

Wood Residue Green Energy

For SE Alaska

VENTEK/SEALASKA

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Overview

- ☐ Introduction and why are we here....
- ☐ Biomass overview
- ☐ Trends in Europe and N America
- ☐ Northern Examples – Yukon, NWT, and BC
- ☐ Opportunities for Alaska

Introduction – Peter Brand

- 27 year career in the electrical business with **BC Hydro**, primarily distribution engineering, remote area and district management.
- 11 years with **Pinnacle Pellet** in Quesnel BC as Partner, Vice – President, Marketing and Business Development.
- Instrumental in growing Pinnacle's annual sales from less than 20,000 tonnes in 1999 to over 700,000 tonnes in 2008. Increased production plants from one to five. Currently #2 in world production.
- Since retirement from Pinnacle, bioenergy consultant, with clients such as **Yukon Government, Ventek Energy, Sealaska, NWT Government, Zilkha Bioenergy (Texas) and Prairie Green Renewable Energy (Sask).**

Introduction

Ventek Energy Systems

Rod Graham and Markku Riionheimo

Viessmann North America

Simon Koeb

Sealaska Corp

Rick Harris, Wade Zammit, Ron Wolfe, Nathan Soboleff

“Press Release, Dec. 2009

Sealaska to Convert Plaza to Biomass Fuel

Juneau, Alaska— In 2010, Sealaska Corporation’s corporate headquarters in Juneau will become the first commercial building in Alaska to convert to renewable bio-energy. Sealaska will convert its corporate headquarters to a wood pellet fired boiler system. The Sealaska Plaza is currently heated by over **35,000 gallons** of heating oil per year. Sealaska’s goal is to establish a green energy model that can be applied throughout Southeast Alaska. The effort is one element of Sealaska’s green initiatives to build sustainable Southeast Alaska economies. We believe this project will show that conversion to biomass can save money, reduce hydrocarbon-based footprints and create anchor demand for resources that can be manufactured within the region.”

Savings will be approx. 8400 tons CO2 over 25 yrs and over \$1m in energy costs.

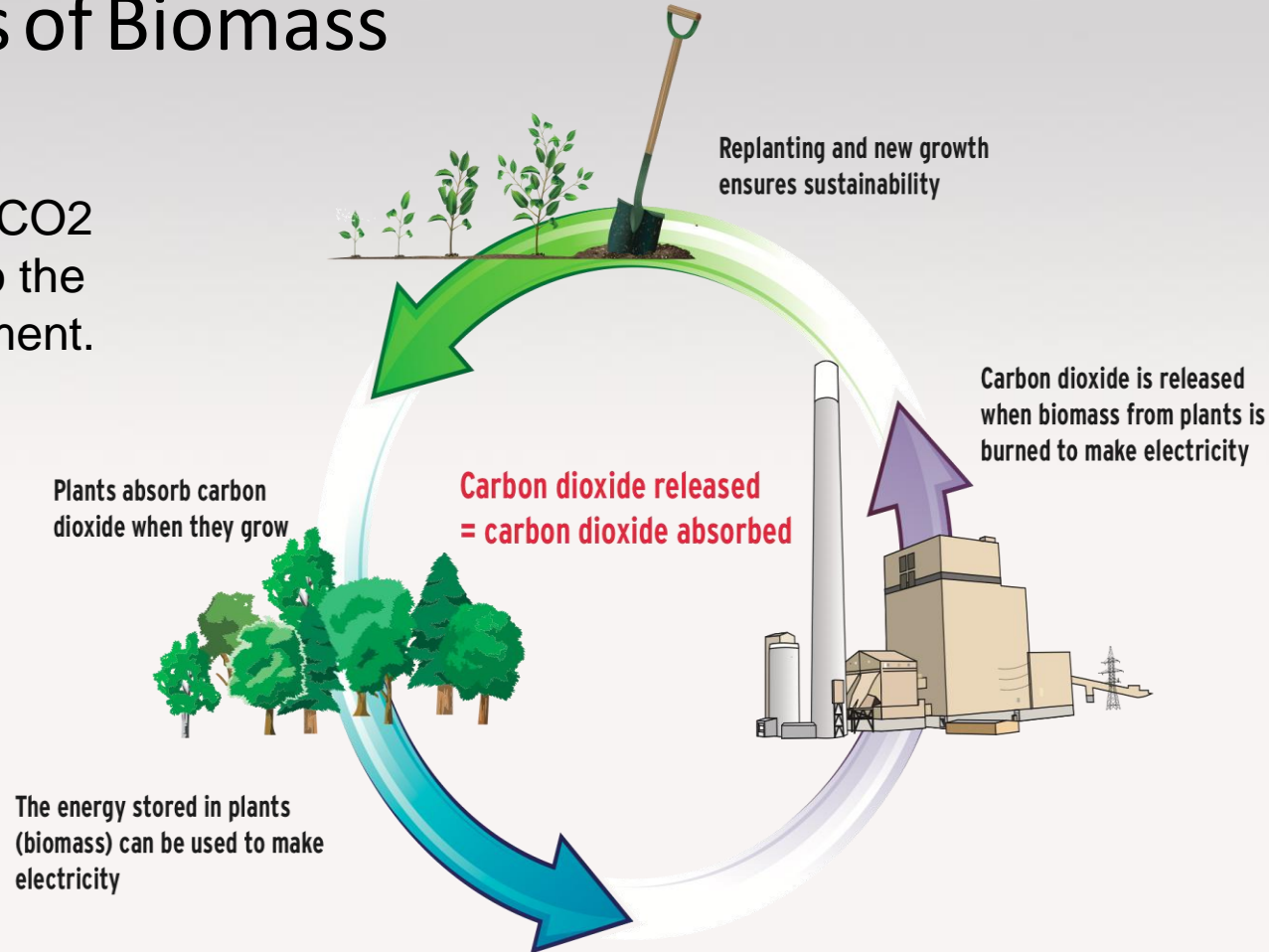
Sealaska Energy Initiative

- Reduce CO²
- Reduce Energy Costs
- Create local jobs in SE Alaska
- Start by setting an example with Sealaska Plaza

Why are we here....

Concepts of Biomass

No new CO₂
added to the
environment.



As plants grow they absorb carbon dioxide, a greenhouse gas that contributes to climate change, from the atmosphere. When they are used to make electricity the carbon dioxide stored by the biomass is released. No new net greenhouse gases are produced making biomass fuel 'carbon neutral' - better than fossil fuels which are major contributors to climate change

Concepts of Biomass

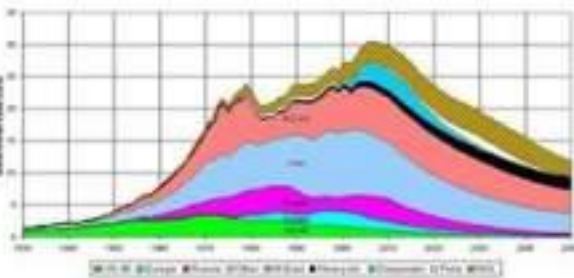
- ☐ Wood Pellets are “Carbon Neutral” and “Sustainable”
- ☐ Jobs and profits are local
- ☐ Energy savings are real, 30-50%
- ☐ Public is demanding reductions in carbon output
- ☐ Local impacts of climate change are very evident
- ☐ Europeans are much further ahead than N America

Concepts of Biomass

- ☐ Boiler technology is just recently being transferred from Europe
- ☐ Government incentives/penalties are just being launched
- ☐ There are many other proposed “green” solutions, such as:
 - Tidal, Micro (or small) Hydro
 - Wind and Solar
 - Geo Thermal
 - Ethanol
 - Other Biomass (Wood chips, olive pits, energy crops, etc.)
 - Controversial options such as nuclear and “clean” coal
 - Conservation.... Perhaps the biggest and most cost effective

Strong Clean Energy Market Fundamentals

OIL AND GAS LIQUIDS
2004 Scenario



➤ Oil & Gas peak & price

➤ Energy security

➤ Global warming & environment

➤ Public awareness

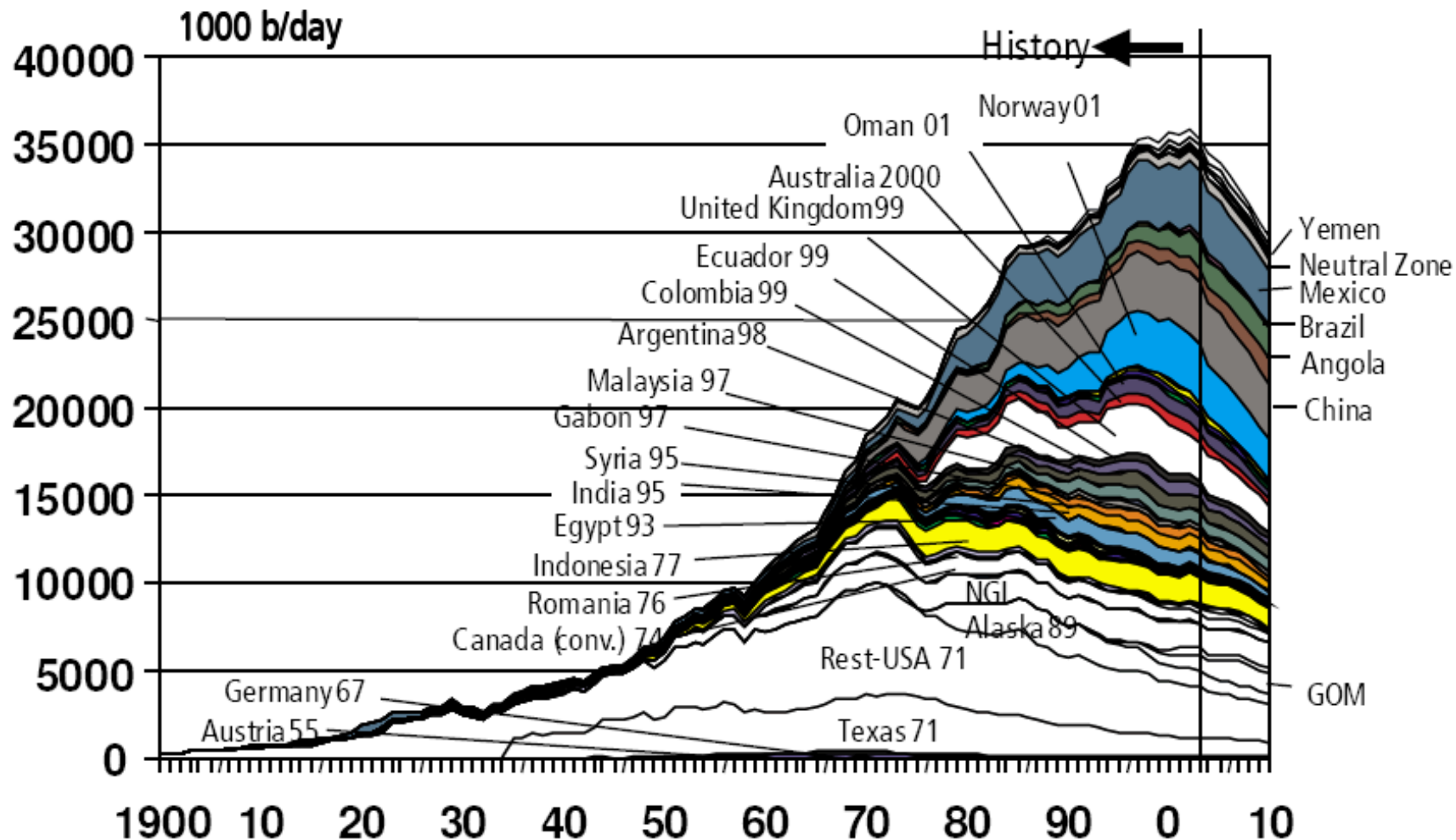
➤ Rush to benefit



(GE sales of “green” products and services now \$12b/yr)



