Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

ADDRESSING BARRIERS RESTRICTING BIOENERGY SYSTEM APPLICATIONS IN CANADA

Prepared For:

The Canadian Bioenergy Association

Submitted by:

Bruce McCallum
Ensight Consulting
Hunter River, PE
C0A 1N0
902 964-2297 Ph.
bmccallum@pei.sympatico.ca

December 3, 2008

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

INTRODUCTION

Regulatory hurdles have restricted the deployment of bioenergy technologies in Canada, for decades. Little progress has been made in addressing these known obstacles.The need to address our regulatory barriers has been made much more urgent by the recent escalation in energy prices that preceded the current recession and the continued expectation of a future with rising costs and growing pressure to reduce carbon emissions. Bioenergy in the form of woodchips, pellets and straw are all suitable renewable energy alternatives that are readily available in many regions of Canada at reasonable costs.

Unfortunately, Canada has lagged behind European countries in promoting bioenergy and developing reliable, clean burning technologies to use these biofuels. Regulatory hurdles such as costly staffing requirements, based on old technologies, remain to be addressed. This report documents the principal challenges facing a young bioenergy industry and offers recommendations that will allow Canada to create a much more positive bioenergy regulatory environment. A positive regulatory and policy framework will enable us to realize the full potential of Canada's extensive farm and forest bioenergy resources.

Ensight Consulting has been commissioned by CANBIO (Canadian Bioenergy Association) to identify regulatory hurdles that restrict the installation of biomass combustion units in the various provinces of Canada. Provincial pressure vessel regulations relating to operator staffing requirements and the need to comply with ASME boiler design requirements have been identified as key barriers to the widespread use of biomass systems in Canada by many biomass industry experts and specifically by the Board of CANBIO.

The author has had extensive experience as a bioenergy consultant. This report also reflects discussions with experts in the bioenergy industry and regulatory authoritiesin Prince Edward Island,where the author resides. PEI is used as an example of how our regulatory system for pressure vessels is structured and applied at the provincial level.

Readers should be aware that pressure vessel regulations are similar in all the provinces of Canada, but there can be differences in the names of the various acts, in the departments that administer the Acts and in some specific regulations. Different Chief Boiler Inspectors may also interpret the same, or corresponding act provisions, differently.

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

EXECUTIVE SUMMARY

In order to address longstanding hurdles and create a positive regulatory regime for new bioenergy technologies, Canada's provincial governments should implement the following measures**:**

1. To avoid the problem of exceeding the current boiler capacity threshold (50 therm hours or 150 HP) that triggers the continuous staffing requirement, PEI (and other provinces)should implement a safe alternative to physically removing a piece of the boiler section or sections of boiler piping.

2. The PEI Boiler Engineers Act or Regulations (and corresponding acts and regulations in all the provinces and territories) should be amended to reflect modern computer monitoring technology to allow the operation of biomass plants larger than 50 therm hours (1.5 MW)without continuous staffing. A boiler plant operating regime equivalent to the Swedish AFS 2002-1 would be the preferred option.

3. Provincial governments should adopt European Standard EN 303-5 for biomass appliances up to 300 kW and Pressure Equipment Directive (PED) 97/23/EC for larger biomass-fired boilers. This can be done In PEI by adding these boiler codes to the list of codes that are recognized in the regulations of the PEI Boilers and Pressure Vessels Act.

4. Provincial governments should work with insurance companies to encourage them to accept the EN 303-5 standard for biomass boilers up 300 kW without reference to CSA for additional certification. Redundancy in certification is costly and unnecessary.

5. Provincial governments should undertake a risk / benefit analysis of adopting the recommendations of this report. The federal government should assist these efforts by providing technical and financial assistance.

6. The Atlantic Provinces should move to harmonize regulations to hasten the deployment of state-of-the-art bioenergy technologies throughout the region. The heavy dependence on more expensive heating oil in the Atlantic region and the opportunities to generate employment in biomass production make this a priority.

