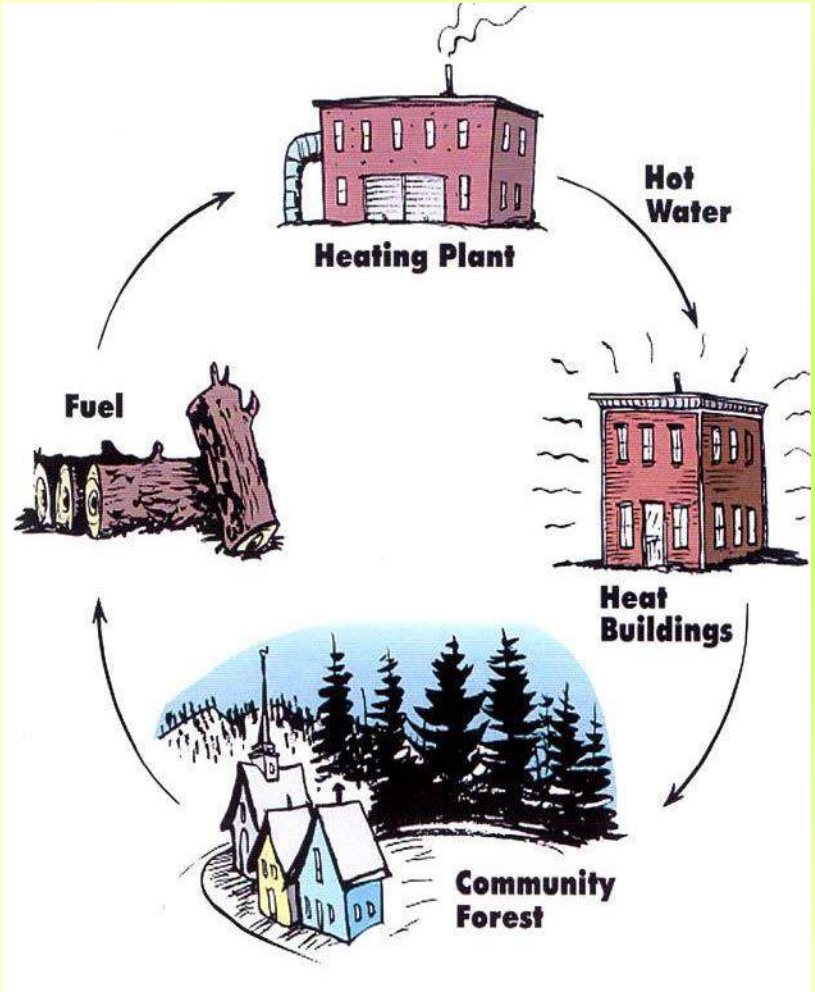
Biomass Heating Opportunity

A Renewable Solution for Schools, Communities and Forests

VECAN Conference
December 5, 2015

Benefits of Biomass

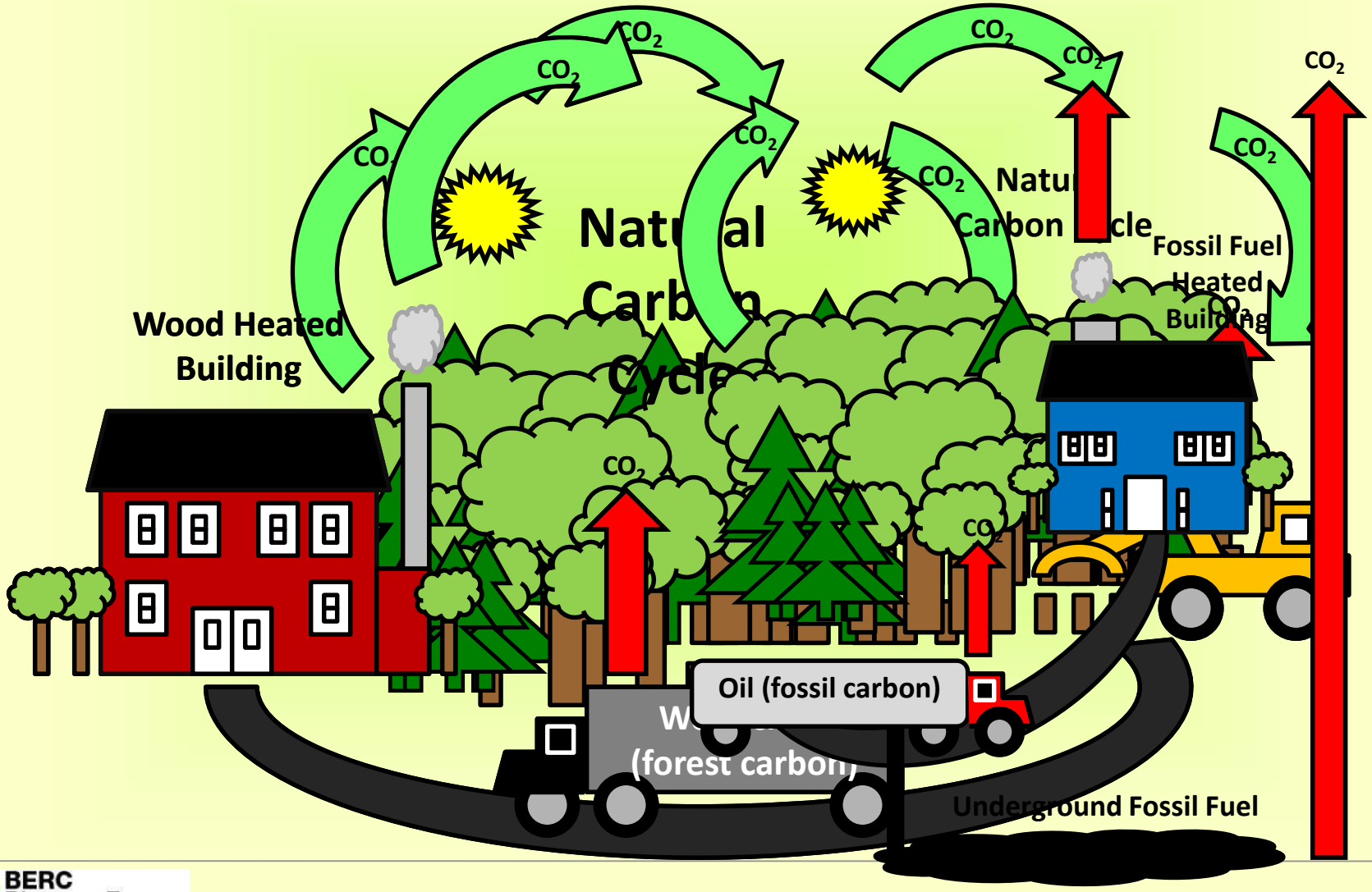


- Sustainable renewable fuel
- Cost-effective waste management
- Healthier forests
- Local economic development
- Keeping fuel $ local