Concept of “Peak Oil”, Hubbert Chart



Source: Industry database, 2003 (IHS 2003)
OGJ, 9 Feb 2004 (Jan-Nov 2003)

North
American
energy plant





Kansai Powerplant, Miazuru, Japan

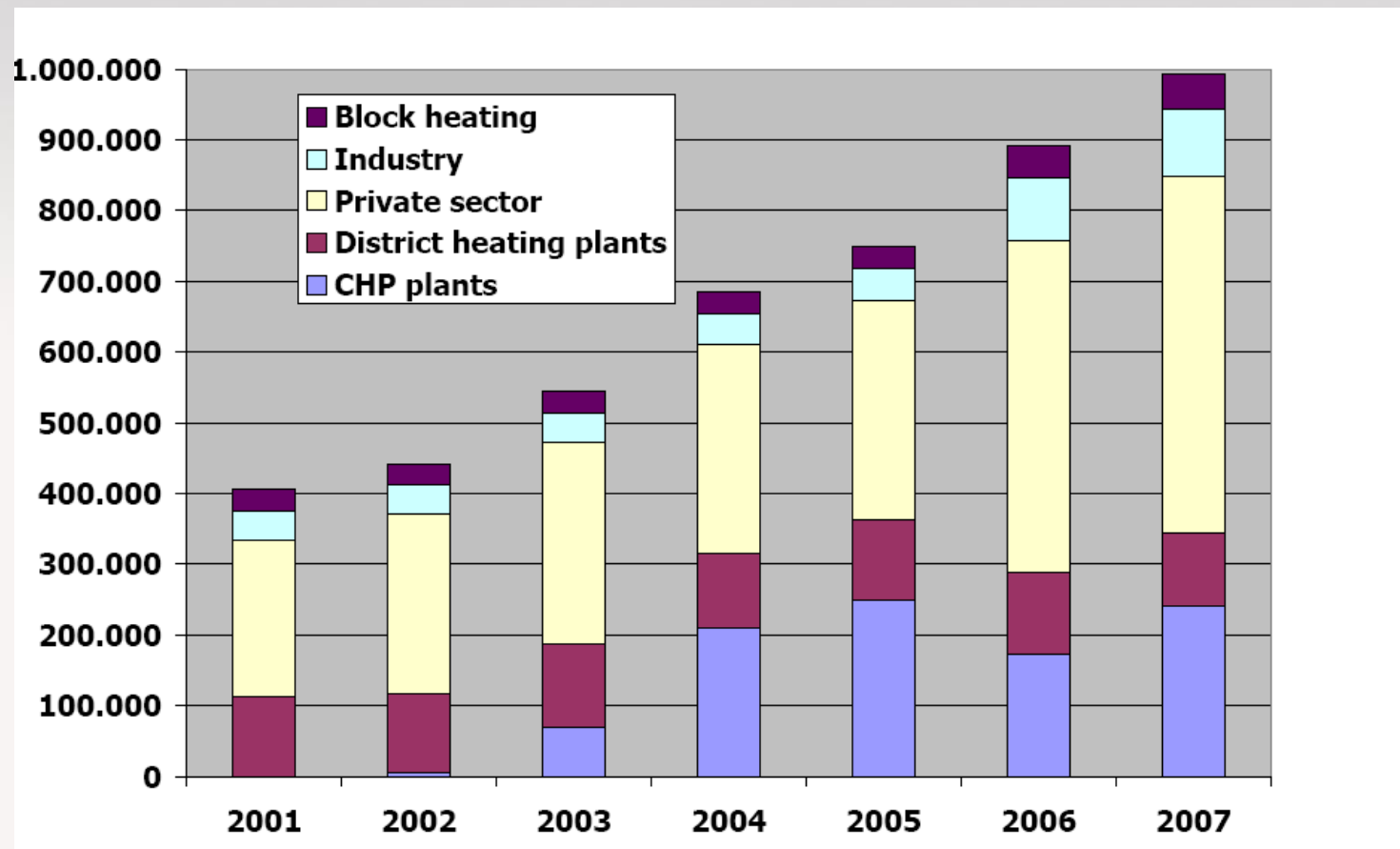
Geertruidenberg, Netherlands



Helsingborg, Sweden



Danish pellet market



Source: Hansen, Force, Wels 2009

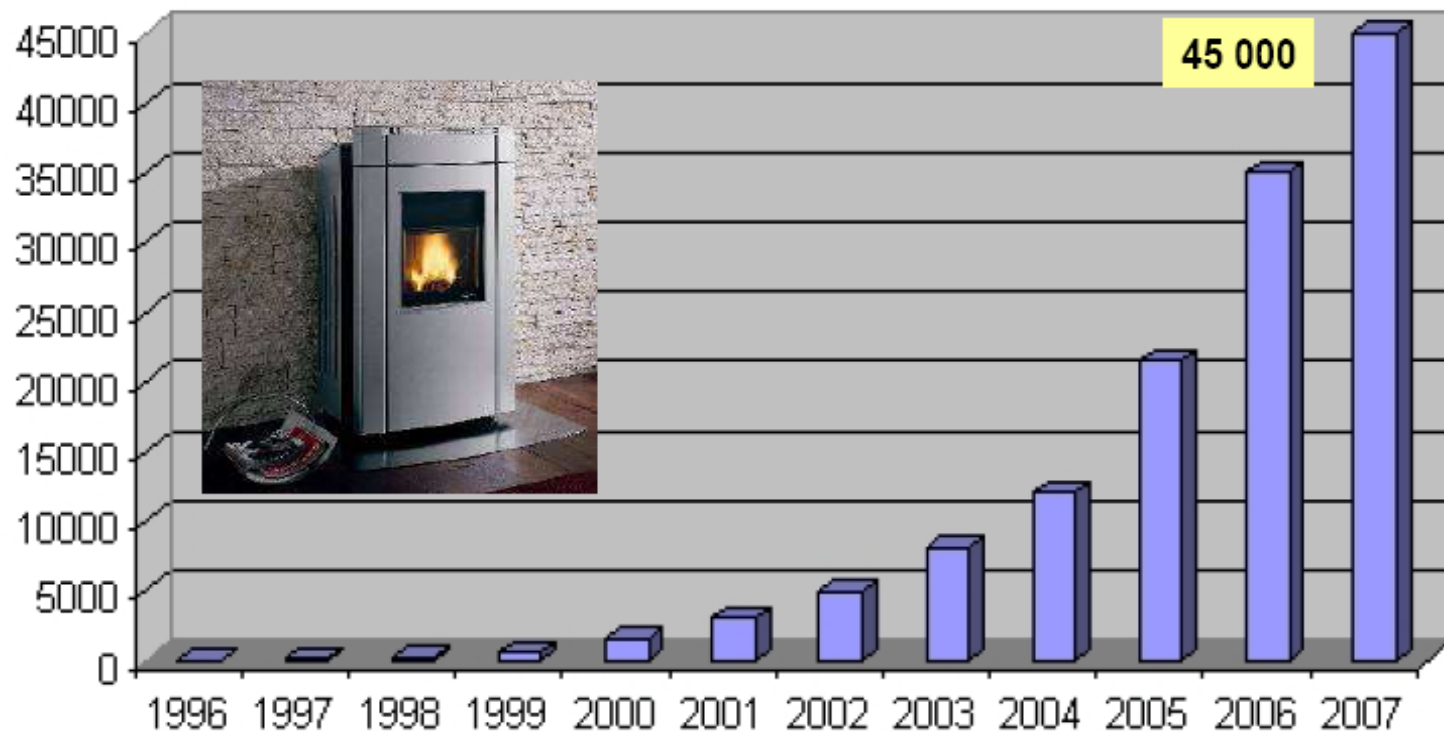
Future Pellet Market in Denmark

- Residential market: increase expected
- District heating market: decrease expected
- Large CHP market: large increase expected
 - DONG Energy
 - 400,000 tonnes at Avedøre II in 2009
 - Vattenfall
 - 100,000 tonnes straw pellets and 250,000 tonnes wood pellets at refurbished Amager plant
 - MaxBio plan on replacing 724,000 tonnes of coal with biomass
- Danish pellet market could double in 5 years!



