powerful influence of the oil lobby; and,
- Canadian cognitive dissonance on climate: we must correct the contradictory idea that we can somehow solve climate change without significantly altering the business as usual. If we are going to be effective, we need to change.

Julia Langer: TransformTO – 2050 Pathway to a Low-Carbon Toronto

Julia Langer, CEO of The Atmospheric Fund, presented on the City of Toronto's progress toward its emissions reduction goals. So far Toronto has hit its 2012 Kyoto Protocol target and is on track to meet its 2020 goal. However, if current trends continue Toronto will not meet its 2050 goal.

As Langer sees it, if Toronto can achieve success in three main areas, it can shift the trend and meet its 2050 goal. This is why TransformTO is campaigning for the following:

- Mobilizing local neighbourhoods toward low carbon community approaches;
- Preparing for the electric transportation transition; and,
- Developing the workforce to build high performance low to zero carbon buildings, and focus on retrofits of existing buildings.

Keynote Panel Day 2: Ontario's Climate Action Plan in the Subnational and Intercontinental Context

Key Takeaways

- Coordination at the state and provincial on climate change is considered to be crucial for success in adapting to and mitigating the effects of climate change.
- Ontario, Quebec, and California are having some success with their cap and trade market.
- Provinces have had success with reducing emissions but are not on track to meet future targets.

Panel Overview

Ontario has taken a leadership position on climate policy in North America, in partnership with subnational jurisdictions including Quebec and California. Moderated by York University's Mark Winfield, the Day 2 panel featured a range of perspectives from Ontario and its key partners, and explored issues such as the implementation of the Pan-Canadian Framework on Climate Change, and the implications of a the Trump administration in the United States.

Dianne Saxe: Annual Ontario GHG Progress Report

Dianne Saxe, the Environmental Commissioner of Ontario, spoke about Ontario's annual report on green house gas (GHG) emissions. She also spoke about the major economic opportunity offered by climate adaptation measures, suggesting this could be the next industrial revolution.

In addition to this, Saxe touched on the Waste-Free Ontario Act, a measure slated to significantly reduce emissions by increasing resource recovery and moving toward a renewable circular economy. This is just one part in many needed to achieve a waste-free net-zero Ontario.

John Godfrey: Federal-Provincial Coordination on Climate Action

John Godfrey, Special Advisor to the Minister of the Environment and Climate Change and Former Federal Cabinet Minister, spoke about how the Ontario climate action plan is progressing. The five-year plan includes major components related to transportation and building infrastructure. Two of the most significant aspects include plans to build the infrastructure to support electric cars, and beginning the massive work necessary to retrofit existing buildings to meet emissions standards. As Godfrey argued, climate action requires that we develop policies that account for mitigation, adaptation, and economic development.

Among the plan components discussed, Godfrey asserted the need for Ontario to do better at supporting green businesses. Green business opportunities have the potential to lead to the most revolutionary changes. Ontario's plan to support this revolution is to

introduce a Green Ontario Fund designed specifically to help finance green business initiatives.

Barry Rabe: Subnational Climate Policy in North America

Barry Rabe, a Professor at the University of Michigan, presented on the American climate context, including state level agreements with Canadian provinces. As Rabe emphasized in his talk, the American climate change mitigation context has shifted significantly since the election of Donald Trump. Despite this, Rabe noted the fact that individual states have a lot of power to set their own climate change policies and agreements means hope if not lost. For example, California has cap and trade agreements with Ontario and Quebec. Moreover, there have been notable renewable energy efforts in traditionally 'red states' including wind energy in Texas. Therefore, Rabe argues that the American climate policy context is likely more resilient to political change than we might think.

Pierre Olivier: Quebec Perspectives on Climate and Energy

Pierre Olivier, Chair in Energy Sector Management at HEC Montreal, provided some context about Quebec's approach to climate change mitigation, and its relationship with the rest of Canada and California. Quebec is currently the lowest per capita GHG emitter in Canada, and has reduced its emissions to 10% under 1990 levels. Despite this success, Quebec will not reach its 2050 goal of being 80% below 1990 levels, even based on current trends.

Olivier also discussed Quebec's shared cap and trade market with California and Ontario. While the market has been somewhat successful, there are issues including legal challenges and shortages on emissions rights.

Olivier also criticized what he calls "Quebec's Climate Change Inaction Plan", something he sees as a major barrier for Quebec to overcome if it is to meet its GHG goals. According to Olivier, the provincial ministries responsible for climate change mitigation are mired by severe bureaucratic inefficiency, including multiple disconnected committees across two provincial ministries. As Olivier argued, for Quebec to meet its goals four conditions must be met: 1) better governmental integration and organization; 2) limitation on political interference; 3) adequate financial support; and, 4) appropriate stakeholder engagement.

Workstream A: Sustainable Energy

Session 1A: Community Energy Planning

Key Takeaways

- Empowering local communities to take action on climate change can succeed in ways not possible if decision-making is concentrated at the provincial and federal levels.
- More tools are needed to empower community energy planning.