7. The federal government should be approached to provide financial support for identifying, assessing and implementing state-of-the-art bioenergy technologies across Canada.

8. The Atlantic Provinces should enter into discussions regarding the establishment of a *regional bioenergy industry group* to foster partnerships with European cluster organizations and companies. Similar groups should be fostered in other regions of Canada. The federal government should assist these initiatives.

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

9. The background work that has been done in Prince Edward Island to identify the relevant acts and regulations pertaining to pressure vessels and labour codes and the Department that administers the Acts. This works needs to be undertaken in all the other provinces and the territories.

ACKNOWLEDGEMENTS

The author would like to acknowledge the contributions of information and advice for this report from the following persons: Claus Mikael Larsen, Manager, Lin-Ka A/S; Hakan Magnusson, Jarnforsen Energi System AB; EjnarNeilsen, Production & Development Manager, Passat Energi; Eric Rosen, President, KMW Systems Inc.; George Jenkins, UNB Wood Science and Technology Centre.

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

INDEX

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

IDENTIFYING AND ADDRESSING REGULATORY HURDLES THAT RESTRICT THE INSTALLATION AND OPERATION OF BIOMASS PLANTS ON PEI

BACKGROUND

With steadily rising fossil fuel prices and growing pressure to address climate change all provinces are seriously looking at their energy efficiency and renewable energy options. In many provinces, including PEI, bioenergy is seen to be one of the most viable alternatives, particularly for heating our homes and buildings and for generating a portion of our electrical power needs. The PEI Government has indicated that bioenergy is an important sustainable energy option and this is reflected in the new provincial energy strategy announced in November of 2008.

The PEI Government is aware that there are a number of obstacles or hurdles that impede the rapid adoption of state-of-the-art bioenergy systems in PEI and other provinces. This report explores these hurdles and proposes regulatory changes to address them.

PEI and a number of other provincial governments are aware that jurisdictions such as Austria and the Nordic countries have rapidly developed major bioenergy industries. Those countries have formulated specific policy frameworks to provide strong incentives for technology providers and users. They have also systematically addressed barriers that impeded the use of bioenergy systems.

STUDY TASK AND CHALLENGES

The consultant has been asked by CANBIO to identify specific hurdles that restrict the installation of biomass combustion units on PEI (as a case study) and to recommend regulatory changes to allow state-of-the-art biofuels technology to be deployed in PEI and across Canada.

Regulatory hurdles have hindered Bioenergy development Canada, for decades. Little progress has been made in addressing known hurdles.

There are***three principal hurdles or barriers*** to widespread use of bioenergy systems. The first relates to ***staffing regulations***, meaning a requirement to provide continuous boiler plant staffing, seven days a week, 24 hours a day. This greatly adds to operating costs and undermines project economics for plants of limited capacity. In PEI, this falls under the PEI Boiler Engineers Act and Regulations, which is administered, by the Department of Community and Cultural Affairs. Other provinces have similar acts that may be administered by different departments.

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

The second major challenge is ***boilerregulatory issues***that make it difficult, or perhaps impossible, to utilize state-of-the-art European biomass pressure vessel appliances in PEI and other provinces of Canada.

Boiler design and inspection in Canada fall under provincial jurisdiction. Canada does not have its own boiler code. Canadian provinces recognize and adopt the US ASME (American Society of Mechanical Engineers) boiler design code. Complying with ASME is very difficult for all but the largest of European boiler manufacturers. Thus, it is a major barrier to bringing advanced European biomass appliances to PEI and the rest of Canada.

The third major challenge relates to the***approval process for automated residential biomass appliances***. This is governed by ***convention*** rather than by legislation. Insurance companies defer to the Canadian Standards Association (CSA) to certify domestic wood burning appliances such as pellet burning boilers. If homeowners do not follow the wishes of the insurance companies, they will not provide them with fire insurance coverage. Thus the wishes or conventions of the insurance companies carry a lot of weight.

