BRIMS

Bio-Resource Information Management System

Biomass Feedstock Data Transparency to Support Certification

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BRIMS Background – A shift in the Market

- Market preference shift to green products
- Biomass and other green economy feedstocks are abundant in Alberta
- Accessible and reliable and data is key to connecting the Alberta Supply to the market



Calculating the Supply Potential BRIMS





BRIMS Calculating the Supply Potential

In general, there are four types of biomass supply potentials:

- Theoretical potential The maximum amount limited by bio-physical limits.
- Technical potential The fraction of theoretical potential that is available given current technological capabilities
- Economic potential The share of technical potential that can be profitably produced.
- Sustainable Implementation potential • The fraction of economic potential that can be produced within a certain time frame and given socio-political realities, including policy incentives and economic, institutional and social constraints.





Calculating the Supply Potential BRIMS

- 3rd Party Certifications Independently Validate the Sustainable Supply
- To determine what is Sustainable, a solid and reliable theoretical potential of supply is required.





Alberta Biomass Data– The Problem BRIMS

- Alberta is lacking accessible, dependable, investment-grade theoretical biomass supply data:
 - How much exists?
 - Where it is located?
 - What the components and quality are?
 - What costs, constraints, and commitments are associated with extraction?
 - What environmental implications for managing these resources?





BRIMS Alberta Biomass Data– The Problem





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Alberta Feedstock Supply Data- It's Worth the Investment





BRIMS The Solution – Building the Theoretical Supply Base -BRIMS

Encourage investment in the bio-industrial sector by:

- Providing a reliable
 Theoretical Supply
- Reduce uncertainty of supply
- Provide framework to collate and share data
- Support terrestrial monitoring and reporting



BRIMS BRIMS Data Framework - Transparency

- Biomass
 - Agriculture
 - Crops
 - Livestock
 - Forests
 - Tree Components
 - Landbase Allocation
 - Mill Waste
 - Municipal Solid Waste
 - Mixed Solid Waste
 - Residential Sludge





BRIMS Populating the Framework – Methodology Transparency

ALBERTA'S BIOMASS RESOURCE POTENTIAL

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1.1.1.3 Oats

Agriculture>Crops>Crop Seed/Product>Oats

Component Introduction:

Oats, known scientifically as Avena sativa, are a hardy cereal grain able to withstand poor soil conditions in which other crops are unable to thrive. Oats are part of the grasses family, the *Gramineae*. Varieties of common white oats, *Avena sativa*, are the most widely grown and are planted in the spring for summer harvesting. In warmer climates where winters are mild, varieties of red oats, *Avena byzantina*, are sown in the autumn and harvested the following summer. There is also a hull-less (in fact locse hulled) species called Naked Oats, *Avena mada*, but this is grown much less commonly. Many varieties of common white and red oats are available, and have names like *Clinton*, *Cherokee, Bonda, Andrew, Clintford, Otee, Noble, Stout, Dal, Orbit, Garland, Astro, and Pemfield*. Their qualities vary, for example *Cherokee, Clinton* and *Bonda* varieties are good for milling and produce a high amount of oatmeal per total weight. Other varieties include Desert oat, Slender oat, Sand oat, Wild oat and Abyssinian oat.

Oats have numerous uses in food; most commonly, they are rolled or into oatmeal, or ground into fine oat flour. Oatmeal is chiefly eaten as porridge, but may also be used in a variety of baked goods, such as oatcakes, oatmeal cookies, and oat bread. Oats are also an ingredient in many cold cereals, in particular muesli and granola. Oats may also be consumed raw, and cookies with raw oats are becoming popular. One of the most common uses is as livestock feed. Oats make up a large part of the diet of horses and ar ergularly fed to cattle as well. Oats are also used in some brands of dog and chicken feed.

The vast majority of Canadian cat is produced in Saskatchewan, Manitoba and Alberta. In 2010, total production of cats in Alberta was estimated at 648 thousand tonnes, an increase of 110% from 2009.⁶ Oat accounted for 2% of the total crop production in Alberta, in 2010. Total production more than doubled from last year. Higher yields and an increase in harvested acreage were behind the gain. The provincial average yield was estimated at 79.2 bushels per acre, or 18.7% higher than in 2009, while the harvested area was up 76.7%.