Summary of the Session

The panel on community energy planning explored important questions related to the implementation of sustainable energy at the municipal and local level. Speakers included individuals from the public, non-profit, and energy sectors. Moderating the discussion was Karen Farbridge (from Farbridge and Associates) who spoke about the long-standing tradition in Canadian governance that limits the power of local municipalities in favour of the provincial and federal levels. If the implementation of energy solutions is to happen at the local level, municipalities need to be empowered accordingly.

Mike Lee from QUEST, a smart energy advocacy group, spoke about the way his organization helps municipalities plan and build up sustainable energy use practices. This includes evidence-based suggestions for the kind of rules municipalities can introduce to limit expansion, density, land use, and buildings in a way that can effectively control emissions. In addition to helping with planning, QUEST specializes in relationship building between utility companies, provincial agencies, and municipalities.

Lisa King from the City Planning Department of Toronto spoke about the important role green building standards have on the path to achieving the goal of zero emissions. As King explained, if Ontario is to succeed in its emissions goals, cities need to build a new consistently enforceable framework for green building standards based on global comparative best practices.

Another example of community energy planning is the Community Climate Change Action Plan (CCCAP) being undertaken by the Town of Caledon in Peel Region. Climate Change Specialist Shannon Carto spoke about the ongoing work that has been undertaken. Through development of the plan, the top emissions producers in the Town of Caledon were identified as transportation, residential buildings, commercial buildings, agriculture, industrial buildings, and waste related emissions, respectively. The CCCAP outlines a number of recommendations related how emissions can be reduced in each of those sectors (they can be found at the following link). The Town of Caledon is now in the process of collecting feedback on its plan.

Finally, the panel concluded with Neetika Sathe from Alectra Energy Solutions, the second largest municipality owned utility company in Canada, speaking about new innovations in energy production and distribution. As Sathe went on to explain, in order to effectively reduce green house gas emissions a combination of methods at all levels of community energy need to be included. For example, Sathe discussed the promise of

combining microgrid technology, and high capacity battery storage in the residential and commercial sector.

Session 2A: The Future of Energy Systems

Key Takeaways

- Existing energy technology and policy frameworks are not sufficient to nurture future technology innovation.
- Energy storage technology is crucial to making renewable transition possible.
- Disrupting the existing energy production industry is necessary for a renewable energy transition.

Summary of the Session

Chaired by Environmental Studies Professor Mark Winfield of York University, the second panel explored future energy systems. Specifically, this panel looked at frameworks for energy storage technologies, the movement towards 100% cities, and the future of energy efficiency in Ontario.

York University Professor Jose Etcheverry made the case for why the future of energy should be one hundred percent renewable, with a one hundred percent community focus. To achieve this goal, our perceptions of the meaning of energy need to change. As Etcheverry argued, perceptions are narrowly mediated through the context of our five senses. If history is any guide, perceptual contexts can be transformed to give way to new ways of thinking about the world, as demonstrated by transformations facilitated by the electrical grid. Etcheverry believes a similar transformation could happen with renewable energy, assuming we allow it to.

Shahab Shokrzadeh, a post-doctoral fellow in York University's Sustainable Energy Initiative (SEI), spoke about energy storage technologies, and how this is affected by policy regimes. Since the flow of solar and wind energy depends on environmental conditions (sunshine, wind), energy storage technology becomes a crucial consideration. Therefore, how policy can be constructed and implemented to support this is an important aspect of achieving emissions goals. As Shokrzadeh notes, energy storage technologies have the potential to disrupt the way traditional utility companies function. The rigidly governed policy context of existing utility companies makes the implementation of new policy and technologies challenging. Shokrzadeh ultimately argues that the goal of future policy should be to:

- Transform the way energy is transferred and stored on the grid;
- Reconfigure itself as a crucial component of emissions reduction;
- Re-alignment the energy system such that conventional utility approaches may become obsolete; and,
- Encourage economic development with emerging technologies, and help transition to a 'green economy.'

James Gaede, a post-doctoral fellow at the University of Waterloo, also spoke about the future of energy storage technology. One interesting observation from Gaede's research is that energy storage is not as closely associated with climate change goals as other technology such as wind and solar power themselves. Rather than policy barriers, Gaede

focused on the social acceptance of energy storage. Social acceptance means, community acceptance, market acceptance, and socio-political acceptance. As Gaede observes, currently social acceptance of energy storage is fairly high, but is limited by cost and technology efficiency. If these limitations can be overcome, energy storage has the potential to transform energy production in unexpected ways, either disruptive or adaptive. Therefore, more attention is needed to explore how better energy storage technologies might impact society and the economy.

Closing out the panel was OCC's own Peter Love speaking on the topic of energy conservation strategies in Ontario. According to Love, two thirds of energy produced in Ontario is wasted. Reducing this level of waste can be achieved through five strategies:

1. Behavioral conservation changing the way people use energy sources (turning off lights when leaving the house), without changing the technology.
2. Energy efficiency is changing the actual energy consuming technology in a way that it requires less to do the same or similar tasks.
3. Demand response is by generating energy to more effectively match the times when demand for energy is highest and lowest.
4. Fuel substitution is transitioning to other fuel sources (ones that generate less green house gases).
5. On-site generation is increasing the number of locations that generate their own energy, reducing the strain on the power grid.