I - BOILER PLANT STAFFING REGULATIONS

The ***design*** of boilers in PEI is regulated by the PEI Boilers and Pressure Vessels Act. The PEI Boiler Engineers Act governs the ***operation*** of boilers. Each Act has an accompanying set of Regulations that form part of the Act. Changing an act requires submitting an amendment to the Provincial Legislature. In contrast, regulations are created and amended by Orders of Executive Council. It is much easier to create or amend a regulation than to amend an Act of the Legislature.

The Regulations of the PEI Boiler Engineers Act include a number of key points that relate to biomass system design and operation. They require that continuous supervision be provided by Boiler Engineers for plants exceeding 50 therm-hours capacity. This is equivalent to 150 HP or 1.5 MW. On first glance, this does not seem too serious since relatively few existing PEI boiler plants exceed that capacity. *Obviously, this threshold is more serious in other provinces with more, larger capacity boilers systems.*

However, one must keep in mind that boilers in many institutions are oversized and the backup boilers are usually of the same size. Under the Act, the capacity of all interconnected boilers must be added together, regardless of whether they are intended to be run concurrently. If you install a biomass boiler of, perhaps 75% of the capacity of one oil boiler, to carry the base heat load, that capacity must be added to the total with the two oil boilers. Adding the capacities of, say, three boilers together, you can sometimes exceed the 150 HP threshold and find yourself dealing with a continuous staffing requirement. This added labour cost can easily scuttle a proposed bioenergy project.

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

This threshold most notably comes into play with district heating systems. District heating systems are only economic when heat loads are accumulated sufficiently that the savings can offset the capital and operating costs of the district heating plant and distribution network. Getting into a continuous staffing requirement significantly adds to the operating costs of smaller systems. (Larger systems need continuous staffing for operation and maintenance so continuous staffing is less of an issue.)

This threshold issue has arisen in other provinces. The town of Revelstoke, British Columbia encountered continuous staffing issues when they installed a biomass-fired district heating system about six years ago. The Provincial Government of British Columbia has stated that it will address this problem, but no measures have been implemented to date.

One way to avoid the continuous staffing requirement without coming into conflict with the PEI Boiler Engineers Act is to change the boiler from a pressurized system to a non-pressurized system. This takes the Boiler Inspectors out of the equation. This approach is readily accepted by the Boiler Inspectors. Indeed, the PEI Government has taken this approach at Three Oaks High School in Summerside and Beach Grove Home in Charlottetown. This presents the spectre of one branch of the provincial government taking action to circumvent incumbering regulations administered by another branch of the same government, rather than addressing outdated and inappropriate legislation.

Going to non-pressure boilers is not an ideal technical solution. The problem is that oxygen can get into the boiler and heating system, causing corrosion that will shorten the lifespan of the boiler and the entire system. A heat exchanger can be installed to isolate the open boiler from the pressurized heat distribution system, but this adds more cost.

The Boiler Engineers Act regulations do offer a means of reducing the combined boiler capacity. Under Section 2 (3), “a piece of the boiler section is removed from the boiler outlet piping, at or near the boiler.” Boiler plant engineers sometimes use this approach to reduce the boiler capacity sufficiently to allow the plant to operate on a hot standby basis without staff on the weekends. This approach was practiced by the boiler staff of Canada Packers in Charlottetown for a number of years on weekends when the plant was not in operation. While it achieves a staff reduction, it is an inconvenience and expense to the plant owners and represents a crude solution to a simple technical challenge, i.e., how to prevent all the boilers from somehow running amok simultaneously and possibly blowing up.

The most serious drawback with physically disconnecting boilers to reduce rated capacity is that it does not allow for oil boilers to assume a heating load *automatically* should there be an unplanned stoppage in a biomass system. A cold institution or business does not help to build confidence in bioenergy systems.

Recommendation 1. To avoid the problem of exceeding the current boiler capacity threshold (50 therm hours or 150 HP) that triggers the continuous staffing

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

requirement, PEI (and other provinces) should implement a safe alternative to physically removing a piece of the boiler section or sections of piping.

