

The Global Industrial Bioeconomy Opportunity: Is Canada Going to Get Serious?

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Jim Lane

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By Jeff Passmore, CEO Passmore Group Inc.; Chair, Scaling Up

Special to The Digest

If you heard Canada is sitting on an untapped \$200 billion/year sustainable economic development opportunity for forestry, agriculture and municipal solid waste, would you not want to hear more?

In its May 2020 report “**The Bio Revolution: Innovations transforming economies, societies, and our lives**” McKinsey Global Institute wrote: “The direct economic impact of the Bio Revolution could be up to \$4 trillion a year over the next ten to 20 years. More than half of this direct impact could be outside human health in domains such as agriculture and food, consumer products and services, and materials and energy production.”

This latter half, the part that is ‘outside human health’ (not pharmaceuticals), is known as the industrial bioeconomy and, paraphrasing the International Energy Agency, refers to the production of products and materials from the sustainable processing of biomass – trees, crops (residue or dedicated), grasses, algae.

Similarly, the US Department of Agriculture defines bio-based products as those derived from plants and other renewable agricultural, marine and forestry materials that provide an alternative to conventional petroleum-derived products.

So just about everything we consume that comes from a barrel of oil – from transport fuel to heating and cooling, to personal care products – could instead come from trees, crops, grasses, and waste. And this is no small potatoes. Several trillion dollars of biology-based products and materials are already being traded annually across the globe.

How is this happening? The McKinsey report states: “The current innovation wave in biology has been propelled by a confluence of breakthroughs in the science itself, together with advances in computing, data analytics, machine learning, artificial

intelligence, and biological engineering. Biology is increasingly being used to create novel materials that have unique qualities, introduce entirely new capabilities, are

biodegradable, and/or produced in a way that emits significantly less carbon.”

To discover these ‘novel materials’ one only need go to the US Department of Agriculture’s Bio-Preferred Program. There you will find a catalogue of **over 3000 items** that are certified as minimum 30% derived from plants and other renewable agricultural, marine and forestry materials. These include insulation, paints, solvents, lubricants, plasticizers, cosmetics, textiles, inks, diapers, fragrances, fertilizers, and composites, as well as paper, packaging, engineered wood products, wood pellets, biofuels, and much more. And the best part? These certified products qualify for mandatory federal purchasing. Talk about market pull!

Clearly, the size of the prize for those that get in early is enormous. McKinsey’s estimate of a \$2+ trillion business by 2030 – 2040 is based on technologies that are feasible or commercially available today, with no thought as to scientific advances that will most certainly take place in the intervening years. As such, many see this \$2trillion as conservative. In fact, as long ago as 2009, in its report “*The Bioeconomy to 2030*” the OECD estimated that by 2025-30, the world’s bioeconomy market will be worth between US\$2.6 and US\$5.8 trillion. Further, according to Nature magazine, global trade in agriculture, forestry, food, bioenergy, biotechnology and green chemistry products was already at US\$2 trillion in 2014.

At the moment, about 50 countries in the world have national bioeconomy strategies. Sadly, Canada is not among them. Costa Rica has one for goodness sake! Its purpose is “to make the bioeconomy one of the pillars for the productive transformation of Costa Rica, by promoting innovation, value addition, diversification and sophistication of

(our) economy, applying the principles of the ‘circular bioeconomy’ and seeking the decarbonization of production and consumption processes.” **Canada should be embarrassed.**

Elsewhere, the American “National Bioeconomy Blueprint” was published by the White House in 2012, and that same year, **US Secretary of Agriculture Tom Vilsack** said “Why not a bio-based economy that makes the US the envy of the world? It will create jobs and expand our exports.” As part of this commitment, the US Departments of Energy and Agriculture jointly publish their annual ‘Federal Activities Report on the Bioeconomy.’

Also in 2012, the European Commission published “Innovating for Growth – towards a European Bioeconomy,” which it updated in 2018 with a call to “deploy local bioeconomies rapidly across Europe.” The Commission then committed **9 Billion Euros** for the period 2021 – 2027 to boost research and innovation in sectors covered by the bioeconomy.

The question for Canada then is ‘Do we have the will to be part of this revolution?’ We certainly have the resources. With 348 million hectares of forests (9% of the world’s), 60 million hectares of agriculture land (70% of which is in Saskatchewan and Alberta), and dozens of cities wondering what to do with their growing municipal waste, there is no question Canada could be a world leader in the biobased economy. From Newfoundland to B.C., Canada is covered in trees. Alberta, for example, is 60% forest, and Saskatchewan’s forests occupy more than 50% of its land.

But for latecomers (and Canada, at the national bioeconomy policy level at least, seems to have a near blind spot) the prize will be nothing. Nothing that is, except importing bio-based consumer products from innovative jurisdictions like the US, China, and the EU that are currently on a bioeconomy fast track. In fact, that is precisely **Bill Gates’ plan** for American climate related technologies – reduce their costs and export them to the rest of the world.

To be fair, there are already some Canadian enterprises working in this space including, for example, biobased plastics, biobased cleaning products, renewable fuels, tall wood buildings, and more recently, biodegradable face masks. But many have had to go offshore to pursue financing and commercialization – usually in the United States.

What Canada really needs is a **National Bioeconomy Strategy** led jointly by Agriculture Canada, Natural Resources Canada, and Innovation, Science & Economic Development. And if Ottawa is not up to developing a practical, action-focussed road map, the Provinces should take the lead instead.