Love also identified some challenges associated with implementing all or some of the above strategies. In most cases, conservation is difficult to measure as it depends on many variables. Moreover, for conservation to be successful, all relevant stakeholders (government, industry) must participate. In the long run however, energy conservation has the potential to not only reduce green house gas emissions, but also to make the economy more productive. Love is hopeful that with the right combination of incentives, subsidies, technological change, a new culture of conservation is possible.

Session 3A: Ontario's Long-Term Energy Policy

Key Takeaways

- Balancing cost and efficacy in any climate mitigation plan needs to improve.
- Accuracy and availability of data related to climate mitigation technology and the economic effects of certain measures remains a challenge for policy makers.
- Reaching 100 percent renewable will require a combination of measures including new power grid technologies and market programs like cap and trade.

Summary of the Session

The final panel in the Sustainable Energy Workstream explored long-term energy policy in Ontario. Chaired by the OCC's Peter Love, the panel examined the best evidence-based options for clean energy production. This included examining energy demand forecasts, the taxpayer costs related to cap and trade, variable energy flows, and the costs associated refurbishing existing nuclear reactors.

Ralph Torrie, partner at Torrie Smith Associates, began the panel by talking about Canada's energy production mix, and how it might achieve 100 percent renewable in the

near future. Comparing fossil fuel with renewable electricity generation, the later makes up only 20 percent. There are many challenges associated with getting up to 100 percent. An important place to start, according to Torrie, is with heating residential buildings. Current forecasts for energy demand compared with plans for sustainable electricity generation do not look promising, so something needs to change quickly.

Mark Brouillette from Strategic Policy Economics spoke about emissions reduction and long-term energy planning. As Brouillette explained, one of the main difficulties related to long-term energy planning is the lack of data on the effects that emissions reductions will have on the economy. For example, cap and trade represents an untracked cost to taxpayers and ratepayers. All available data suggests that with currently available technology, switching energy over to renewable to meet current emission reduction targets will cost over 27 billion dollars per year, if we are lucky. Therefore, in order to achieve emissions targets, there needs to be a better balance between green politics and the politics of cost.

Continuing with the theme, Madeline McPherson from the University of Toronto talked about the logistical considerations associated with shifting Ontario's power grid to 100 percent renewable. Specifically, properly converting to more wind and solar power, with it's variable flow, into the existing grid is a challenge. Important considerations include how to respond to power grid demand, and how to store power when it is not needed. Ultimately McPherson argues that the shift to renewable needs to happen gradually by replacing inflexible generators with flexible ones, and ensure appropriate technology for storage and demand is integrated.

Closing out the panel, Jack Gibbons from the Ontario Clean Air Alliance discussed the role of nuclear power for the future of Ontario's energy mix. Is nuclear power a practical part of the renewable energy? According to Gibbons the answer is 'no'. Indeed, nuclear power is now more expensive per kWh than wind or solar. The current Ontario Government is considering putting in more than 26 billion dollars to refurbish existing nuclear plants. To make up for the cost of refurbishment electricity bills will likely need to increase. Thus, Gibbons argues this is not a practical solution. Alternatively, the Government of Ontario could be importing wind energy for one-tenth the cost.

Workstream B: Climate Justice

Session 1B: Climate Law and Justice

Key Takeaways

- Existing constitutional human rights protections offer a lot of potential for legal action on climate change.
- Scientific evidence connecting climate change to harm is crucial for successful legal cases.
- Legal frameworks compelling corporate climate disclosures should be established.

Summary of the Session

Chaired by Dustin Klaudt from Osgoode Hall Law School, the first panel on climate justice explored recent developments in climate change litigation and advocacy. Topics explored included recent trends involving human rights and risk disclosure based claims, and the use of corporate disclosures to avoid legal liability related to climate harms.

David Estrin from the international law firm Gowlings WLG began by speaking about the growing prevalence of climate change litigation being argued on constitutional and human rights grounds. Estrin offered three legal cases as examples of climate change litigation around the world.

- *Urgenda v Holland:* a group of 886 Dutch citizens brought a case against the Dutch Government arguing that by not curbing carbon emissions the government was guilty of negligence against the population. The citizen's group won the case and the courts ordered the Dutch Government to reduce emissions 25% by 2020.
- *Leghari v Pakistan:* in this case a farmer filed a public interest allegation in the Lahore High Court claiming the government was not doing enough to protect his constitutional rights to life and dignity which were threatened by climate change. Again, the court ordered the government to take action.
- *Austria – Vienna Airport Expansion:* this was case where construction of a major infrastructure project, and airport expansion in Vienna, was halted because of projected environmental impacts.

Etrin's main takeaway was that these examples demonstrate a lot of potential for future climate change litigation. Claims on the grounds of human rights and constitutionality could be an important strategy going forward.

Echoing many of the same sentiments as Estrin, Greenpeace's Kristin Casper emphasized the importance of scrutinizing the political influence high carbon-emitting corporations such as oil and gas have on the democratic process. Casper highlights three recent court cases as examples of positive climate change litigation.

- *Philippines - October 2016:* 14 civil society organizations filed a petition with the Philippines' Commission on Human Rights against 49 companies that are responsible for 21.6 percent of estimated global GHG emissions. While the case is still ongoing, it is being argued on right to life guarantees in the constitution.