A possible solution is to use electronic interlocks that would prevent the simultaneous operation of all boilers present and interconnected in a boiler room or heating system. The activation of backup boilers could also trigger a remote alarm to be responded to by the plant operators.

Boiler Monitoring in Sweden

Boiler operating codes for biomass systems in Europe are *much less restrictive* than in Canada. Sweden is a good example. The most recent revision to Sweden's boiler operating code is AFS 2002-1. Both steam and hot water boilers above 3MW capacity can be operated during the week with only *two operator inspections* per 24 hours. (This does not mean that staff are not on hand for more than two brief visits. System cleaning and maintenance are normally done during the daytime.)

Swedish boiler plants above 3MW capacity can go up 72 hours on weekends without operator inspection, if provisions are made for enhanced low water safety devices. These provisions are normally made. Boiler operating codes vary somewhat from one EU country to another. For example, in Norway, the same boilers can go up to 84 hours between plant inspections on weekends.

Plants under 3 MW capacity in Sweden require inspections only *once* per 24 hours and up to 72 hours on weekends.

All Swedish biomass plants are equipped with alarm systems and operators are continuously on call should a problem arise. In this case, a computer controller will send a message to a plant operator. They are often are directed to personal cell phones and provide a text message that indicates the nature of the problem. In the case of an alarm, the operator on call must inspect the plant within 30 minutes. Many plants have two regular boiler engineers as well as backup engineers should the regular operators be absent.

Conclusion: Today we have the possibility of continuous monitoring from remote locations via computer modems. This monitoring can be combined with local operators who are on call and able to inspect a plant promptly should an alarm be triggered.

Recommendation 2.The relevant PEI Boiler Engineers Act or Regulations should be amended to reflect modern computer monitoring technology and allow the operation of plants larger that 50 therm hours (1.5 MW) without continuous staffing. A boiler plant operating regime equivalent to the Swedish AFS 2002-1 would be the preferred option.

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

II - BOILER REGULATORY ISSUES

Canada does not have its own boiler code. Boiler design and inspection fall under provincial jurisdiction; in this case, the PEI Boiler and Pressure Vessels Act. All Canadian provinces recognize and adopt the US ASME (American Society of Mechanical Engineers) boiler design code. The Regulations of the PEI Boiler and Pressure Vessels Act list ASME as one of the codes that it recognizes and adopts.

Complying with the requirements of ASME is very difficult for most foreign boiler manufacturers. ASME certification requires a lengthy procedure to certify the company and its welders to ASME standards. Generally this means US measurement standards as opposed to metric standard measurements. The company must use ASME approved materials and fittings. Boiler designs must be certified under ASME. The manufacturer will also be subject to ongoing visits by ASME inspectors. There are substantial costs involved. Unless the manufacturer is a big company that sells a large portion of its production to North America, compliance with ASME would be time consuming and prohibitively expensive.

For new boilers coming into PEI that are not built to the ASME code, the PEI Boiler Inspector will request a copy of the engineering drawings for the boiler. He/she can demand specific changes in the boiler design.

In theory, a non-ASME boiler can receive a *Special PEI Canadian Registration Number (CRN)* if the boiler design is submitted and approved by the Chief Boiler Inspector of PEI. This number would only apply in PEI. To use the same boiler in other provinces, the company would have to apply for a Special CRN in each additional province. The boiler inspectors from other provinces can ask for additional design changes for the same pressure vessel.

Boiler inspectors sometimes ask for burner/boiler provisions that are unsuited to biomass systems, based on their interpretation of their respective Acts. An example was a Boiler Inspector in the Maritimes who specified the provision of a dowsing system that could extinguish a fire in a biomass fuel cell in 30 seconds. If such a system were activated, pouring large volumes of cold water on red-hot refractory, it would destroy the refractory in the fuel cell, requiring a total shutdown of the system and a very lengthy and costly system rebuild. It would also likely result in large quantities of steam blasting out of the combustor.