To be fair again, Canada’s Council of (federal and provincial) Forest Ministers did publish a “Forest Bioeconomy Framework for Canada’ in 2017. But despite a lofty vision, this has not progressed to a national strategy that integrates all the key feedstocks including forestry, agriculture and municipal waste. Also, while the 2016 Pan-Canadian Framework on Clean Growth and Climate Change identified “lower-carbon bioenergy, and bioproducts from agriculture and forestry waste (as a means) to replace higher-carbon fuels,” the 2020 update to this Framework barely mentions bio-based initiatives except to “examine options to enhance fuel switching to low-carbon fuels,” and create “new natural resources jobs supporting tree planting and forest management activities.”

In a similar vein, a collection of forestry, biobased industry, and innovation agencies submitted a Bio Design Super Cluster proposal in response to the federal government's 2017 call. But Ottawa chose to put its money elsewhere, and the bioeconomy is not included in any of the five clusters it ultimately funded.

More recently, in 2019, a group of forestry and bioeconomy enthusiasts took the initiative and presented the Government of Canada with its "Canada's Bioeconomy Strategy." But there has been virtually no government response. At least Canada's years late Clean Fuel Standard is expected to be published at some point.

To be sure, transitioning away from hydrocarbons to an economy based on biology and carbohydrates will encounter challenges. But these challenges should not be the result of political ignorance or myopia. Yes, some job re-training of extremely talented folks currently working in the oil, gas, and chemical sectors may be required. But many of the **jobs needed in the bioeconomy are easily transferrable from the fossil fuel sector**. The bioeconomy needs chemical, civil, stationary and electrical engineers, computer scientists, pipefitters, welders, folks skilled in data analytics, biologists, and marketing and communications specialists to name just a few. Such skilled individuals could readily find employment and add considerable value to the emerging industrial bioeconomy sector.

Yet governments rarely act aggressively unless they are being asked, and sadly, unlike in the United States, **the bioeconomy industry in Canada is fractured at best**. We need to get organized and make a unified case to Governments as to the nature of our 'ask.'

As a starting point, **to position Canada for Clean Growth**, Finance Minister Chrystia Freeland should end the tax subsidies and direct cash infusions to the oil and gas sector and implement stronger low carbon regulations across the economy. The government should also implement a federal bioproducts procurement policy similar to the American Bio-Preferred Program. At the same time, the definition of the Canadian Renewable & Conservation Expenses category, which allows start-ups to flow through tax deductions to companies that can actually take advantage of them, should be expanded to include bioproducts, biomaterials, and bioenergy.

Further, because of Canada's 120 million tonnes of sustainably grown and harvested biomass, and because money goes where it can find the highest rate of return, the federal government needs to **provide capital markets with the right signals** to catalyze bio-based investment. By establishing the necessary Policy and Program incentives to identify and de-risk investment in what have been referred to as Canada's 'biomass development opportunity zones,' governments will see new industrial facilities that sustainably produce biochemicals, biomaterials, biogas, renewable fuels, and district energy established across the country. To get going, a loan guarantee Program similar to the US model would be a good first step.

While Canadian governments have always been good at supporting early-stage Research & Development, later stage strategic investments will only be made by the private sector including big oil, big ag, and big chemical, if it makes economic sense to do so – in part as a hedging strategy, in part to stay domestically and internationally competitive, and hopefully, in part due to government carbon regulations prodding them in that direction. (The \$170/tonne carbon tax target is a good start). And of course, Canada’s financial institutions and pension funds should be investing in low carbon emitting products and materials because, as anyone who is following the money can see, the world is turning towards a low carbon future.

In this regard, Premiers Jason Kenney and Scott Moe, both with massive provincial biomass resources, would be well advised to **heed the words of Mark Carney**, United Nations Special Envoy for Climate Action and Finance, and past Governor of both the Bank of England and the Bank of Canada: “Firms that align their business models to the transition to a net zero [carbon] world will be rewarded handsomely. Those that fail to adapt will cease to exist.” One could easily replace ‘Firms’ with ‘Governments.’”

In sum, Canada cannot meet its Paris Agreement commitments without renewable fuels, biomaterials, and district energy facilities fuelled by biomass or municipal waste. And if this is going to be a \$2+trillion global market opportunity, then why not leverage Canada’s natural resource bounty and position ourselves to capture 10% of that? The \$200billion/year result would create thousands of high-end jobs, and **put us on a sustainable path to competing in a low carbon world**, while meeting our GHG emission reduction obligations.

Reindustrialization and wealth creation opportunities like this don’t come along every decade. Hopefully it is not already too late for Canada to grasp its share of the biobased marketplace. It’s time to get past the blind spot. It’s past time for Canada to get serious.

About the Author:

Jeff Passmore has spent more than 40 years in the cleantech, renewable energy, and bioeconomy space including 12 years as Executive Vice President of advanced renewable fuel company Iogen Corporation. In 2010 he launched Passmore Group Inc., www.passmoregroup.ca a management consultancy focused on the necessary financing, policy, and communications tools that lead to the more rapid commercialization of new technologies. He is the Past Chair of many industry associations including the Canadian Renewable Fuels Association, the Canadian Wind Energy Association, the Solar Energy Society of Canada, and the International Association for Energy Economics – Ottawa Chapter. He is Past Senior Vice President of the Independent Power Producers’ Society of Ontario, and Past Member of both the National Advisory Board on Energy Science & Technology, and the CleanTech Advisory Board of the Department of Foreign Affairs and International Trade Canada. In 2016, he inaugurated ‘Scaling Up,’

www.scalingupconference.ca *Canada's signature industrial bioeconomy business conference held annually in Ottawa. Passmore currently sits on the Board of the Canadian Association for The Club of Rome.*