Pellet Fueled Central Heating in New England:

Convenient and Automatic Central Heating with Sustainable Fuel from our Forests

Presented by Dr. William Strauss

President, FutureMetrics

Co-Founder and Director, Maine Energy Systems
What is the possible future?

We can look to Europe which is decades ahead.

Note the role of biomass in the European renewable energy portfolio.

While solar and wind make up important electricity generating components of the mix, **heat for homes and buildings is not made from electricity.**

(Geothermal heat pumps are a good heating solution and should be part of the strategy. But in much of New England hard rock drilling is required making the capital cost very high. Most of New England’s homes will rely on combustion systems for heat.)

<table>
<thead>
<tr>
<th>Year</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
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<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar energy</td>
<td>0.4%</td>
<td>0.4%</td>
<td>0.4%</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.6%</td>
<td>0.6%</td>
<td>0.7%</td>
<td>0.8%</td>
<td>0.9%</td>
<td>1.2%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Biomass</td>
<td>60.7%</td>
<td>60.5%</td>
<td>60.1%</td>
<td>59.2%</td>
<td>62.3%</td>
<td>64.1%</td>
<td>63.8%</td>
<td>65.4%</td>
<td>66.0%</td>
<td>66.8%</td>
<td>66.6%</td>
<td>66.8%</td>
</tr>
<tr>
<td>Geothermal Energy</td>
<td>4.5%</td>
<td>4.7%</td>
<td>4.8%</td>
<td>4.5%</td>
<td>4.8%</td>
<td>5.0%</td>
<td>4.8%</td>
<td>4.6%</td>
<td>4.5%</td>
<td>4.3%</td>
<td>4.0%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Hydro power</td>
<td>31.3%</td>
<td>30.9%</td>
<td>30.8%</td>
<td>31.5%</td>
<td>27.2%</td>
<td>24.8%</td>
<td>24.5%</td>
<td>22.4%</td>
<td>21.4%</td>
<td>19.8%</td>
<td>19.6%</td>
<td>18.7%</td>
</tr>
<tr>
<td>Wind power</td>
<td>1.0%</td>
<td>1.3%</td>
<td>1.9%</td>
<td>2.3%</td>
<td>3.1%</td>
<td>3.6%</td>
<td>4.5%</td>
<td>5.2%</td>
<td>5.7%</td>
<td>6.7%</td>
<td>7.2%</td>
<td>7.6%</td>
</tr>
</tbody>
</table>

Let’s look at the US and Sweden’s aggregate numbers.
Biomass as % of Total Energy

- Sweden
- Canada
- United States

Sweden currently has a carbon emissions tax of 930 Swedish Kronor (SEK) ($139.54) per tonne of CO2 emissions. (source: Government Offices of Sweden: Energy Policy)
GDP/Capita vs. Competitiveness

source: World Economic Forum, analysis by FutureMetrics
<table>
<thead>
<tr>
<th>Country</th>
<th>GDP/Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luxembourg</td>
<td>$ 113,533</td>
</tr>
<tr>
<td>Qatar</td>
<td>$ 98,329</td>
</tr>
<tr>
<td>Norway</td>
<td>$ 97,255</td>
</tr>
<tr>
<td>Switzerland</td>
<td>$ 81,161</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>$ 67,008</td>
</tr>
<tr>
<td>Australia</td>
<td>$ 65,477</td>
</tr>
<tr>
<td>Denmark</td>
<td>$ 59,928</td>
</tr>
<tr>
<td>Sweden</td>
<td>$ 56,956</td>
</tr>
<tr>
<td>Canada</td>
<td>$ 50,436</td>
</tr>
<tr>
<td>Netherlands</td>
<td>$ 50,355</td>
</tr>
<tr>
<td>Austria</td>
<td>$ 49,809</td>
</tr>
<tr>
<td>Finland</td>
<td>$ 49,350</td>
</tr>
<tr>
<td>Singapore</td>
<td>$ 49,271</td>
</tr>
<tr>
<td>United States</td>
<td>$ 48,387</td>
</tr>
</tbody>
</table>
CO₂ Emissions (metric tons per capita)

source: World Bank, 2012, Analysis by FutureMetrics
We are here!

The total in Austria would equal about 30% of Maine’s 420,000 households that use heating oil...

All are fueled with pellets made in Austria!

Pulpwood Demand is Declining

The wood-to-energy business will keep the forest products industry alive!

![Graph showing Maine Pulpwood Harvest from 1980 to 2011](image)

Ice Storm!

Estimate

Source: Maine Forest Service, 2012, analysis by FutureMetrics
Wood pellet production for domestic use in the north can replace propane and heating oil.
Modern Wood Pellet Boilers are CLEAN and completely automatic

**Total Pounds of Particulate per Year**

normalized to the equivalent of the BTU from 1000 gallons of heating oil per year

- **Fireplace**: 3920.0
- **Uncertified Wood Stove**: 644.0
- **EPA Certified Wood Stove**: 196.0
- **Pellet Stove**: 68.6
- **Old Oil Boiler (pre-1990s)**: 10.08
- **Modern European Pellet Fuel Boiler**: 2.94
- **Modern Oil Boiler**: 2.52
- **Gas Boiler**: 1.16

To put this into perspective, let’s compare using one cord of wood in a fireplace and one cord of wood’s worth of energy from wood pellets in a modern pellet boiler.