The Challenge for Individual Provinces

The market for straw, grain, woodchip and pellet burners in the Maritime Provinces is relatively small at the present time, although it has the potential to grow. Companies such as Lin-Ka or Passat of Denmark (which are experts in straw combustion) are small companies employing fewer than 40 people. This is the case for many of the companies

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

building excellent bioenergy boilers in a number of countries in Europe, including Sweden, Finland, Germany and Austria. While such companies have very good technology, they generally do not have the resources to absorb the costs that would be involved in complying with ASME certification for the small bioenergy market in the Maritimes, or indeed in Canada.

In addition, markets for biomass appliances in Europe have been very strong for the last several years and that is likely to continue. European bioenergy system manufacturers do not need our Maritime or Canadian markets to be successful. If Canadians want state-of-the-art European biomass technology and appliances, we are going to have to remove the current barriers that impede their introduction and use in Canada.

Why is European bioenergy technology important to Canada? Canadians need the best possible biomass technology to develop our bioenergy resources to their full potential in the shortest possible time. In the first phase of bioenergy use, in the 1980s, we imported some bioenergy appliances and some domestic companies built their own systems with very mixed results. The state-of-the-art was not at the high level that it is today in Europe and we did not have the knowledge base to properly assess the products on offer and select the best from that era. We made mistakes and installed some bioenergy systems that performed rather poorly. Those systems performed rather poorly and gave the industry a very bad reputation in the eyes of some people. As an example, the PEI school boards refuse to have anything to do with current biomass systems (regardless of the fuel or technology) because of real and perceived problems with woodchip burning systems in the 1980s.

To avoid repeating past mistakes, we need the best technologies available. Today, the leading edge bioenergy technologies come from Europe, where there are perhaps 200 companies manufacturing bioenergy systems of various types and sizes.

Many European bioenergy manufacturers are interested in the Canadian market. They know that it has huge potential. A lot of those companies would be happy to work with Canadian fabricators, dealers and installers to make their appliances available to the Maritimes and the rest of Canada. There are opportunities to generate hundreds of jobs in the Maritime Provinces and possibly thousands across Canada by working co-operatively with European bioenergy system manufacturers. Working with European manufacturers will also raise the knowledge level of everyone working in the field in Canada and lead to a much more viable domestic industry in the future. Removing the current Provincial barriers to biomass systems will greatly increase the likelihood that we will develop a large and prosperous bioenergy industry in Canada.

KEY EUROPEAN BOILER STANDARDS

European Standard EN 303-5 (Small Boilers)

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

Many manufacturers of residential and small commercial biomass boilers advertise that their appliances meet the European Standard EN 303-5. The European Standard EN 303-5 (Part 5) covers heating boilers for solid fuels, hand and automatically stoked, with a nominal heat output of up to 300 kW. The standard addresses terminology, testing and marking. This standard was adopted by the European Committee for Standards (CEN) in November of 1998. Committee members included the 19 member states of the EU at that time. Other countries have joined the EU since that time.

The European Standard EN 303-5 comprises some 51 pages. It also includes references to numerous other publications or standards and indicates that it cover things such as the approval of boiler welders and the structural steel requirements for boilers. These other standards form part of the EN 303-5 Standard.

Appliances are built to this standard and tested for both safety and emissions by independent laboratories. Companies are also subject to annual inspections to determine that the appliances are being constructed to the approved drawings and that the welding meets the required standards.

One of the attributes of this standard is that there is no difference between residential appliances and small commercial appliances, as is the case in Canada. (This matter will be discussed in greater detail below.)

Pressure Equipment Directive (PED) 97/23/EC (Large Boilers)

This directive concerns the manufacture of items such as pressurised storage containers, heat exchangers, steam generators, boilers, industrial piping, safety devices and pressure accessories.

The Pressure Equipment Directive (97/23/EC) was adopted by the European Parliament and the European Council in May of 1997. It came into force on 29 November 1999. From that date until 28 May 2002 manufacturers had a choice between applying the pressure equipment directive or continuing with the application of their existing national standards. On 29 May 2002 the Pressure Equipment Directive became obligatory throughout the European Union. Companies can still comply with national standards, but they must also me

Larger boiler manufacturers in Europe must now comply with this standard. As an example, Lin-Ka Energy of Denmark, a well known manufacturer of woodchip, pellet and straw-burning boilers meets Pressure Equipment Directive (PED) 97/23/EC.