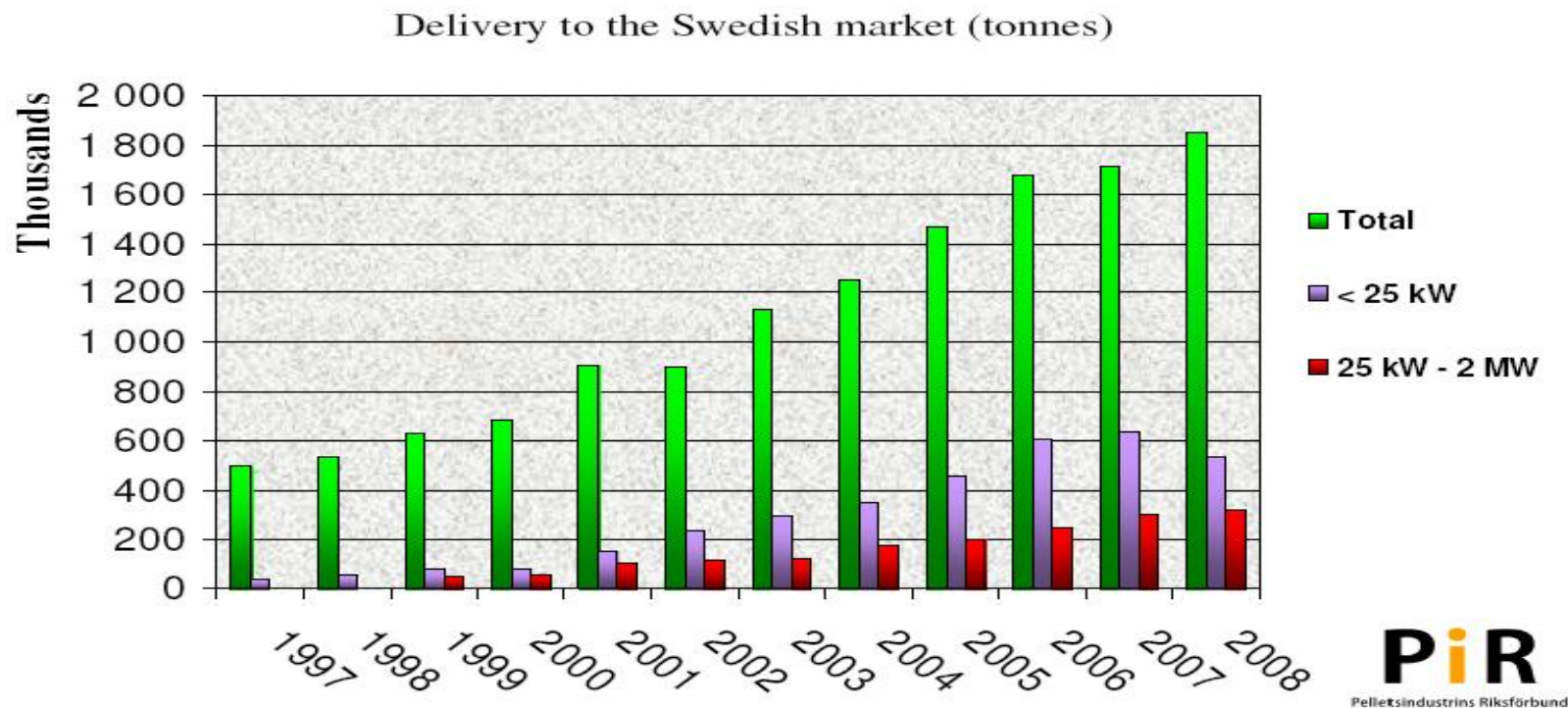
Pellet stoves in France

Cumulated sales of pellet stoves in France, ITEBE

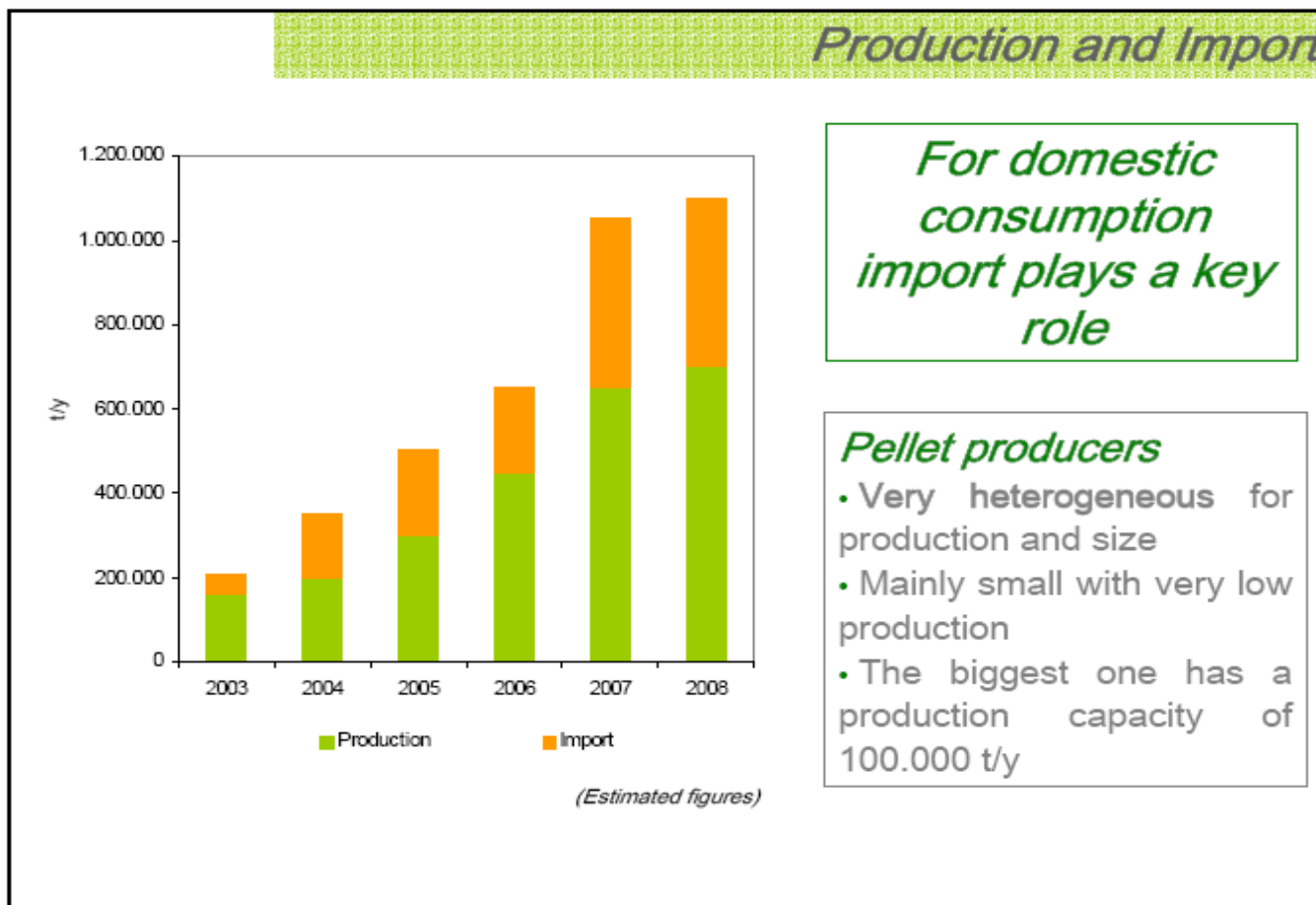


Source: ITEBE, Wels 2009

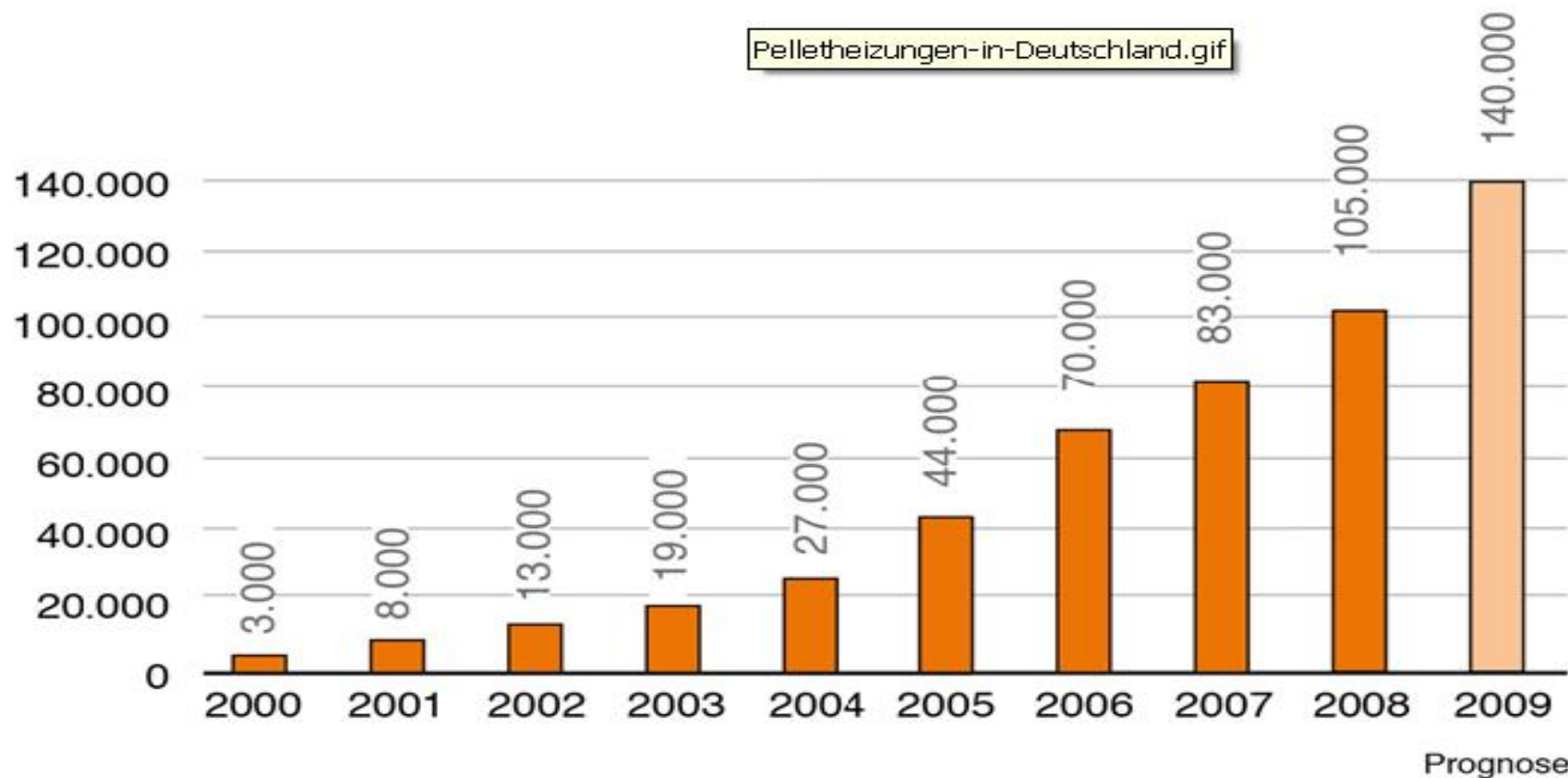
Swedish pellet market



Production and import of pellets in Italy

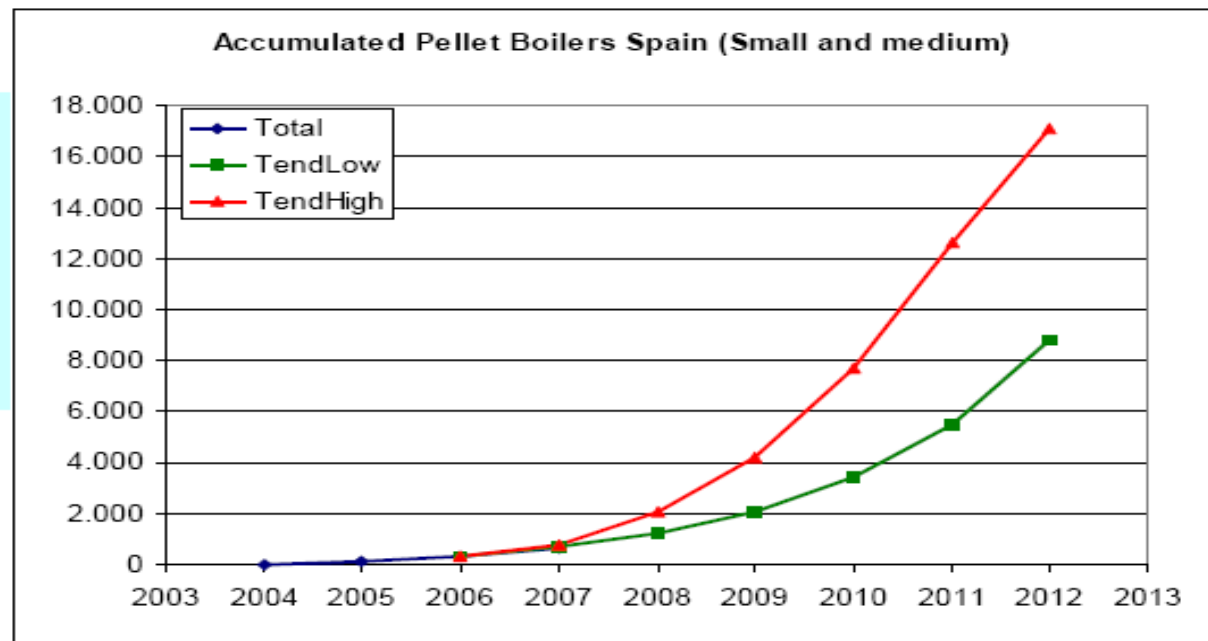


Residential pellet boilers in Germany