- *Klima Seniorinnen: Senior ladies climate case in Switzerland - October 2016:* following a massive heat wave that predominantly killed seniors, a group of over 500 Swiss women over 65, brought suit against the government arguing it failed to take action on climate change.
- *Nature and Youth and Greenpeace Nordic - October 2016:* this lawsuit argues that Norway should invalidate the oil production licenses granted in the 23rd round in the Barents Sea. The claim is that these licenses violate both the Paris Agreement and the constitutional right to a healthy and safe environment.

Once again echoing Estrin, Casper argued that scientific facts on climate change are the key to winning these types of cases.

Nathalie Chalifour, law professor from the University of Ottawa, presented on the Canadian Charter of Rights and Freedoms and how it might apply to climate change cases. Specifically Chalifour has been focusing her research on sections 7, which guarantees the right to life, liberty, and security of the person, and 15(1) which states that every individual is equal before and under the law and has the right to equal protection and benefit. As Chalifour argued, government inaction on climate change seems to plausibly violate both these sections in a variety of ways. Chalifour's talk was based on two papers she was working on at the time of presentation.

Osgoode Hall Law Professor Cynthia Williams presented on the G20's Financial Stability Board's (FSB) task force on climate change. The FSB was established to help member nations of the G20 create stable financial conditions. Through its recent task force, the FSB has been analyzing long-term financial risks posed by climate change. Such risks include property, political stability, and food and water security. Since financial market analysis tends to focus on short-term risk to investors, the FSB has been attempting to create a system that can represent climate change related risk to investors. This all depends on creating standardized obligations for companies to disclose climate-related financial information. As Williams pointed out, this is one of the few market-oriented attempts to solve the risks associated with climate change.

Keith Stewart from Greenpeace Canada closed out the panel by discussing the need for corporate climate disclosures. Since long-term costs associated with climate change are not being adequately represented, Stewart argued for the establishment of a strong legal framework. According to Stewart, a good framework would be 1) mandatory for all companies; 2) be science-based; and 3) be enforceable so that non compliant companies would be appropriately penalized. Establishing such a framework could form the basis for future lawsuits.

Session 2B: Climate Justice and the Commons

Key Takeaways

- The renewable transition should be inclusive of currently marginalized groups, especially those with a history of suffering environmental racism.
- Activist work has the most impact when it can build alliances with a diverse number of groups.

Summary of the Session

The second panel in the climate justice workstream focused on the impact of climate change on marginalized communities. Moderated by Ellie Perkins, a professor at York University, the panel explored the ways in which the negative effects associated with climate change disproportionately impact marginalized communities. Discussions focused on industrial chemical effects on indigenous communities, environmental racism, faith-based alliances on climate change, and the fragmented Great Lakes governance structure.

The first panelist was Anishinaabe climate activist Vanessa Gray. Gray grew up in Aamjiwnaang, a community in close proximity to the chemical plants near Sarnia, Ontario, known colloquially as the 'chemical valley'. Gray recounted memories of her community developing illnesses as a result of chemical exposure. A troubling statistic shows that the miscarriage rate in Aamjiwnaang is 39 percent compared to the national rate of 15 percent. Gray's main message was a rallying cry for indigenous communities to mobilize against environmental colonialism and to reconnect with cultural traditions.

Cheryl Teelucksingh from Ryerson University spoke about racism and environmentalism. Teelucksingh began by talking about how environmental injustice is often linked to racism, and cited examples like Standing Rock. Environmental racism has a long history of displacement and marginalization. As society moves toward a zero-carbon future, Teelucksingh wants to ensure that these changes happen without displacing disadvantaged communities. Ultimately, Teelucksingh wants to see the zero-carbon transition benefit everyone, rather than only the privileged.

Lucy Cummings, Executive Director of Faith and the Common Good, presented on an emerging alliance of faith groups who share a commitment to protecting the environment. As Cummings argued, climate change is a moral issue that should concern members of many different faiths. Since the group's formation, alliances on a number of climate related issues have formed between many faith groups including various Christian and Muslim groups. One of the advantages associated with faith groups are their ties to grassroots communities, meaning actions have the potential to be more locally oriented.

The panel concluded with Paul Baines from Great Lakes Commons, an organization dedicated to protecting the environmental health of the Great Lakes. Baines is critical of the large and very fragmented governance structure of the Great Lakes. As the Lakes cross many jurisdictions (federal, state, provincial etc.), coordinated policy becomes almost impossible. Bains argues for a new model that would treat the Lakes as a commons in a way where all jurisdictions must conform to certain standards of treatment and respect.

Session 3B: Gender Diversity in the Low Carbon Economy

Key Takeaways

- Women face a gender barrier in the renewable energy industry.
- Energy literacy is crucial for informed action on climate change.
- The process needs to be more inclusive.

Summary of the Session

The final panel on climate justice took up the issue of gender in the low carbon economy. Environmental careers are generally thought of as progressive career pathways for women. Chaired by York University Professor Christina Hoicka, the final panel presented the research of four thought leaders in the energy field and their experiences as female academics in the energy space. Discussions touched on gender equity in the renewable energy industry in developing countries, energy literacy, approaches to energy conservation, and the democratic advantages of community energy.