Sweden has its own boiler code AFS 1999-4, but that code complies with the Pressure Equipment Directive (97/23/EC). Jarnforsen Energi Systems AB of Sweden is a company very similar to KMW Energy of London, Ontario, a well-known Canadian biomass system manufacturer. Jarnforsen have a partner in Slovenia that builds boilers to

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

PED 97/23/EC standard. These boilers can now be sold throughout Europe without any changes to meet specific country boiler codes. The common EU boiler standard has been very beneficial to Jarnforsen and other biomass plant manufacturers.

Recommendation 3. Provincial governments should consider adopting European Standard EN 303-5 for biomass appliances up to 300 kW and Pressure Equipment Directive (PED) 97/23/EC for larger biomass-fired boilers.

This can be accomplished in PEI by enacting a regulation through an Order of Executive Council, under Section 33 (1) of the PEI Boilers and Pressure Vessels Act, adopting European Standard EN 303-5 and Pressure Equipment Directive (PED) 97/23/EC. Other provinces could take comparable measures.

Working With Canadian Boiler Manufacturers

An alternative approachto changing provincial boiler codes is to foster partnerships between European biomass boiler and plant manufacturers, who have proprietary, industry-leading technology, with Canadian boiler manufacturers who are already set up to build boilers to ASME specifications.

In some cases, it is possible to find a similar boiler design in Canada that meets the ASME code and adapt it to a European combustion appliance. In other cases, European boilers have been specially designed to interface with a particular combustor configuration which makes matching up a Canadian boiler difficult, without redesigning the entire appliance.

Alternatively, a Canadian boiler manufacturer can take European spec boiler engineering drawings and convert the design into something that will meet the ASME code.

On the negative side, this approaches involves incurring significant costs to re-design perfectly safe and functional boilers. More importantly, there are no such boiler manufacturers on PEI, only a few in the Maritimes and a relatively small number across Canada that have suitable manufacturing capabilities. Maritime examples include Matheson Boiler and Newmac from Nova Scotia and New Yorker Boiler in New Brunswick. There is also the challenge of matching companies that build boilers in the same size range. Most boiler manufacturers do not like to start designing and building boilers that are outside of their normal size range.

An additional problem is that most Canadian boiler manufacturers only wish to build boilers. They generally do not wish to build or market complete biomass systems. Separate companies would have to build the materials handling system and do the system assembly, installation and or servicing of complete biomass systems. An offshore manufacturer could have to deal with two or possibly three Canadian companies. This is not an attractive prospect for a European biomass system manufacturer.

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

III - TESTING & REGULATION OF DOMESTIC BIOENERGY APPLIANCES

It does not appear that there is any direct regulation of domestic biomass appliances under government acts. Domestic appliances are governed by ***convention*** not ***regulation***. Insurance companies defer to the Canadian Standards Association (CSA) and Underwriters Laboratories of Canada (ULC), which test automated biomass appliances to their standards CAN/CSA B366.1-M91 and ULC C1482. These standards test appliances for electrical and fire safety.

There are a number of challenges with this North American testing system. It is very time consuming and expensive for Canadian companies. It takes roughly one year and at least $20,000 for a new appliance. It can easily take longer and cost more. Once certification is achieved, there are annual fees to CSA and ULC. These costs and the in-kind commitment of time are very onerous for small manufacturers. Even more serious, the approval is specific to a particular design. Companies tend to focus on getting their appliance through CSA approval as quickly as possible in order to be able to generate cash flow. Once certified, a manufacturer cannot make any changes to the design, regardless of whether those changes would improve its performance, without re-testing the appliance. Thus, CSA/ULC certification becomes an obstacle to technical improvements in new Canadian biomass appliances.