Projected sales of pellet boilers in Spain

Total pellet
boilers
installed:
1.000 Units
54 MWt



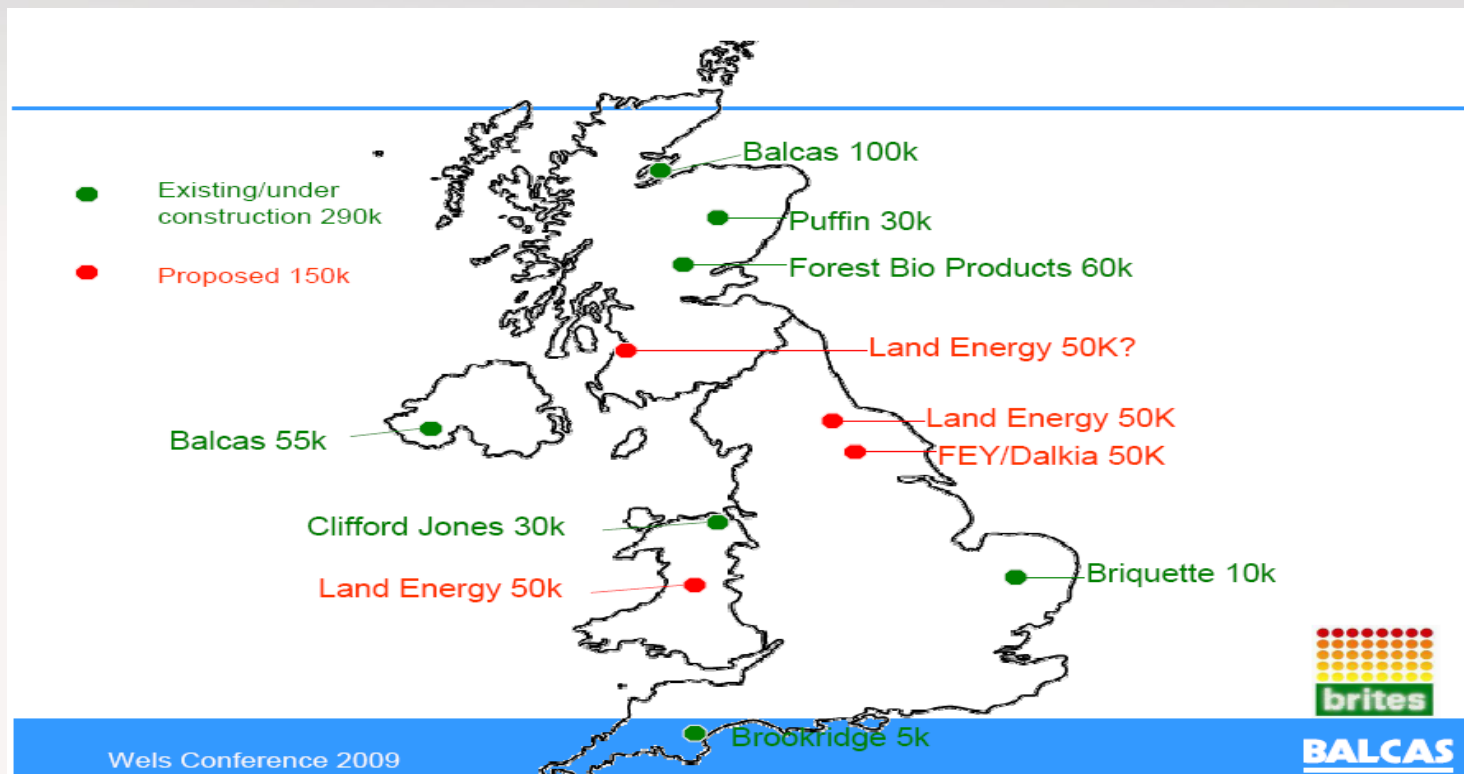
24/01/2009

www.biohousing.eu.com

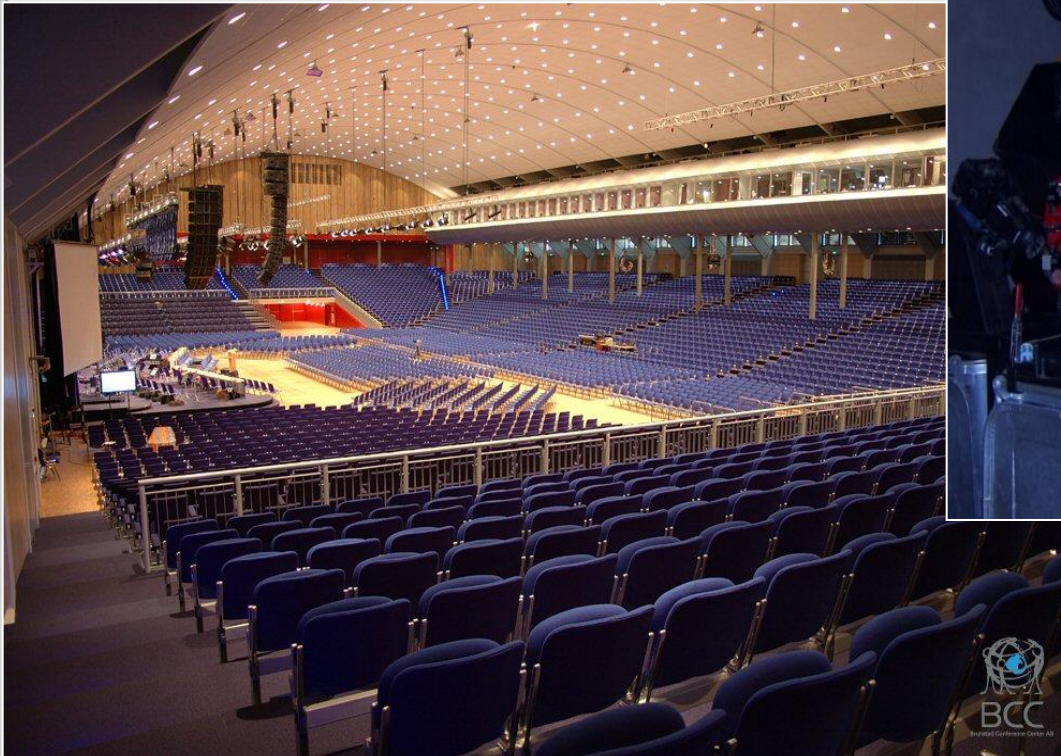
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Source: Puente-Salve, Escan, Wels 2009

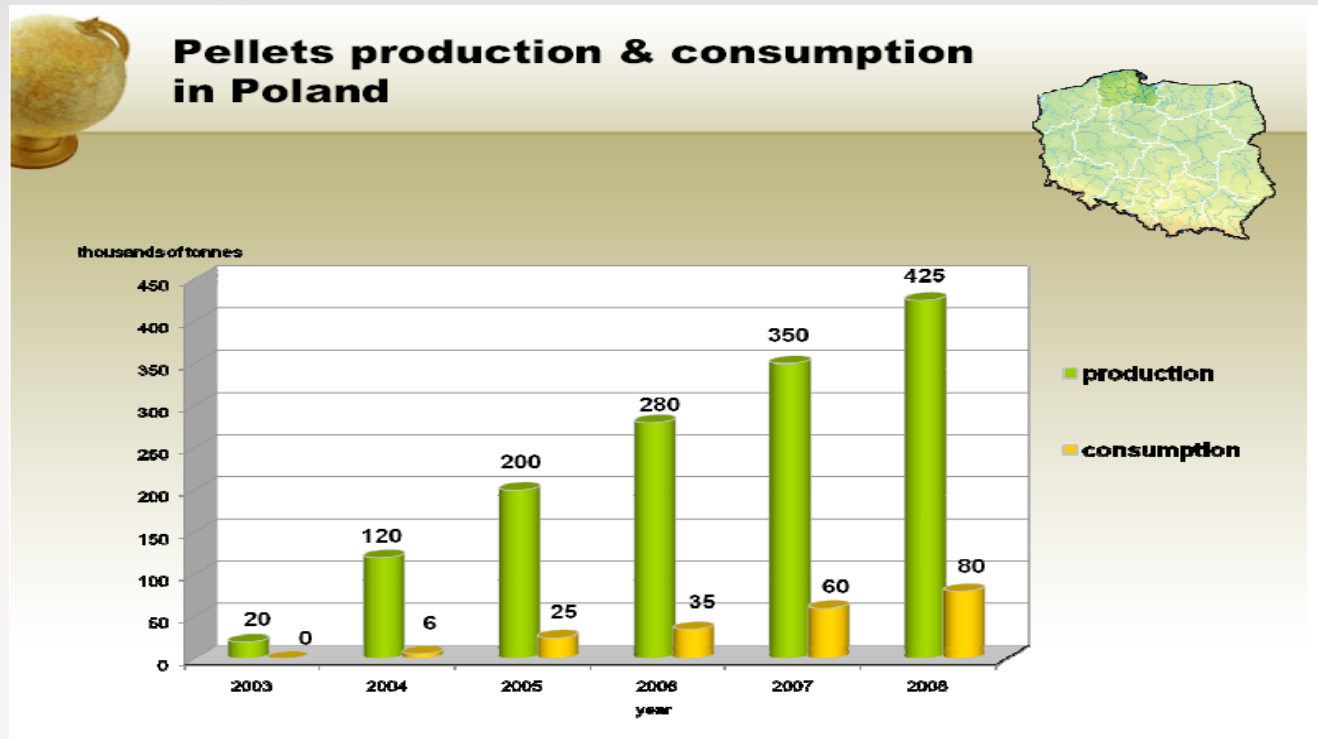
Development of pellet production in the UK



