CONFERENCE SUMMARY

BioDesign™

INTRODUCTION

The second annual Canadian BioDesign Conference was held on Thursday September 26, 2019 at The Lambton College Event Centre in Sarnia, Ontario, Canada, by organizing partners Bioindustrial Innovation Canada (BIC) and Lambton College.

With respect to registrations, 101 people registered with 38 organizations represented. These registrants came from across the country representing industries, agencies and governments, to support and discuss the focus of the conference, the Canadian Bioeconomy Strategy.

Canada's first bioeconomy strategy was released on May 14, 2019 which reflects the views of more than 400 industry representatives from across the country. The report was produced by BIC in partnership with the proponents of the BioDesign consortium.

The BioDesign consortium is led by BIC, BioNB, FPInnovations, Forest Products Association of Canada (FPAC) and BIOTECanada. The purpose of the consortium is to develop and commercialize new bio-based products and biomass-to-bioproducts technologies that will transform Canada's abundant and sustainable biomass resources.

The objective of the BioDesign conference was to share perspectives on the bioeconomy strategy and its recommendations, gain feedback and commitment, from the industry on the next steps for implementation.

The conference panels focused on three of the four priorities within the Canadian Bioeconomy Strategy:

1. Establishing Biomass Supply and Stewardship
2. Building Strong Companies and Value Chains, and
3. Building Strong Sustainable Ecosystems

These panels were followed by a partnership session and workshop that gathered industry feedback and support for the development of actions plans to move the Canadian Bioeconomy Strategy forward.

Presentations from the panel participants are available on the BioDesign website.

MORNING SESSION

Opening remarks were made by A.J. (Sandy) Marshall, Executive Director of Bioindustrial Innovation Canada (BIC) who briefly discussed the agenda, the National Bioeconomy Strategy and welcomed attendees to Sarnia, Ontario.

First panel to start off the day was ***Panel 1: 'Establishing Biomass Supply and Stewardship'*** facilitated by Murray McLaughlin, Advisor, of Forest Products Innovations (FPInnovations) and Bioindustrial Innovation Canada (BIC).

He welcomed three speakers:

1. Brian Cofell, General Manager of The Cellulosic Sugar Producers Co-operative (CSPC),
2. Jordan Solomon, President and Chief Executive Officer of ECOSTRAT Inc., and
3. Sandy Ferguson, Vice-President Corporate Affairs and Business Development of Conifex Timber Inc.

From a farmer's perspective Brian Cofell discussed the abundant supply of biomass that Canadian farmers have to offer. With this available biomass, the CSPC was created in partnership with Comet Bio. Comet Bio is a company that plans to utilize farmer's residual corn stover and wheat straw. CSPC is interested to partner with industry to continue development of its agricultural residue-based supply chain

Jordon Solomon of ECOSTRAT Inc., spoke next about the Canadian standards for biomass supple chain risk, what they are and the project financing barriers they address. Jordan stated that the path ECOSTRAT sees forward is developing a rating system and scoring protocols which will aid to quantify biomass supply chain risks and to gain appropriate debt financing for projects. He also discusses government priorities, the Forestry Bioeconomy Framework, and the role of the Canada Forestry Service.

Sandy Ferguson of CONIFEX Timber Inc., took the stage next to discuss CONIFEX as the next-generation forest company discussing two CONIFEX sites, the Sawmill Complex and the Power Plant site along with CONIFEX biomass supply chain and challenges they have faced.

Next to the stage was ***Panel 2: 'Building Strong Companies and Value Chains'*** facilitated by Shauna Carr, Economic Development Officer of Sarnia-Lambton Economic Partnership (SLEP).

She welcomed three speakers:

1. Alex Ward, President of Canada Research, Origin Materials,
2. Alain Bourdages, Vice-President of Innovation and Energy, Resolute Forest Products and
3. Hamdy Khalil, Senior Global Director for Advanced Technologies and Innovation, Woodbridge Foam Corporation

Alex Ward, of Origin Materials Canada Research, told the conference the company has faced challenges, but they are making progress. The California-based company continues to work on setting up their demonstration plant to use agricultural and woody biomass, such as sawdust, to make chemicals for use in plastics and other products. The plant is using a modular construction with several modules fabricated at other sites and shipped to its site in Arlanxeo's

Bio-industrial Park Sarnia. Origin Materials is part of the NaturALL Bottle Alliance with Danone, Nestle and Pepsi to develop bottles made from biobased plastics.

Alain Bourdages gave an overview of Resolute Forest Products discussing sales, innovation and facilities. Resolute's focus is on the market and the ability to understand the needs and manufacturing process of its clients. Key principles that Resolute uses for building success value chains is knowing its strengths, leveraging its asset base, don't push its technology and be open to options.