For offshore companies, the challenges are equally problematic. CSA has a legitimate role to assist companies to find suitable electrical components and to adapt their electrics to North American standards. But companies also have to submit their appliances to an additional certification process that involves the expenditure of both time and money. Most biomass appliances coming out of European countries have already been tested and certified to the EU 303-5 standard for systems up to 300 kW. Redundancy in standards should be avoided.

There are some additional drawbacks. Like Canadian manufacturers, when new or updated models are introduced, which generally implies new and improved designs; the companies must re-submit the new models to CSA and ULC. This involves extra cost and can delay the introduction of new models for a year or more. We have seen the introduction of new, cleaner-burning appliances in Europe, while the company continues to sell its old model in North America. An example is the Tarm Solo roundwood boilers. A new Tarm Innovo boiler was introduced in Europe two years ago. The Innovo will not be available in North America until 2009, after testing for CSA/ULC is complete. Such delays are not in the interests of Canadian consumers.

Times Change Fuel Choices

If mistakes are made during certification, for example with fuels tested or even simply listed, they can provide obstacles to future applications of the appliances, regardless of the approval of the manufacturer. For example, in 2002, Tarm USA, the American

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

distributor for BAXI AS of Denmark submitted the Tarm Multi-Fuel appliances to an American lab to be tested and listed for wood pellets and corn which were the two fuels that they deemed to be of interest in the United States at that time.

The CSA/ULC sticker affixed to the boilers states that they are tested and approved for pellets and grain (corn). These appliances were actually designed by the manufacturer to burn wood pellets, grain and woodchips that are common biofuels in Denmark. Grain in Denmark refers to crops such as wheat, barley and oats, but not kernel corn, which is a mainly a North American crop. Today corn has become a very expensive fuel, given the development of the ethanol industry and the rise in all grain prices.

In 2008, these Multi-Fuel appliances are being introduced to the Maritimes. The Maritime agent would like customers to be able to burn pellets, grain or woodchips, as intended by the manufacturer. But some Maritime insurance companies are being dogmatic, insisting that its clients can only burn pellets or corn as stated on the CSA sticker. Thus Tarm buyers are effectively being restricted to pellets, as corn is very costly and not widely available in this region.

Revising the CSA sticker to list other biofuels is not a simple process and may require retesting the appliance. Retesting an existing (approved) appliance is not a high priority for the manufacturer. It has two other appliances in the approval pipeline that have higher priority.

The approved fuels specified on a CSA sticker can be very limiting. The fuels to be burned in an appliance should be those specified and sanctioned by the appliance manufacturer and listed in appliance manual, not CSA or insurance companies.

CONFLICTS BETWEEN CSA AND ASME

A more serious problem is the conflict between CSA and ASME. CSA does not test pressure vessels. If a boiler is CSA approved, it is accepted for any home installation as a pressure vessel. In PEI, if you take, say a 40 kW (147,000 BTU/hr.) CSA approved pellet boiler and install it in a commercial building such as an apartment building (with more than four apartments) or an institution such as a school, CSA certification no longer applies. The PEI Boiler and Pressure Vessels Act then comes into play, as described above. CSA approved boilers cannot be used as pressure vessels in commercial buildings unless they are also designed built and approved under ASME.

One option, as suggested above, is that Prince Edward Island (and ideally all Canadian provinces) adopt European Standard EN 303-5 for biomass appliances up to 300 kW.

An additional question is, would Canadian insurance companies accept the appliance testing done under the EN 303-5 standard, negating the need for retesting appliances under CSA? In this case, the role for CSA would be limited to ensuring that European manufacturers adapt their controls and motors to meet North American electrical standards, i.e., 230 volts @ 60 hertz and use CSA approved electrical components.

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

Recommendation 4. Provincial governments should work with Canadian insurance companies to encourage them to accept the EN 303-5 standard for biomass boilers up 300 kW.