Two boiler KOB system Brunstad Congress center (Norway)



Pellet production and consumption in Poland



Wach, Energy and Environmental Conservation, Wels 2009

KOB heated Hotel Lagorai Cavalese (Italy)

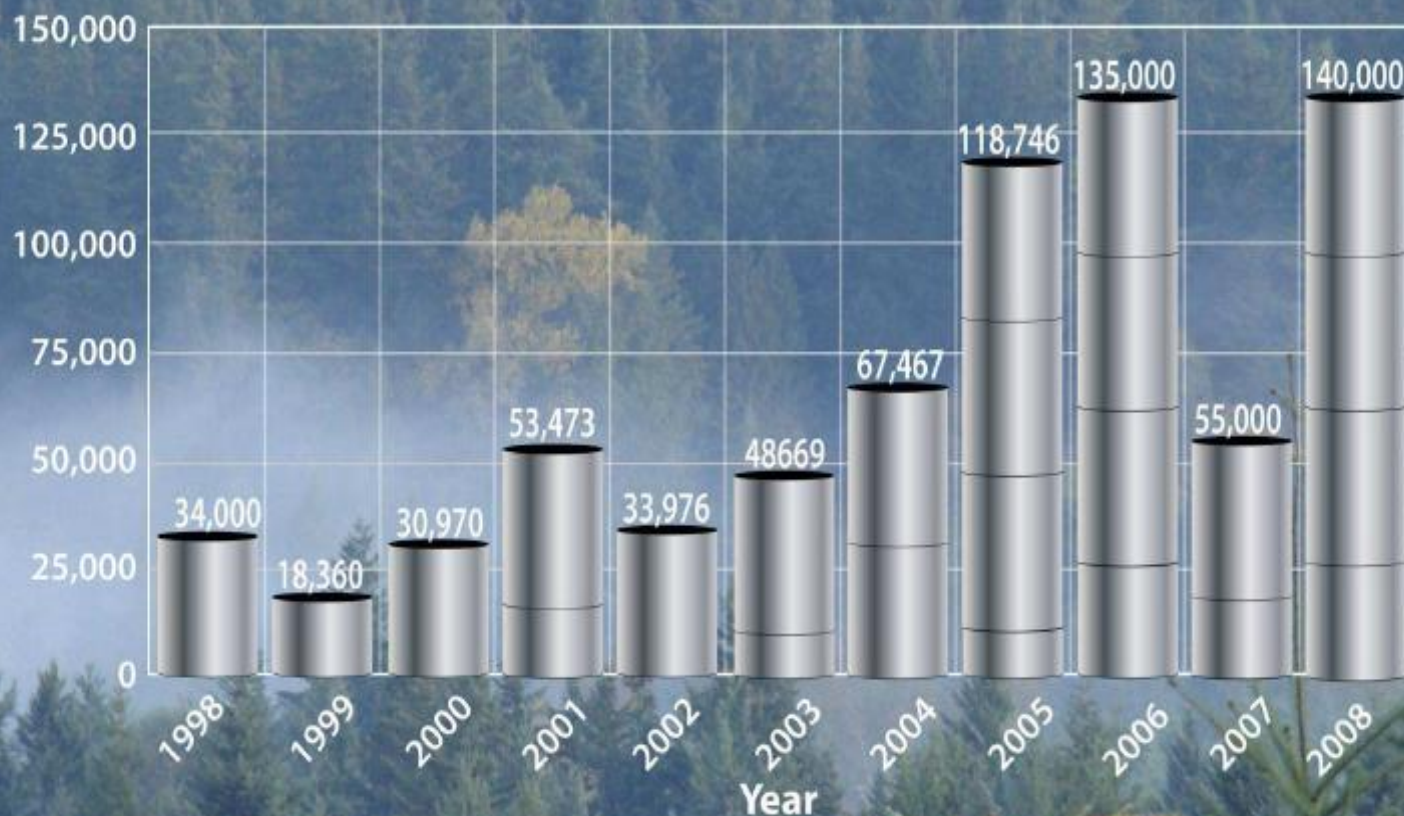


KOB heated 3 Apartment Buildings Skien, Norway

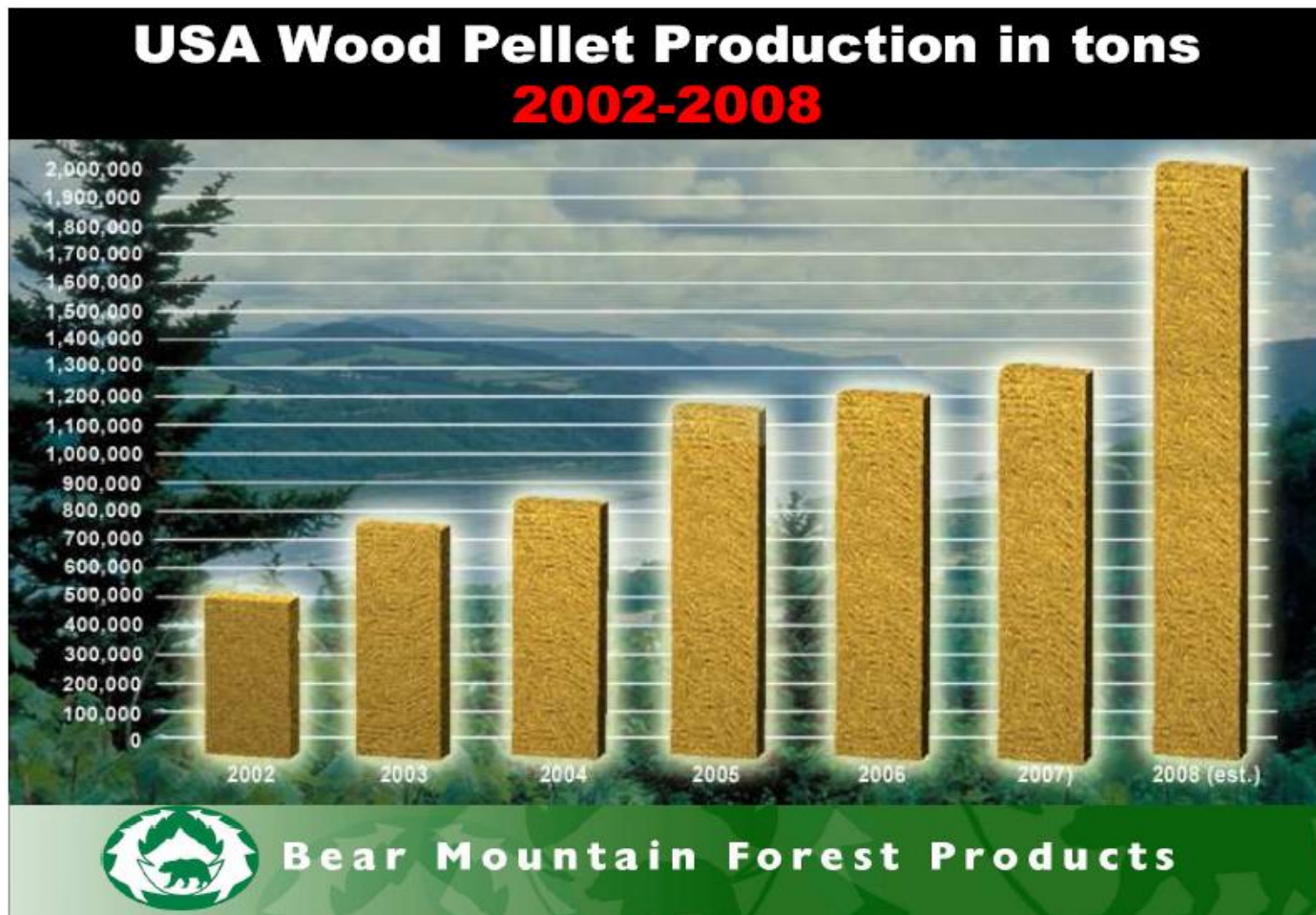


USA: Development of pellet stove sales

USA Pellet Appliance Shipments **1998-2008**

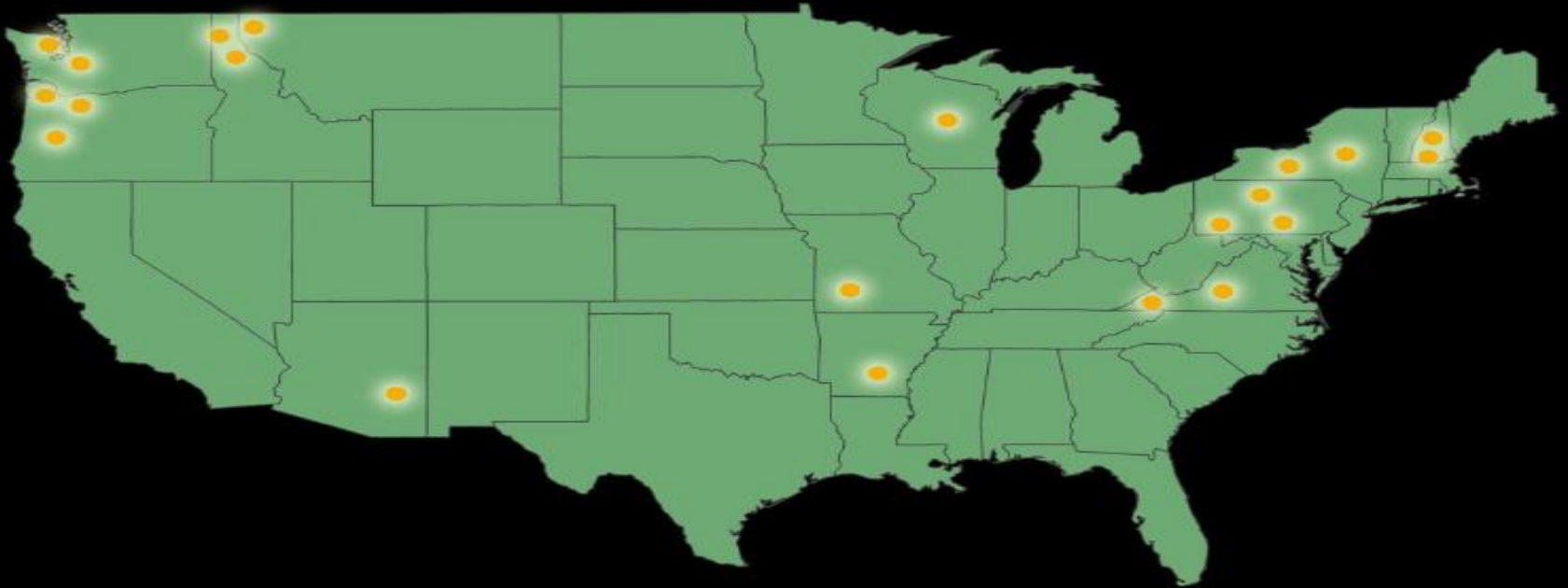


USA Wood Pellet Production



