



Report on South Korean Trip – Nov 22 to Dec 2, 2010

By Gordon Murray, January 8, 2011

Introduction

I visited South Korea from November 23 to December 1, 2010. The trip had two purposes: (1) to give a presentation at the International Biomass Energy Seminar as part of the Korea Green Technology and Industry Exhibition hosted by Incheon Metropolitan City (<http://www.kogreentech.kr/eng/>); and (2) to explore opportunities for Canada to export pellets to Korea. The conference host sponsored my air fare and hotel stay during the conference. As part of the conference program, I visited a greenhouse operation heated by pellet boilers, a residence heated by a pellet boiler and in-floor hot water heat, a sawmill/pellet operation, and a pellet boiler factory.

Following the seminar, I visited the Seoul offices of OCI Company, a major chemical manufacturer. OCI is a significant energy producer/consumer, greenhouse gas emitter, and potential pellet customer.

International Biomass Energy Seminar

Approximately 200 delegates attended, representing government, universities, power companies, and large industrial energy consumers. The Korean television network Daejeon MBC covered the event and interviewed me following my presentation. They are planning to show one hour program on biomass energy in February 2011.

Seminar presenters and topics included:

- Christian Schagitweit of ProPellets Austria: EU Biomass Strategies and Energy Potential
- Gordon Murray of the Wood Pellet Association of Canada: Canadian Wood Pellet Industry – Opportunities for Korea
- Kenichiro Kojima of Japan Pellet Club: Japan Pellet Situation
- Dr. August Raggam of KWB Boilers: Biomass Co-Generation
- Dr. Larry Baxter of Brigham Young University USA: Biomass Co-firing in Power Plants

- Robert Gletteler of Regionalenergie Steiermark Austria: Case Study on Wood Energy Contracting

Key seminar messages included:

- South Korea can learn from Europe's biomass experience. The European Commission recently implemented an Energy Program for Recovery to accelerate infrastructure investment, improve security of energy supply, and accelerate implementation of the 20/20/20 objectives for 2020.
- In Europe, biomass provides 69% of renewable energy. As of 2007 biomass provided 98 million tonnes of oil equivalent compared to 27 Mtoe for Hydro, 9 Mtoe for Wind, 6 Mtoe for Thermal, and 2 Mtoe for Solar.
- Wood biomass is dominant, providing over 80% of European biomass energy.
- South Korea is the world's 10th largest energy consumer, 5th largest oil importer and 2nd largest coal importer. 64% of electricity of produced from fossil fuels.
- South Korean coal consumption – currently 122 million tons per year – is accelerating.
- South Korea is committed to a 30% reduction in CO₂ emissions from projected levels by 2020. The government has directed 374 of South Korea's largest companies¹ reduce CO₂ emissions by 2020. Each company must submit a plan to government by mid-2011 and begin implementation in 2012. In addition, renewable portfolio standards for power generators are being implemented in 2012. Power companies must produce a minimum of 2% renewable energy in 2012, increasing by ½% per year until they are producing a minimum of 10% by 2020. This all bodes well for pellets.
- Potential pellet competition for Canada be from Southeast Asian countries (e.g. Vietnam, Cambodia, Laos, Malaysia, and Indonesia), New Zealand, and Australia. Pellets are widely seen by Korean companies to be one of the most cost effective forms of energy for meeting CO₂ reduction targets. It will be

¹ Includes 78 petrochemical producers, 57 paper and wood manufacturers, 36 power generators, 34 steel manufacturers, and 31 electronic chip manufacturers

important for Canadian pellet producers to focus on the Korean market in 2011 so as to acquire market share in advance of the 2012 implementation of renewable portfolio standards.

- Japanese companies have already begun limited co-firing of wood pellets with coal for power generation. Japan has 51 pellet plants collectively producing about 36,000 tons per year with a further 60,000 tons being imported. Power companies are becoming somewhat more interested in co-firing with pellets, but so far insufficient policy incentives exist to create widespread adoption of the practice.
- Co-firing biomass with coal is the most affordable, efficient, and environmentally benign form of renewable power production and there is little technical risk to power generators.