Bipasha Baruah is one of the cofounders of Women in Renewable Energy, an organization focused on employment equity in the renewable energy space. Baruah's research found that gender equity in the renewable space is often better in developing countries (like India and Brazil) than it is in developed ones. Reasons for this include the prevalence of systematic devaluation of women in technical occupations, even with higher education qualifications. Baruah, along with her organization, Women in Renewable Energy, are working on programs to correct this gap.

Runa Das from Ryerson University spoke about the importance of energy literacy. Since energy is directly tied to climate change, and is something that we rely on everyday, it's something we should all understand. According to Das, an energy literate individual will value the impact of energy on the environment and society, and will engage in related behaviors and decision-making. Das' current project has been engaging practitioners and educators in the development process of an energy measurement tool that can help contribute to energy literacy.

Ryerson University Distinguished Research Fellow Jessie Ma presented on energy conservation as a way of maximizing societal benefit. Ma discussed different strategies for reducing per unit cost of energy including peak shaving, off-peak reduction, peak shifting, and time-independent conservation. The model would be especially useful for price sensitive consumers, including those in disadvantaged communities.

The panel concluded with Julie MacArthur from the University of Auckland discussing community energy strategies. Developing new energy systems can be a very contested process caused by the conflicting interests of several stakeholders. Community energy is a more democratic approach that includes the community in the decision-making process. MacArthur argues that if people participate in the process there is greater likelihood of the right kinds of projects proceeding. Currently there are several community organizations working towards some kind of community energy framework.

Workstream C: Planning and Implementation

Session 1C: Regional Land Use Planning

Key Takeaways

- Climate change realities often conflict with the sometimes heavily developer influenced planning process.
- Getting a diverse set of stakeholders to agree is challenging.
- When public participation is involved, those proposing a change always need to do at least twice the work of someone arguing to preserve the status quo.

Summary of the Session

Chaired by York University Professor Jennifer Foster, the panel on land use planning featured three planning professionals. These included: Susan Swail, a former municipal councilor and consultant at Environmental Defense Canada, Franz Hartmann, executive director of the Toronto Environmental Alliance, and Jason Thorne, General Manager of Planning and Economic Development for the City of Hamilton. Rather than each participant giving a short presentation, the panel was organized as an extended Q&A with Professor Foster introducing a series of discussion questions for response from the panel. Topics discussed included challenges that planners face related to climate change, social and cultural inequity in planning, NIMBYism and climate action, and the role of expert knowledge in planning.

The first question focused on the biggest climate change challenges faced in land use planning. Some major themes discussed included urban sprawl, the carbon-intensive construction of single-family homes, and the challenge of building consensus between multiple agendas and stakeholder. Another major challenge is how to retrofit the existing municipal infrastructure for a zero-carbon future.

The topic of social and cultural inequity in planning for climate change was also raised. Panelists generally agreed that planning is too influenced by private interests and is set up in a way that seems to disincentivize marginalized groups from participating. Grassroots planning could be a way of getting more marginalized groups involved in a way that might lead to initiatives like more affordable housing.

Another important question posed to the panel was whether in some cases public participation accelerates climate change (because of Not-in-my-backyard sentiments)? Panelists acknowledged that this is sometimes a problem, and that in general the bar is always higher for people on the side of change. This is why it's important to do public participation in the right way, in a way that presents all the facts.

The discussion evolved into a larger conversation about the role that knowledge and facts play in planning, especially in an era some people call "post-truth" where well-established scientific facts are contested for political reasons (as in the case of climate science). The challenge arises when evidence conflicts with people's personal beliefs. As one of the panelists noted, while planning should be evidence-based, we cannot ignore participation. Perhaps the best response to this would be to develop an alternate

participation method in a way that local residents play a larger role in knowledge production.

Session 2C: Addressing Challenges Faced by Low-Income Communities

Key Takeaways

- Climate change mitigation strategies do little to address the potential effect on disadvantaged communities
- Measures should be taken to ensure that any transition to renewable technology benefit the least well off

Summary of the Session

Chaired by Ian McVey from the Ontario Climate Consortium, the panel explored challenges faced by low-income communities including susceptibility to flood risk and energy poverty and the opportunities to implement new technologies. Topics discussed included how current cap and trade strategies do not include any reference to low-income populations, the importance of retrofitting social housing, the potential cost benefits offered by smart grids, and the moral implications of measuring flood risk.

The panel began with Barbora Grochalova from the Canadian Environmental Law Society talking about carbon pricing and energy poverty. As Grochalova pointed out, climate change's effects on the environment and energy pricing disproportionately affect low-income communities. Currently proposed plans to curb emissions through carbon pricing and cap and trade do not include strategies to support low-income and vulnerable populations. Grochalova argues that this is unjust and we need a piecemeal approach to ensure support for the vulnerable.

Abhilash Kantamneni, from the University of Guelph, spoke about energy sustainability in social housing. Social housing is an important part of Ontario's affordable housing stock. However, only 2 percent of it has been retrofitted for emissions reductions. As Kantamneni sees it, this could be a good opportunity for government cost savings provided the following barriers can be overcome: 1) awareness of the situation, 2) the collection of sufficient technical data, 3) institutional efficiency on government funding, and 4) the building of a business case to demonstrate cost savings.