2004 US Pellet Producers

2004 USA Pellet Producers
21 Plants- 850,000 tons

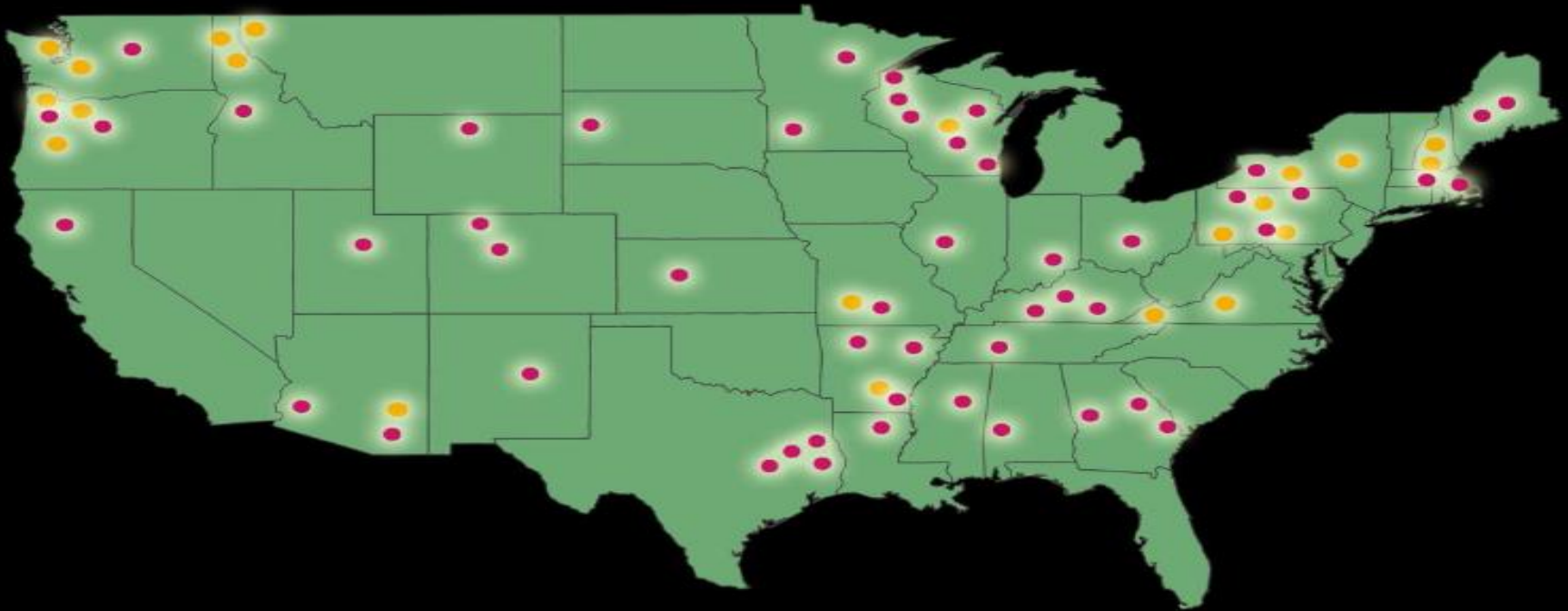


Bear Mountain Forest Products

Source: Stan Elliot, Wels 2009

2009 US Pellet Producers

2009 USA Pellet Producers
80 Plants- 2,000,000 tons



Bear Mountain Forest Products

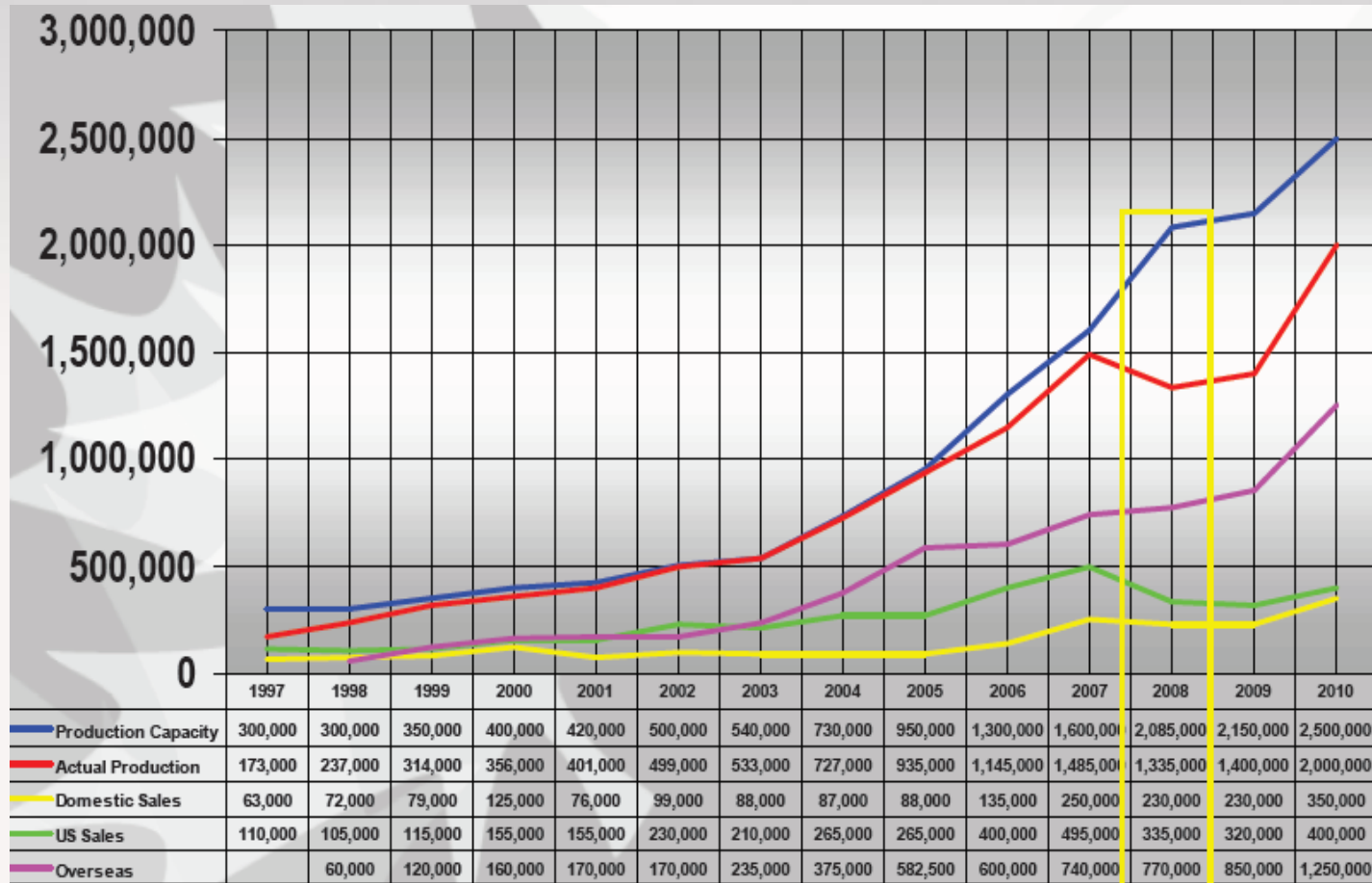


New England Wood Pellet

Harney District Hospital, Burns OR Container System



Canadian pellet production



Houston BC Pellet Plant
+/- 150,000 tons/yr.