Hamdy Khalil of Woodbridge Foam Corporation gave an inspiring talk on the role of chemistry value chains in driving economic development in Canada. He made the point that Canada has a strong resource-based economy but relies on value chains outside of Canada where most of the economic value is created. Hamdy asserts that Canada needs to focus on the development of more complete value chains within Canada to maximize the economic value for Canada. Woodbridge can play an important role as an anchor company and looks forward to supporting broader development of value chains within Canada.

Next to the stage was ***Panel 3: 'Building Strong Sustainable Ecosystems'*** facilitated by Austin Beggs, Chief Executive Officer and Partner, TALM Services Inc.

He welcomed three speakers:

1. Chris Walton, Chief Executive Officer, Centre for Research & Innovation in the Bio Economy (CRIBE)
2. Rod Badcock, Executive Director, Nova Scotia Innovation Hub
4. A.J. (Sandy) Marshall, Executive Director, Bioindustrial Innovation Canada (BIC)

Chris Walton of CRIBE discussed what was next for Ontario's forest and bio-economy sectors by using collaboration to enable innovation & competitiveness. He explained that CRIBE launched a new Ontario forest-based innovation network called NEXFOR which will consist of a system of open collaboration forums focused on targeted value chains. Chris ended his presentation by stating that shared collaboration ecosystems are essential.

Rod Badcock of Nova Scotia Innovation Hub took the stage to discuss how the Innovation Hub creates and promotes best-in-class investment ready conditions for a low carbon bio-resource economy. The Nova Scotia Innovation Hub can help with advocacy, key business level data, connection to resources and milestone funding.

Last to present in the panel was A.J. (Sandy) Marshall of Bioindustrial Innovation Canada (BIC). Sandy discussed how BIC is a business accelerator that works to support bio-based start-up companies to commercialize. In order to bring companies to the Sarnia-Lambton area, BIC is supported through a collaborative ecosystem which created the region's BioHybrid Chemistry Cluster.

AFTERNOON SESSION

Mehdi Sheikhzadeh, Executive Dean, Applied Research and Innovation of Lambton College announced the newly funded Bio-industrial Process Research Centre – Technology Access Centre (BPRC-TAC) and the new Industrial Research Chair for Colleges (IRCC) grant awarded to Lambton College faculty member, Dr. Baoling Chen. Both the BPRC-TAC and Dr. Baoling are available to support applied research and development with companies in the sector. Lambton College looks forward to discussions with parties interested in leveraging these new resources.

Next to the stage was ***Panel 4: 'New Partnerships and Projects in the Bio-sector'*** facilitated by Rob Nicol, Manager of Bio-industrial Process Research Centre (BPRC) Lambton College

He welcomed four speakers:

1. John Almey, Application Scientist, GreenMantra Technologies
2. Kalsi Sukhdev, Project Manager, DMT Bioproducts
3. Anna Maveal, Extraction and Process Optimization Manager, Motif Labs
4. Ian McGregor, Co-founder and CTO, Drystill Technologies Inc

In this panel, speakers discussed their company, products and their collaborations with either Lambton College and/or Bioindustrial Innovation Canada. Each company highlighted the value and benefits of leveraging the Sarnia-Lambton innovative ecosystem in supporting their corporate development.

The agenda for the day concluded with the ***The BioDesign Workshop,*** facilitated by A.J. (Sandy) Marshall.

The BioDesign partners created a series of questions so that participants could reflect on the panel discussions and the Bioeconomy Strategy summary provided and articulate their thoughts on the following questions:

1. What priority area is of most relevance and importance to your organization?
   - Creating agile regulation and government policy
   - Establishing Biomass Supply and Stewardship
   - Building Strong Companies and Value Chains, and
   - Building Strong Sustainable Ecosystems
2. Which actions are of highest importance to your organization? How would you see your organization working with the BioDesign consortium to progress these actions effectively?
3. Would your organization participate in BioDesign supported events and share information?
4. Would your organization participate as a formal partner in the BioDesign Ecosystem?
5. Would your organization provide a letter of support for a formal funding application to government? Would this letter of support include matching funding support (cash and/or in-kind) to BioDesign?
6. How would you expect any matching funding support from your organization to be used?

The participants of the BioDesign conference split up into three groups aligned with the Bioeconomy priority areas:

1. Establishing Biomass Supply and Stewardship,
2. Building Strong Companies and Value Chains, and
3. Building Strong Sustainable Ecosystems.