Contacts Made in South Korea

- Gyu, Seong Han, Ph.D., professor of wood and paper science at Chung Buk National University and president of Korea Association of Pellet Fuel
- Huh, Jae Jung, manager of trade and investment for British Columbia's Korean trade office
- Jeong, Jinkyu, senior vice president of OCI Company, a large chemical manufacturer and energy consumer. OCI is interested in importing large quantities of pellets for use in its own energy plants and for trading to other potential Korean pellet consumers.
- Kang, Dae Jae, president of National Forestry Cooperative Federation, Wood Products Distribution Centre which operates, among other things, a pellet plant
- Kim, Kyung Suk, managing director of British Columbia's Korean trade office.
- Kim, Sang Byeong, manager of eco-project team for Chiel Jedang, a major food processing company, large energy consumer, and potential pellet customer
- Kim, Yeong Suk, Ph.D., professor of forestry at Kookmin University
- Kim, Yonhan, president of CanKor wood pellets, a trading company interested in importing pellets from Canada

- Ko, Yae Young, managing director of the plant division of eTEC, a large manufacturer of chemicals, semi-conductors, pharmaceuticals, and other products. eTEC is a large energy consumer and potential pellet customer
- Lee, Jae Koo, executive vice president of Korea Midland Power Company, a large electrical power generator and potential pellet consumer
- Lee, K.Y., president of FnD International, a bioenergy consulting firm and pellet boiler manufacturer
- Pil, Jin Sun, director, Timber Utilization and Product Division of Korea Forest Service
- Ryu, Jae Yun, Ph.D., head of laboratory for National Forestry Cooperatives Federation Wood Products Distribution Centre which operates, among other things, a pellet plant
- Shim, Hyojung, assistant manager of business development of OCI Company
- Sung, Alex, business analyst, OCI Company
- Sung, Heungmo, deputy senior manager, OCI Company
- Yoon, Young-Kyoon, Ph.D., Director General, Bureau of Forest Resources, Korea Forest Service

South Korean Pellet Market Review

- Pellet market began in 2007 when 150 domestic boilers were installed throughout the country. In Korea, domestic heating is accomplished by means of boilers heating hot water which is then circulated through in-floor pipes to create radiant heat. North American-style forced air heating is uncommon.
- In 2008, the Korea Forest Service began subsidizing the purchase of domestic pellet boilers by 60% to 70%. About 600 boilers were installed in 2008, 3,000 in 2009, and 4,000 in 2010. About 6,000 boilers are expected to be installed in 2011.
- In 2010 commercial greenhouse operators began using pellet boilers for heat. Pellets are not yet used for power generation or for any other industrial purpose.
- Domestic pellet consumption in 2010 was estimated at 27,000 tonnes of which 15,000 tonnes were produced in Korea and 12,000 tonnes were imported from

China, Vietnam, Chile, Indonesia, and Japan. About 1,000 tonnes of Canadian pellets were imported but used mainly for animal bedding.

- Most pellet boilers used in Korea are manufactured locally. Average boiler energy efficiency is about 85% with newer boilers coming in at about 90%.
- There are about 23 pellet plants in Korea. All are extremely small scale, mostly attached to woodworking operations.
- The pellet market is expected to grow rapidly starting in 2012 due to the government's newly introduced renewable portfolio standards requiring power companies to increase the proportion of renewable electricity production. It is expected that at least 60% of renewable energy will be from pellets.
- South Korea presently uses about 75 million tons of coal per year. If some 2% of this is converted to pellets by 2012 at a ratio of 1.5 tons of pellets per ton of coal replaced, this would mean a market of 2.25 million tonnes of pellets. By 2020, after accounting for growth in energy consumption and ever increasing renewable energy requirements, the demand for pellets could exceed 15 million tons per year from the power sector alone.

Visit to National Forestry Cooperatives Federation Wood Products Distribution Centre

- A group of 8 conference delegates visited the Wood Products Distribution Centre and listened to a presentation from Jae-Yun Ryu, Ph.D., head of lab. The Centre, established in 1997, consists of a log yard, sawmill, value-added mill, dry kilns, a home construction operation, a landscape architecture operation, and a pellet plant.
- The pellet plant began with one pelletizer in 2009. A second pelletizer was added in 2010. The plant uses sawdust supplied by the adjacent woodworking operation. The plant consists of a belt dryer, two small flat-type pelletizers, a pellet cooler, and an automatic bagging line. All product is packaged in 20 kg bags. Annual production is 18,000 tonnes, all of which is sold in South Korea.



Figure 1. Entrance to Wood Products Distribution Centre



Figure 2. Typical larch and pine logs



Figure 3. Lumber and architectural columns produced in the sawmill



Figure 4. Pellet plant with lumber drying kiln in left foreground



Figure 5. Sawdust stockpile for pellets



Figure 6. Kahl pelletizer



Figure 7. Pellet cooler



Figure 8. Automatic bagging line



Figure 9. Worker stacking finished product on pallets



Figure 10. Gordon Murray with Dr. August Raggam, founder of German boiler manufacturer KWB Biomasseheizungen, in front of the Imperial Palace in Seoul