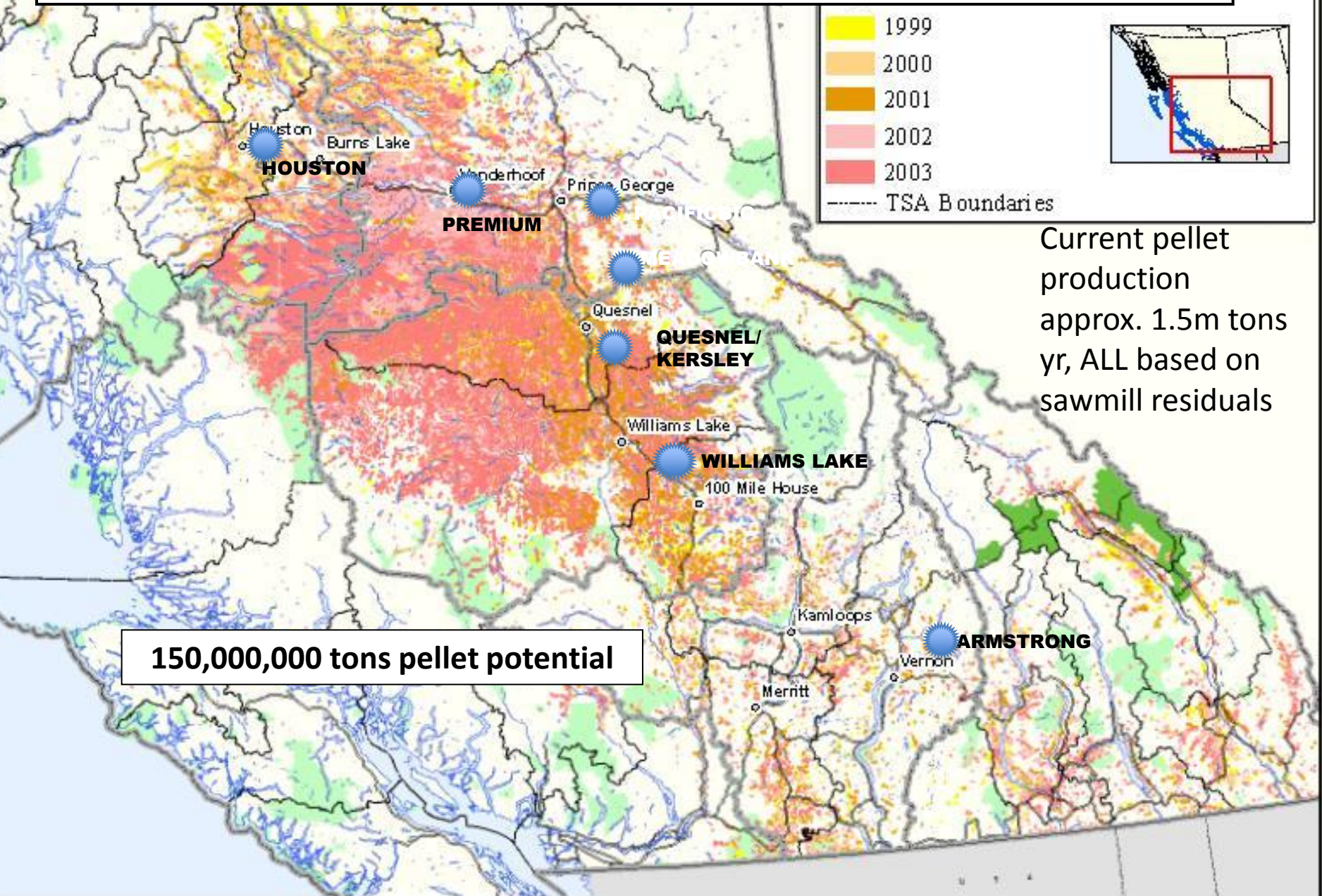








BC Pellet plant locations vs. Beetle Wood











Type of Fuel	Rate as of July 1, 2008	Rate as of July 1, 2012
Gasoline	2.41 cents/litre	7.24 cents/litre (USD 0.26/Gal)
Diesel Fuel	2.76 cents/litre	8.27 cents/litre (\$0.30/Gal)
Natural Gas	49.88 cents/GJ	149.64 cents/GJ (\$141.84 per MMBH)
Light Fuel Oil	2.76 cents/litre	8.27 cents/litre (\$0.30/Gal)
Canadian bituminous coal	\$20.79/tonne	\$62.36/tonne (\$53.85/Ton)
Sub-bituminous coal	\$17.72/tonne	\$53.15/tonne (\$45.90/Ton)
Propane	1.54 cents/litre	4.62 cents/litre (\$0.17/Gal)



- ☐ One of the first schools in Canada with 100% biomass heating – virtually 100% carbon neutral
- ☐ Net CO2 savings of 60 tons per year
- ☐ Displaces 8500 gallons of propane/yr.
- ☐ Fuel cost savings starting at \$10,000/yr - year one
- ☐ A model for the community, staff and students
- ☐ Local resource, local jobs, local suppliers (Pinnacle, Ventek)
- ☐ Eliminates \$1500/yr BC Carbon Tax (2012 onward)



Devon Greenhouse, Abbotsford, BC









BIOMASS HEATING SYSTEMS FOR GNWT BUILDINGS



INSTALLED AND PLANNED WOOD PELLET BOILERS

OCTOBER 2009



Chief Jimmy Bruneau School, Behchoko
One KOB 750 kW wood pellet boiler
Expected fuel oil reduction of 155,000 litres per year
Expected GHG reduction of 410 tonnes per year
Installation completed in October 2009

Highways Maintenance Garage, Hay River
One KOB 280 kW wood pellet boiler
Fuel oil reduction of 100,000 litres per year
Expected GHG reduction of 270 tonnes per year
Installation to be completed in 2010

Central Heating Plant Serving Four Schools, Hay River
One KOB 1 MW wood pellet boiler
Expected fuel oil and propane reduction equivalent to 318,000 litres of fuel oil per year
Expected GHG reduction of 850 tonnes per year
Installation to be completed in 2010
Diamond Jenness School & new Tradeshop
Harry Cammell School
Ecole Boreale
Princess Alexandra School



Schools to be heated by a central heating plant in Hay River

A BRIEF HISTORY

The first wood pellet boilers for a Territorial Government building were installed at the North Slave Correctional Centre in 2006. Arctic Green Energy (AGE) owns and installed the boiler, and sells heat to the Government of the NWT (GNWT). Thanks to the success of that project, the GNWT is now investing in its own wood pellet boilers for other facilities, where economically viable.

Since the cost to transport wood pellets is higher than that of other fuels, the most viable locations for wood pellet boilers are those closest to the source of wood pellets. Currently, that source is in La Crete in northern Alberta. Therefore, the GNWT is investing in wood pellet boilers in communities on the road network in the South and North Slave regions.

Kalemi Dene School, N'Dilo
Three Bosch MESys 23 kW wood pellet boilers
Expected fuel oil reduction of 30,000 litres per year
Expected GHG reduction of 80 tonnes
Installation completed in September 2009

North Slave Correctional Facility, Yellowknife
Two BINDER 750 kW wood pellet boilers
Fuel oil reduction of 587,000 litres in 2008
GHG reduction of 1,560 tonnes in 2008
Installation completed in November 2006

Legislative Assembly Building, Yellowknife
One BINDER 300 kW wood pellet boiler
Expected fuel oil reduction of 83,000 litres per year
Expected GHG reduction of 220 tonnes per year
Installation to be completed in 2009/10

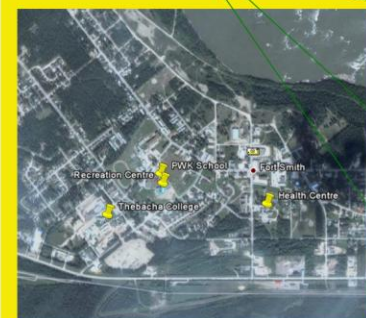
École St Joseph School, Yellowknife
One KOB 540 kW wood pellet boiler
Expected fuel reduction of 102,000 litres per year
Expected GHG reduction of 270 tonnes per year
Installation completed in October 2009

Sir John Franklin School, Yellowknife
One BINDER 750 kW wood pellet boiler
Expected fuel reduction of 142,900 litres per year
Expected GHG reduction of 380 tonnes per year
Installation completed in February 2008

PWK School & Recreation Complex, Fort Smith
One KOB 750 kW wood pellet boiler
Expected fuel oil reduction of 200,000 litres per year
Expected GHG reduction of 530 tonnes per year
Installation to be completed in 2010

Thebacha College, Fort Smith
One KOB 750 kW wood pellet boiler
Expected fuel oil reduction of 200,000 litres per year
Expected GHG reduction of 530 tonnes per year
Installation to be completed in 2010

Health Centre, Fort Smith
One KOB 750 kW wood pellet boiler
Expected fuel oil reduction of 200,000 litres per year
Expected GHG reduction of 530 tonnes per year
Installation to be completed in 2010