They were asked the above questions. After completion, the groups moved to a second priority area to provide feedback. A transcript summary for each of the three priorities has been provided in the Addendum.

The facilitator of the three priorities were asked to share the feedback provided to them. The following key messages were taken from the Workshop:

- Establishing biomass supply requires policy certainty which allows companies to create longer term business plans with appropriate returns on investment.
- Understanding quantity, quality, cost and sustainability of the biomass basket in Canada is critical to having meaningful conversations with industry and potential converters. Building a transparent and predictable national inventory is needed to evaluate biomass supply risk and ensure that maximum valorization can be achieved
- Agile regulations and policies are important to reduce project and product approval times. Involving regulatory at early stages of commercialization is important to ensure alignment of priorities.
- Communication with the public and government as paramount. Currently, the positive sustainability impacts and the benefits to reducing carbon are not well appreciated. Public education is needed to move the bioeconomy forward. There needs to be an alignment of the message amongst the bioeconomy partners and we need to promote conversation amongst Canadians.
- Creating market pull is needed to accelerate commercialization of new technologies. Brand owners are important players to create this as shown by the successful model; the NaturALL Bottle Alliance between Origin Materials, Danone, Nestle and Pepsico
- Business accelerators and incubators are important as scaleup needs to move faster. This requires collaboration, networking and innovation partners who can bring expertise.
- The bioeconomy enables us to have sustainable products and we need to market to consumers. The big brands are missing from the conversation and need to articulate the value proposition of the bioeconomy. We need to use tools such as life cycle analysis and carbon intensity to strengthen the argumentation for bioproducts.

Closing Remarks were made by Mehdi Sheikhzadeh, Executive Dean, Applied Research and Innovation of Lambton College.

An afternoon networking session was sponsored by VIP Rail Inc.

- END

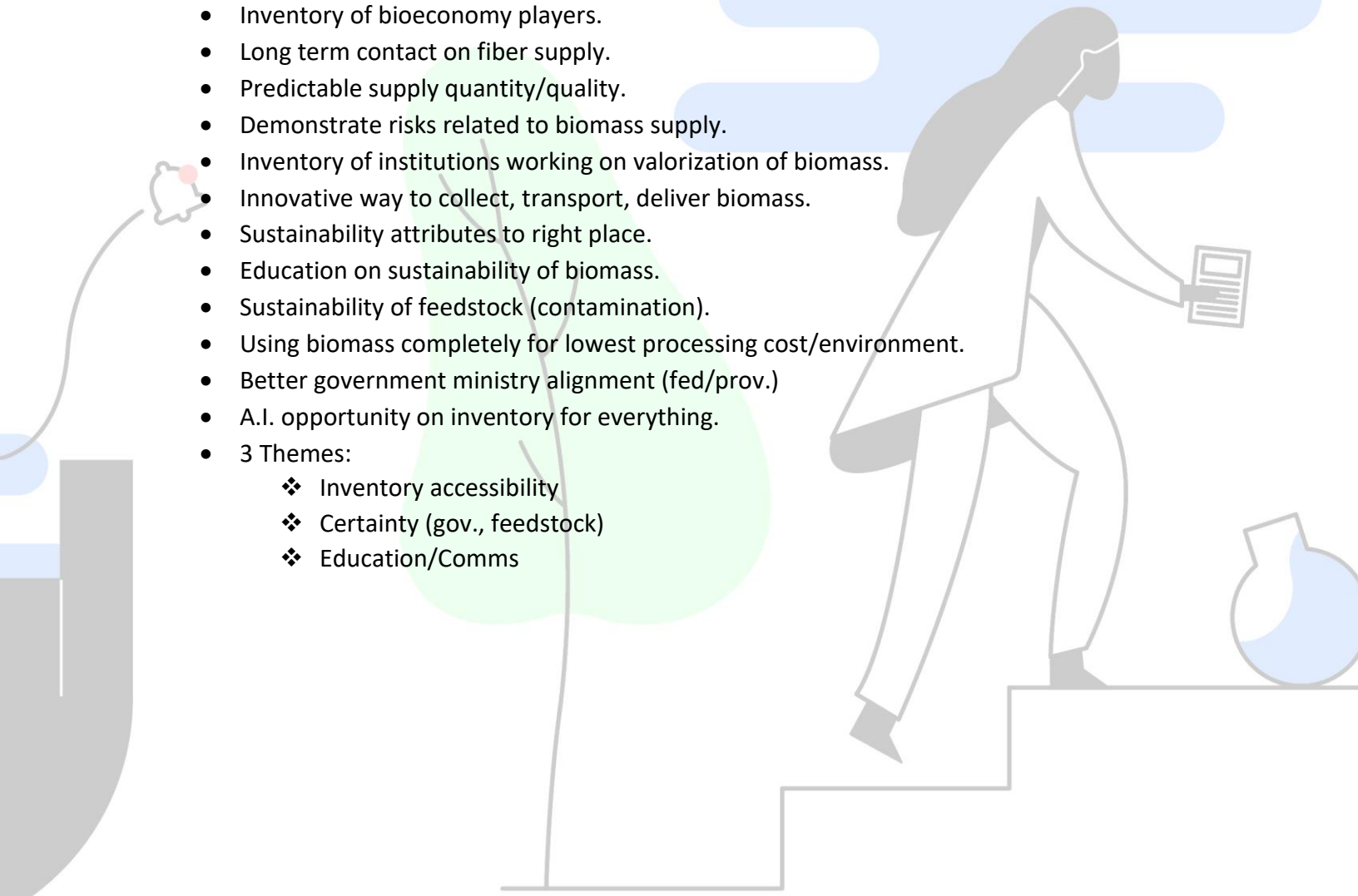
Addendum: BioDesign Conference Workshop Transcript Summary