Ian Rowlands from the University of Waterloo presented on the potential benefits of smart energy grids for low-income households. Indeed, according to Rowlands, smart grid technology could bring costs down considerably. Challenges with this approach are high initial sunk costs. In addition, vulnerable households are likely to be shut out of the transformation because the initial sunk costs are so high. Therefore, the main challenge is to figure out a way to include vulnerable households in the transition to smart grids.

The panel wrapped up with a presentation from Jared Houston and Usman Khan, from Queen's University and York University, respectively. Their talk took an interdisciplinary approach to analyzing flood risks by combining engineering knowledge about flood patterns, with a moral analysis. The implementation of flood prevention measures is currently calculated on potential economic costs. As Khan and Houston argued, there are more just ways of considering flood prevention including basing it on potential harm to vulnerable individuals.

Session 3C: Going Beyond Compliance by Accelerating Transformational Change

Key Takeaways

- There is a strong business case to be made in favour of sustainability based on morality, risk, and opportunity.
- Measurement tools are an important way of tracking sustainability success.

Summary of the Session

This panel, chaired by Stefan Hostetter from the Centre for Social Innovation, explored the limits of conventional measurements and reporting frameworks such as the Global Reporting Initiative (GRI) and the barriers and opportunities to moving beyond compliance. Specific topics discussed included new strategies for measuring emissions reduction successes, the importance of evidence-based policy, methods for evaluating sustainability, making a business case for sustainability.

Lotfi Belkhir from McMaster University commenced the panel by presenting on the need for a new system for measuring success in emissions reduction strategies. Belkir proposed an approach that considers the national targets and the emissions contributions specific to each business within a sector to determine comparable indicators for each company. This way a clear path to emissions reduction can be established.

Mark Pajot from the Region of Peel talked about the importance of evidence-based policy for addressing climate change. Pajot offered a number of examples from the Region of Peel's recent climate change strategy report. Some of its main objectives included strengthening partnerships, reducing community vulnerability, and reducing community emissions.

Randy Sa'd from REFOCUS presented on how organizations can improve their efforts to become more sustainable. Many companies have been making an effort to be more sustainable but some key challenges remain. For example, existing management systems are dated, sustainability staff are often under-resourced, and measurements for what constitutes sustainability remain inconsistent. Sa'd's organization offers a methodology to overcome these challenges through workshops and eLearning designed to engage staff in businesses and NGOs in a rigorous approach to identifying priorities and ways of measuring performance.

Leading sustainability expert Bob Willard discussed ways of demonstrating the business value of corporate sustainability strategies. According to Willard there are three main justifications for sustainable action. Firstly, sustainability is the morally right thing to do, given all that is at stake with climate change. Secondly, sustainable energy is a huge economic opportunity as clean energy and energy efficiency is projected to account for over 2 trillion dollars, and up to 380 million jobs by 2030. Thirdly, doing nothing is an enormous risk from an economic and financial perspective. Potential costs associated with inaction on climate change are difficult to calculate but are expected to be catastrophic to many businesses. Thus, conveying the above three justifications to the business community are crucial for climate change success.

Workstream D

Session 1D: Future of the Water System

Key Takeaways

- Increased rainfall related to climate change is a significant threat to existing infrastructure.
- New engineering and policy approaches are needed to cope with new climate context.

Summary of the Session

Chaired by Kurt Kornelsen from FloodNet, this panel focused on modeling flood impact scenarios in Ontario. Specific topics discussed included the engineering challenges related to increased rainfall, the harm that rainfall causes to animal habitats, new stormwater policies, and damage caused by droughts

Fabio Tanto from the Toronto and Region Conservation Authority (TRCA) presented on the engineering challenges associated with preparing for increased rainfall and rising water levels. Current engineering standards for mitigating rainfall are based on out-of-date intensity-duration-frequency (IDF) calculations. This means environmental infrastructure is ill prepared for intense weather events. As Tonto argued, municipal and provincial governments need to adopt standards that include up-to-date IDF curves.

Karen Hofbauer from Matrix Solutions discussed the effects climate change has been having on regional ecological features. Future climate data analysis shows temperature and precipitation trending upwards, leading to increased runoff and flows. This trend has been harmful to existing wildlife by threatening the stability of natural habitats. Hofbauer argues that adaptation measures are needed to keep up and mitigate the damage.

Amna Tariq, a senior specialist at Credit Valley Conservation, talked about developing quality management standards for wastewater and stormwater infrastructure. Tariq has been working on a new set of policy proposals that will attempt to consistently and effectively manage stormwater and wastewater quality. This will include the development of new procedures of due diligence, and to support continual improvements based on changing climate conditions. A pilot of Tariq's policy proposal will begin in August of 2017 in the Town of Caledon, Ontario.

Professor Emeritus of Engineering at McMaster University, Ioannis K. Tsanis, closed out the session by speaking about changes caused by droughts and flooding in Europe, and the effects on major basins. Tsanis also reviewed a number of flood and runoff modelling methods that could serve to help protect from future flooding.

Session 2D: Greenspace Protection and Enhancement – A Critical Adaptation Measure to Protect Public Health in the 22nd Century (Part 1)

Key Takeaways

- Our health relies on environmental health, though because the connection is indirect, more education is needed.

- Access to green space is positively associated with mental and physical health.