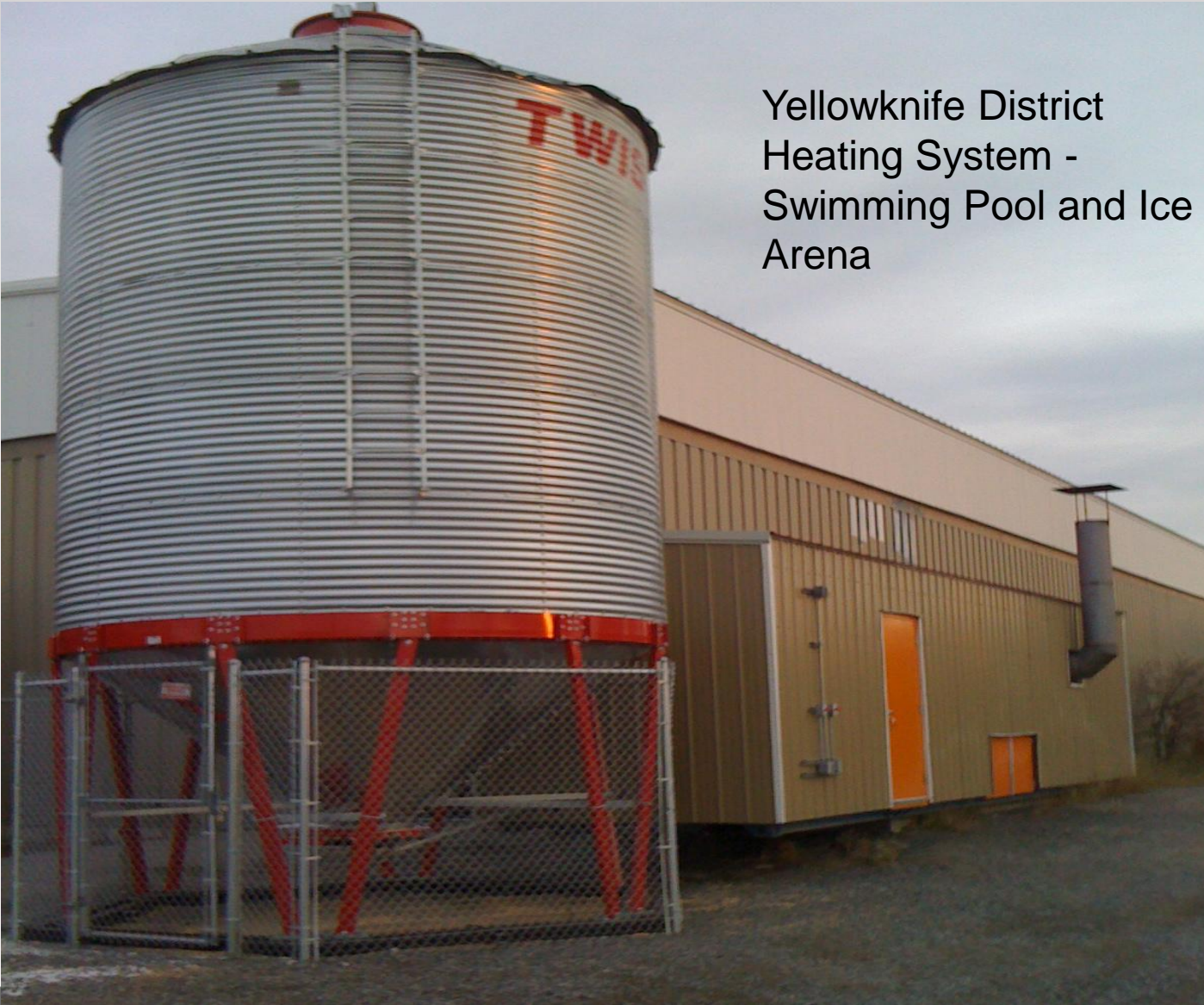


Yellowknife Apartments,
Boiler and Storage



Yellowknife Swimming Pool, District Heating



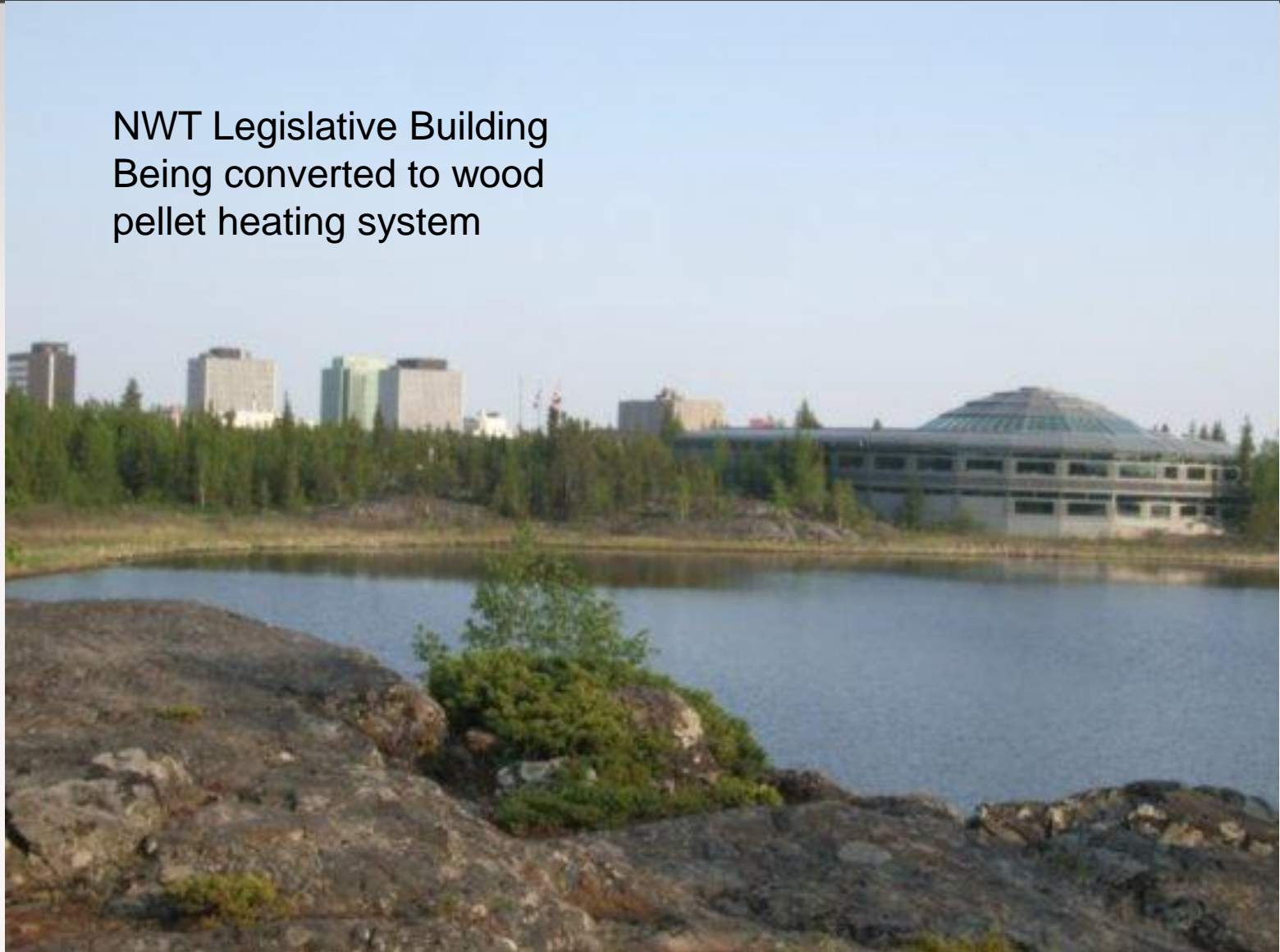


Yellowknife District
Heating System -
Swimming Pool and Ice
Arena

New School
Installation
being
completed in
Yellowknife



NWT Legislative Building
Being converted to wood
pellet heating system



Northwest Territory Summary:

425,000 sq/mi – 35,000 residents

(vs Alaska 586,000 sq/mi, +/- 600,000 residents)

- Approx. 15 commercial biomass boiler installations
- Many residential wood pellet stoves (up to 50% fuel savings vs oil/propane).
- **12,000 tons/yr** of pellet consumption, for a population base of 35,000, in just 4 years!

Yukon Summary:

186,000 sq/mi – 33,500 residents

(vs Alaska 586,000 sq/mi, +/- 600,000 residents)

Enough dead trees from forest wild fires annually to supply 600,000 tons of wood pellets/yr (10% would supply the entire thermal needs of every Yukon building!

- Approx. 6 commercial biomass boiler installations in planning stage, including Dawson City and Yukon Corrections Facility
- Growing number of residential wood pellet stoves, up to 50% fuel savings vs oil/propane.
- **1,000 tons/yr** of pellet consumption, (want to catch-up to NWT!)

Bob and Donna
Supernault, Delta Junction
Largest Harman Stove Dealer
In Pac NW
+100 stoves/yr
+1000 tons pellets/yr





Typical Pellet Stove,
Residential Installation
Harman Stove

Current US Federal Tax
Credit, 30% up to
\$1500 per installation

New Superior Pellet Plant, Fairbanks
10,000 tons production, up to 60,000
Start-up, summer 2010



Pellet Opportunity for SE...

**Wood pellet fuel = 30% saving for the average heating bill,
based on today's price of oil**

(does anyone expect oil prices to decrease?)

Pellet Opportunity for SE...

**30% saving for the average heating bill,
based on import wood pellets**

**Viking Lumber planning 15,000 ton/yr pellet plant,
currently seeking equipment and funding.**

**Viking Lumber currently has approx. 10,000 tons/yr of
residual waste**

Pellet Opportunity for SE...

Wood pellet stoves, commercial sized boilers and distribution is now readily available.

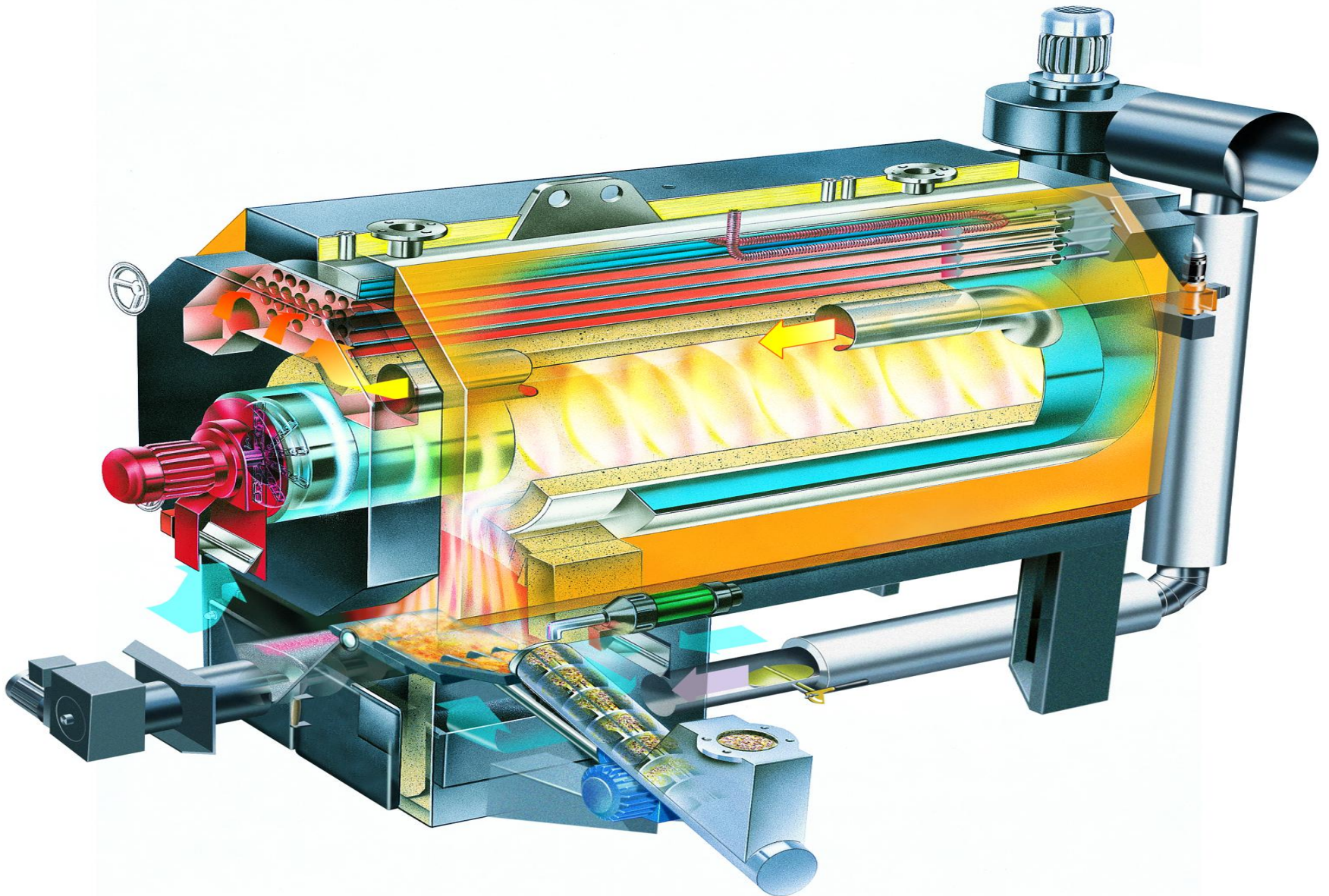
There is no plan to harvest the Tongass for biomass – thinning and residuals would provide enough feedstock.

Imports will continue to be available as necessary.

- KOB Boilers – 30 years in Austria
- Now part of Viessmann, excellent reputation globally (33 countries, 6800 employees)



KOB/Viessmann Boiler



SUMMARY

- ☐ Wood pellet demand, as a preferred “green” fuel in N America, is expected to grow dramatically in the future.
- ☐ Prices will remain stable as the market matures, compared to the volatility of fossil fuels.
- ☐ There is an abundance of raw material in N America.
- ☐ Developing wood pellet applications in Alaska will create jobs, reduce carbon emissions, save money, and....

“It’s the right thing to do!”