Listed below is a transcription of all the bullet points that were created during the workshop at the BioDesign Conference on September 26th, 2019 in Sarnia. This summary provides a great starting point for moving forward with further BioDesign workshops across Canada.

Panel 1:

Establishing Biomass Supply and Stewardship:

- Long term policy certainty.
- Long term planning.
- Deliberate & easily accessible inventory of biomass.
- Understanding cost, quality, and quantity.
- Established network of "same minded" individuals across Canada to talk, compare notes, and take action.
- Reducing approval time for projects and new applications.
- Inventory of bioeconomy players.
- Long term contact on fiber supply.
- Predictable supply quantity/quality.
- Demonstrate risks related to biomass supply.
- Inventory of institutions working on valorization of biomass.
- Innovative way to collect, transport, deliver biomass.
- Sustainability attributes to right place.
- Education on sustainability of biomass.
- Sustainability of feedstock (contamination).
- Using biomass completely for lowest processing cost/environment.
- Better government ministry alignment (fed/prov.)
- A.I. opportunity on inventory for everything.
- 3 Themes:
    - ❖ Inventory accessibility
    - ❖ Certainty (gov., feedstock)
    - ❖ Education/Comms



Panel 2:

Building Strong Sustainable Ecosystems:

- Overcome inertia or lack of standards for new products.
- Alignment of message from companies to government + other companies.
- Promote more conversation.
- Involve regulatory in early stages of commercialization.
- Convene industry group (e.g. cosmetics manufacturers) to identify core problems.
- For government – one report voice for all aspects of the bioeconomy.
- Platform for end users to learn about properties of bio-based products.
- Sarnia – successful model to replicate.
- Collaboration – support industry, support for common good. (NRC – in kind services)
- Made in Canada requirements for projects or create incentives.
- Online Community:
    - ❖ Need high level conversations about benefits to Canada + relationships to other ecosystems such as transportation or I.P. "Not in a bubble"
    - ❖ Need the will to build cluster upon + government champions.
    - ❖ Policy change – always a risk.
    - ❖ Effective communication with all major political parties.
    - ❖ Must be industry-led to be sustainable.
    - ❖ Increase awareness of BioDesign and how members can participate in its formation. Talk to more people than just ourselves.
    - ❖ BioDesign to talk to all provinces about tools like the bioproducts map + public acceptance.
    - ❖ MAR COMM.
- Marketing to consumers – The bioeconomy enables us to have sustainable products.
- Big brands are missing. They don't know the value proposition of the bioeconomy. Data from government (inventories, soil quality)
- LCA as a promotional tool. (And need to be standardized, possibly globally).
- **WHAT CAN BIODESIGN DO?**

Panel 3:

Building Strong Companies and Value Chains:

- Communication value.
- Having champions in BioDesign to communicate to government.
- Creating pull.
- Integration of programs to more formal.
- Matching with stage of development.
- Mentorship on corporate growth.
- Business and company incubators.
- "Who you going to call?"
- Scale Up – Need to share info on help to move faster – focus on your expertise.
- Accelerate match making for target companies.
- De-risking Investment:
    - ❖ Feedstock
    - ❖ Technologies
    - ❖ Procurement
- Need to know your market opportunity. (discovery)
- Need successes to communicate to government or others.
- Communicate to investors on how we will scale to a billion dollars.
- De-risking support of business before going out for large funding.
- International connect or bring in if needed. Mission support.
- Model – "NaturAll Bottle Alliance"