Provincial legislation may come into with biomass systems play through codes such as CSA that may be adopted by various provinces. As example, he CSA B365 installation code for solid fuel appliances has been adopted as part of the PEI Fire Prevention Act. That code has installation and fuel specification provisions which can impinge on biomass system owners. There needs to be a study of how CSA codes are integrated with provincial legislation and what the implications may be.

Canadian bioenergy industry associations such as CANBIO or the Wood Pellet Association of Canada also have a role to play in these matters. That role includes developing position papers and lobbying Canadian insurance companies and certification agencies, such as CSA and ULC, to achieve a more positive environment for bioenergy appliances. They would be happy to work with the provinces to encourage insurance companies to provide greater support for bioenergy systems.

CHANGES WITH CSA STANDARDS POSE NEW PROBLEMS

CSA standards are presently under review and new standards are soon to be issued. The new standards apparently reference ASME which could mean that all wood-fired domestic boilers will now have to meet the ASME Code. (At the time of this writing, Parrsboro Metal Fabricators Ltd., manufacturers of Kerr Heating Products in Nova Scotia, is re-certifying their factory to ASME standards to meet this new requirement.) This new requirement would mean that most European domestic pellet appliance manufacturers would be excluded from the Canadian market unless they were prepared to meet the requirements of ASME. That could include European companies that have been selling their appliances in North America for a number of years with CSA/ULC approval.

ADDRESSING THE BARRIERS

The recommendations contained in this report, if implemented, would greatly aid the importation to Canada of state-of-the-art bioenergy systems from Europe, as well as facilitate partnerships between European manufacturers and Canadian companies. They would also make things easier for Canadian bioenergy appliance manufacturers to introduce new appliances.

The barriers identified in this report are complex issues that need to be reviewed by experts with extensive experience with boiler codes and boiler operation. There will need to be a detailed evaluation of the two European boiler standards EN 303-5 and Pressure Equipment Directive (PED) 97/23/EC**.** Independent experts should do that analysis.

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

Recommendation 5. Provincial governments should undertake a risk / benefit analysis of adopting the recommendations of this report. The federal government could assist this work.

REGIONAL HARMONIZATION

While individual provinces can show leadership in address bioenergy hurdles that fall under their jurisdiction, there will remain a need to meet the same challenges in all provinces, which are very similar in their approach to boiler regulation. The challenges of CSA approval are a Canadian problem.

Recommendation 6. The Atlantic Provinces should move to harmonize regulations to hasten the deployment of state-of-the-art bioenergy technologies throughout the region. The heavy dependence on more expensive heating oil in the Atlantic region makes this a priority.

Recommendation 7. The federal government should be approached to provide financial support for identifying, assessing and implementing state-of-the-art bioenergy technologies across Canada.

FOSTERING BUSINESS OPPORTUNITIES

There are business opportunities that will flow from the growing demand for reliable and efficient biomass appliances in Canada and the US.

There are a growing number of bioenergy technology development groups or clusters emerging in Europe to foster regional bioenergy development and/or the export of products, technology and know-how around the world. Examples include: the OEKOENERGIE- CLUSTER UPPER AUSTRIA, The Wood Energy Net (WENET) from eastern Finland and BIOAGRO from southeastern Sweden. These organizations have formed to assist small domestic companies in developing and marketing their products outside their local areas. These cluster organizations would like to find counterpart organizations in Canada to facilitate long-term business partnerships with Canadian companies. Canadian companies currently working in the bioenergy field, or wishing to enter it, have opportunities to join up with European companies that having leading edge bioenergy technologies.

Recommendation 8. The Atlantic Provinces should enter into discussions regarding the establishment of a *regional bioenergy industry group* to foster partnerships with European cluster organizations and companies. Other similar groups should be fostered in other regions of Canada.

Canadian Bioenergy Association
1769 St. Laurent Boulevard, Suite 318
Ottawa, Ontario, K1G 5X7
www.canbio.ca

Recommendation 9. The background work that has been done in Prince Edward Island to identify the relevant acts and regulations pertaining to pressure vessels and labour codes. This works needs to be undertaken in all the other provinces and the territories.