Summary of the Session

Facilitated by Suzanne Barrett from Barrett Consulting and Karen Morrison, from York University, the two-part panel explored approaches to mitigating public health risks associated with climate change. Topics discussed included the ecological determinants of health, the role of urban and rural forests in protecting human health, and the role of greenspace in addressing heat and air pollution.

The first speaker was Mike Puddister from EcoHealth Ontario spoke about ecological health and climate change. Puddister presented significant evidence on the connection between access to green space and health, both physical and mental. Puddister's work is also concerned with building community action on green space. EcoHealth Ontario is currently developing a series of policy recommendations related to green space improvements.

York University's Karen Morrison presented on the connection between climate change and social determinants of health. Morrison introduced the concept of ecohealth. As Morrison explained it, if we accept that we rely on the environment to sustain our health by producing the air we breath and food we eat we understand the concept of 'Ecohealth'. Even though we understand this, it is difficult to convey how important preserving the environment is because the benefits are indirect and it doesn't feel immediate. This is why Morrison endorses ecohealth education initiatives.

Rob Keane brought a forestry perspective to the conversation by talking about recent trends in deforestation. Clear cutting as a method of resource extraction is unsustainable, and other approaches should be preferred. Echoing Morrison's sentiments, Keane expressed concern that the threat to forests doesn't feel immediate enough for people. Therefore Keane also sees education as a critical part of getting people to feel that forests have a direct impact on their lives.

Marina Whelan from Simcoe Muskoka Public Health presented on the role that green spaces play in overall strategies for improving public health. Traditionally public health departments are concerned with disease prevention and public safety. Public health departments are increasingly interested in green spaces because of the growing evidence demonstrating a positive impact on mental health, exercise, air quality, and flood protection.

Tara Zupancic from Habitus Research talked about the connection between green space and public health. Zupancic also focused on the importance of 'greening' dense areas of the city. According to Zupancic, there are many underutilized parts of cities that could be appropriate for green space transformations. In addition to improving air quality, one of the most notable advantages of adding greenspace is it can naturally cool temperatures, especially in dense urban areas. Since vulnerable populations such as seniors and the very young are especially vulnerable to extreme temperatures and low air quality, greening cities is an obvious public health boon.

Session 3D: Greenspace Protection and Enhancement – A Critical Adaptation Measure to Protect Public Health in the 22nd Century (Part 2)

Key Takeaways

- Greenspace improves neighborhood health by encouraging physical exercise.
- Greenspace should be added to underutilized spaces like roofs and side streets.
- Designing new green spaces should be community led.

Summary of the Session

In this session, attendees participated in an interactive workshop to develop a call to action on greenspace as an adaptive measure for climate change. The activity was divided into four discussion topics: discover, dream, design, and deliver.

Discover: this topic explored examples of existing greenspace approaches that integrate health and wellbeing successfully. Recreational areas like tennis courts, basketball courts, and soccer fields were mentioned as positively contributing to health and wellbeing. A major theme that came up was how green spaces are integrated with the rest of the neighborhood, and how that integration leads neighborhood walkability. Another important consideration was protecting and promoting wildlife habitats in urban green spaces.

Dream: the focus during this discussion was the potential for new innovations in green space integration. Some key ideas for the future included the idea of greening roof top spaces, turning underutilized street space into parklands, greening ally ways to make communities more connected, and de-paving school grounds.

Design: ideas for new approaches to green space design were discussed in this section of the panel. Major ideas raised during the conversation included preserving existing topsoil when planning new parks, integrate 'biomimicry' into designs to better integrate parks with the natural environment, and to make the design process more community focused.

Deliver: the panel concluded with discussion on how to make the all the ideas implement the ideas around greenspaces. The main ideas included creating more emphasis on community education to foster more involvement, better integrating social, health, and environmental initiatives into green space, reform policy surrounding climate change adaptation, and coordinating action with allies.

Workstream E: Indigenous Perspectives

Session 1E: Indigenous Perspectives on Ontario Climate Policy

Key Takeaways

- Indigenous communities are working toward climate change capacity building.
- Most indigenous communities want more freedom of self-determination to implement mitigation strategies.

Summary of the Session

This panel explored the development of strategies and policy for climate change from the perspective of Indigenous people in Ontario. This panel featured representatives of indigenous communities to discuss their observations and ideas. Topics discussed included the impacts of climate change on First Nations lands as well as climate change adaptation efforts undertaken by Indigenous communities.

The first speaker in the panel was Deputy Grand Chief Derek Fox from Nishnawbie Aski First Nation speaking about the way climate change has been affecting traditional First Nations lands. Growing up in the Severn River area near Hudson's Bay, Fox recounted participating in traditional geese hunts. After recently returning to Port Severn, Fox noticed changes brought on by climate change. Roads his community used to rely on are appearing later in the season, forcing livelihoods to adapt. Fox has been working to raise awareness of the issue, and working to affect change.

Kerry-Ann Charles, from Georgina Island First Nation, presented an ongoing project to build a community-based approach to adapting to climate change in indigenous communities. Charles, a member of the Chippewa community on Georgina Island in Lake Simcoe, has spent 17 years working in the community, and 8 years as an environmental coordinator. Charles' community was awarded three years of funding to work undertake adaptation efforts and is now helping other First Nations communities do the same. Charles emphasized the importance of being proactive, rather than reactive to climate change planning.