Alberta has approximately 5000 oat growers and these growers are responsible for producing a globally recognized high quality oat. In the 1980s and early 1990s Alberta was the largest provincial exporter of oats in Canada, supplying oat mills in the US and Canada, and equine feed markets in the US. Unfortunately, Alberta oat production fell sharply with the removal of the WGTA subsidy in 1995. Nonetheless, oats are still seeded on nearly a million acres in Alberta each year, with a five-year average production of over 550 thousand metric torms (ending 2011), with an estimated 117 thousand tormes of annual raw oat exports – mostly to the United States with approximately one-third of these oats being pony oats. Alberta oat production supports two oat mills in Alberta that process between 175-200 thousand metric tormes of oats as well as five cleaning and processing facilities that supply food and feed markets in Canada, the U.S. and Asia. Geographically, the majority of Alberta oats are produced north of Red Deer and in the Peace River region.⁹

Data Source:

⁸ 2010 Agriculture Statistics Yearbook ⁹ http://www.poga.as/files/AOGC/AOGC_businessolan_now2011.pdf Beference 4: 0-60

ALBERTA'S BIOMASS RESOURCE POTENTIAL

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To estimate the total **quantity of biomass** (tonnes), annual crop production for **Oats grain** for each Census Division in Alberta was obtained from the 2012 Agriculture Statistics Yearbook. The data in the Yearbook was compiled by Statistics and Data Development Branch of Alberta Agriculture and Rural Development. It reports cats production from 2001 to 2012 but for the purpose of this study, we report cat production for year 2012 (Table 1.1).

Table 1.1: 2012 Oat productions (Thousand Tonnes) for Alberta Census Divisions

Census Division	1	2	3	4	5	6 & 15	7	8	9
Production '000 tonnes	3.2	4.5	4.5	10.5	8.1	20.7	56.1	24.4	4.4
Census Division	10	11	12	13	14	16	17	18	19
Production '000 tonnes	82.9	45.1	41.8	87.3	7.5		45.7	22.1	47.6

iomass Estimate Formulas

Given that the reported weights in Table 1.1 are not oven-dry-weights, Equation 1.3 is used to transform the weights to oven dry equivalents.

Equation 1.3

D	147	$(M \times W)$
Dw =	VV -	100

(1.3)

where Dw = oven-dry weight; W = Air dried weight including moisture; and M = moisture content on total weight basis (%). A moisture content of 8%¹⁰ is assumed for wheat grain.

Data/Science Limitations and Gaps:

Data is coarse:

- The aim is to get the data to the township level but what is reported is at the Census Division level;
- · Data is not spatially explicit to the level of resolution;
- · Quality of data is not expressed;
- · Seasonal variation not reported;
- Impact of climate on data is unknown.

2. Moisture content was assumed. It comes from studies in North Dakota and Washington State.

¹⁰ Frear et al. Assumes 8% moisture content for Wheat, Barley and Oats, Klass (1998)

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BRIMS BRIMS - More than just Biomass

- **Compositional Analysis**
 - Structural carbohydrates
 - Lignin
 - Protein
 - o Ash
 - Non-Structural materials
 - Phosphorus
 - Nitrogen
 - Potassium
 - 0
- Why are these important tactically?
 - Functional Business Strategy
 - Reducing uncertainty in the bioeconomy
 - Bring biomass supply and demand chains closer together





BRIMS BRIMS - More than just Biomass

- Other Ecosystem Services
 - Working with Alberta **Biodiversity Monitoring Institute** to incorporate their ecosystem service modeling and mapping into the BRIMS framework.





BRIMS BRIMS Web Application





- Application
 - Enhanced data query tools
 - Help tools and onboarding
 - Communications materials
- Business Plan for **Sustainment**







About Silvacom



BRIMS What Does Silvacom Do?

Consulting Solutions:

- **Environmental Planning & Analysis**
- **Forest Management**
- **GIS** services -
- **Communications & Visualizations**
- Linear Restoration
- **Offset Planning**
- **Ecosystem Service Analysis**

Software Solutions:

- SaaS Products: -
 - Environmental Management & GIS solutions
 - Spatial Viewer -
 - Consultation Tracker
- Custom Development







Thank You!