375 pounds

Particulate emissions (SMOKE!)

0.28 pound
Wood pellet fuel is common in Europe where more than a million homes have home heating systems automatically fueled with wood pellets.
Imagine...

TAKING A VACATION WITH YOUR FUEL SAVINGS

Switch to the world’s finest fully-automated wood pellet boiler. The boiler that saves more than it costs.

- **Automatic Operation**
  Just Turn Your Existing Thermostat

- **No Fuel Handling**
  Delivered in Bulk / Automatically Fed

- **Automatic Ash Removal**
  No Ash to Touch

- **Clean Burning**
  Exceeds all EPA Emission Standards

- **Reliable**
  40,000+ Units in Service Worldwide

- **Affordable Fuel**
  Lock-in at $1.99 / Gallon Oil Equivalent

Contact Us
Stop being held hostage by your heating system.

Seriously...

DON’T BURN YOUR MONEY.

If you think your cost of heating is high, switch to the world’s finest fully-automated wood pellet boiler, it saves more than it costs.

- **Automatic Operation**
  Just Turn Your Existing Thermostat

- **No Fuel Handling**
  Delivered in Bulk / Automatically Fed

- **Automatic Ash Removal**
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Contact Us
How’s $1.99 / gallon for the next 2 years sound?
Maine Energy Systems (MESys)
Headquartered in Bethel, Maine, our primary mission is to support a transition to the use of renewable wood pellet fuel for heating of homes, businesses, schools and municipal buildings.

MESys AutoPellet Boilers
MESys manufactures and distributes MESys AutoPellet Boilers in Bethel, Maine. The licensed design was acquired from ÖkoFEN, the world’s leader in automatic wood pellet boiler design and technology since 1989.
The world’s finest wood pellet boiler.

Automatic Auger or Vacuum Fed Fuel
From the pellet mill to the burner, you never see or touch the fuel.

Automatic Tube Cleaning
Tubes are automatically cleaned daily, never requiring a manual cleaning. There is no need to shut or cool down the MESys AutoPellet for cleaning.

Bottom Fed Burner
Our unique bottom fed burner design eliminates emptying ash from the burn chamber for a restart, this results in no by-product build up. After a period of low-demand only the application of air is commonly necessary to restart.
Fuel storage for **any** application.

From 1/2 Ton to 50 Tons, We Can Store It All

With many sizes and configurations available, our wood pellet storage options are designed to fit your space and needs. These options ensure safe, automatic, reliable movement of the wood pellets from bulk storage to the burner. Our FleXILO storage bags are well suited for indoor spaces where space is limited.

View Available Sizes >>
Centralized Heat with Wood Pellets

The MESys AutoPellet Boiler is ideal for central heating and domestic hot water. The fully-automated, highly efficient wood pellet boilers are designed to meet the demands of households, businesses and institutions without backup.
Clean, Easy, Convenient Delivery
Pellets are delivered bagless in bulk by our specialized pneumatic pellet delivery truck.
Easy Ash Removal
Ash removal is automated. Boiler tubes are cleaned automatically several times daily. Emptying the ash box requires two or three minutes of your time only three to four times a year in the average home.

Detach ashbox & lift
Empty into storage box
Return to boiler
Installation Locations Include

- Churches
- Colleges & Universities
- Commercial Buildings
- Fire Stations
- Manufacturing Facilities
- Municipal Offices
- Primary Residential Homes
- Private Institutions
- School Districts
- Ski Resorts
- Vacation Homes
- Wastewater Treatment Plants
## Wood Pellet / Oil Comparison

<table>
<thead>
<tr>
<th></th>
<th>#2 Heating Oil</th>
<th>Wood Pellets</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annual Fuel Consumption</strong></td>
<td>1,300 gallons</td>
<td>10 tons</td>
</tr>
<tr>
<td><strong>Annual Carbon Emissions</strong></td>
<td>39,306 lbs</td>
<td>5,130 lbs</td>
</tr>
<tr>
<td><strong>Fuel Cost (unit price)</strong></td>
<td>$3.83 / gallon</td>
<td>$239 / ton</td>
</tr>
<tr>
<td><strong>Annual Fuel Costs</strong></td>
<td>$4,979</td>
<td>$2,408</td>
</tr>
<tr>
<td><strong>Annual Savings</strong>*</td>
<td>$2,571</td>
<td></td>
</tr>
<tr>
<td><strong>25 Year Savings</strong>*</td>
<td>$64,275</td>
<td></td>
</tr>
</tbody>
</table>

*Assumes fuel prices remain constant.*
Savings that Begin Day One
With available financing options, pellet fuel and boiler payments are commonly less than a homeowner’s current oil bill. Calculate your savings at MaineEnergySystems.com.
MESys Energy Box

Up to four 56 kw boilers in a self contained box. Pellet storage is at each end.

Energy boxes are heating municipal buildings, schools, and a ski area base lodge.
Maine Energy Systems LLC

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Bethel, Maine 04217
MaineEnergySystems.com
(207) 824-NRGY (6749)
Questions?

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