Kyle Powys Whyte from Michigan State University focused his talk on food security in Indigenous communities. Whyte's presentation provided an overview of climate change policy in the United States. Funding Indigenous climate change preparedness has been relatively fragmented and there's a need to bring agencies and people together. There is also a need to combine scientific and political knowledge in a way that resonates with tribal councils. In addition to this, Whyte noted the importance of lobbying and congressional hearings, and acknowledging that Indigenous communities need to be treated as equivalent to states.

Rod Whitlow, an Energy Policy Analyst from the Chiefs of Ontario, discussed environmental capacity building in indigenous communities. The Chiefs of Ontario has worked with a structure of collective decision-making across indigenous communities. Whitlow has been raising awareness about climate change emergency preparedness in Indigenous communities based on traditional First Nations knowledge practices, including a respect for the spiritual value of land in tradition. One of Whitlow's main

takeaways from events like First Ministers Meeting and on the Vancouver Declaration on Clean Growth and Climate Change, was that the indigenous community wants to be more involved in the decision-making process.

Session 2E: Advancing Local Climate Action through Community Mobilization and Collective Action

Key Takeaways

- Grassroots activism can use the power of social media to pressure governments to take action.
- Coordination between municipalities can lead to significant GHG reductions.

Summary of the Session

This session featured experts from diverse sectors who share a desire to see Canadian municipalities take a leadership role on climate issues. They spent time discussing the importance of multi-stakeholder approaches to climate action at the community level. Topics discussed included municipal-level coordinated action on climate change, using social capital to build alliances, and community-led climate activism.

Robin Goldstein from the Federation of Canadian Municipalities talked about how municipalities can partner to develop coordinated climate action. Goldstein cited the recent Climate Action Plan in the Region of Waterloo as an example of coordinated climate action. With the support of over ten originations in the Waterloo region, over 40 thousand tonnes of green house gas emissions have been reduced to date.

Gideon Forman, a policy analyst at the David Suzuki Foundation, shared some experiences the foundation has had on climate action. As Forman emphasized, climate change mitigation is a priority for the Foundation, with a special emphasis on building a grassroots culture around renewables. The Foundation has been supporting Oxford, Ontario's plan to be 100 percent renewable by 2050. The main way it supports the effort in Oxford is by using its social capital and experience to strategize on media, broadcasting stories, and help arrange meetings with governments.

Matthew Chapman, founding member of the Montreal Climate Coalition, presented on the potential of community level collective action on climate change. While there are over 3,600 local governments in Canada, only 152 have set emissions reduction targets and only 3 have committed to 100 percent renewable by 2050. As a result, there is certainly a lot of room for improvement. One of the ways that these numbers might improve is by building citizen-led local community action. Chapman went on to explain the number of ways citizen-led groups can take action on climate change by employing online collaborative tools (like Slack and Strikingly) and taking advantage of the millions in available funding. Such tools have been used to cultivate "climate hubs", community-led groups that pressure governments to take action. Visit www.climatehub.ca for more information.

Session 3E: How People and Goods Move - A Decade of Evolution and a Vision for the Late 2020's

Key Takeaways

- New transportation technologies will be a huge component of emissions reductions.
- Shifting freight shipment from trucks to rail can make a huge difference.
- Electric vehicle infrastructure is a significant barrier to wide adoption.

Summary of the Session

Chaired by Judy Farvolden from the University of Toronto's Transportation Research Institute, the experts on this panel presented their perspectives on the future of transportation in Ontario. Specifically, supply chain transportation, public transit, and new disruptive technologies in microtransit were discussed.

Cara Clairman from Plug'n Drive spoke about the work her organization has been doing on electric vehicle (EV) promotion. It's expected that by 2020 the number of EV's on the road will increase by a factor of four in Ontario. Plug'n Drive works on four areas of focus. First, they work on educating the public and building awareness through test drives and employee engagement programs. Second, they promote the integration of charging station infrastructure in Canada. Third, they research ongoing industry trends in the EV market such as cost and sales. Forth, they work on government policy to make choosing an EV easier for consumers. Plug'n Drive's main goal is to increase EV market share to 5 percent by 2020.

Josipa Petrunic, from the Canadian Urban Transit Research and Innovation Consortium, spoke about recent advancements in transit. Such advancements include low to zero emissions buses, new lightweight materials, autonomous vehicles, and sophisticated data analytics. Petrunic emphasized the importance of willing governments to incorporate innovative advancements.

Chantale Després from Canadian National Rail (CN) argued for shifting freight shipping from trucking to railway. Shifting to railway could reduce green house emissions by 75 percent. Combining this with new energy efficient locomotives could be an incredibly important contribution to reducing emissions.

Closing out the session, Sasha Sud from MaRs Data Catalyst, presented 'microtransit' as a key concept during his presentation. Microtransit is defined as "shared public/private sector transportation offerings that offer fixed or dynamically allocated routes and schedules in response to individual or aggregate consumer demand". Examples of this include ridesharing services like Uber and Lyft, car-sharing services like Zip Car and Autoshare, and other services related to the so-called "sharing economy".