- Price stability
- Low cost fuel
- 90% by 2050 goal

Image from Biomass Energy Resource Center

The Carbon Cycle

Biomass Heated Buildings vs. Fossil Fuel Heated Buildings



BERC
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Resource Center

Wood Heated Schools in Vermont

- 50+ schools in VT
- 1/3 of Student Population

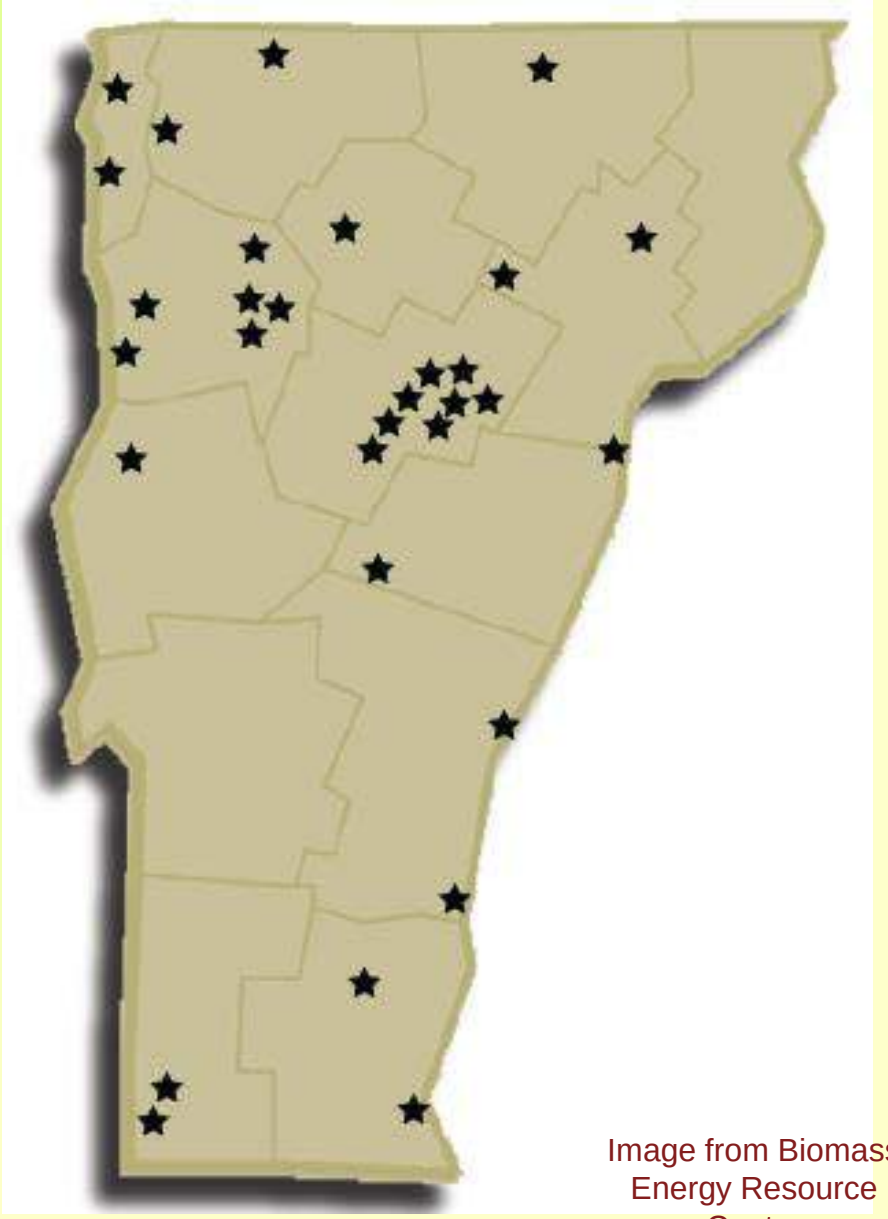
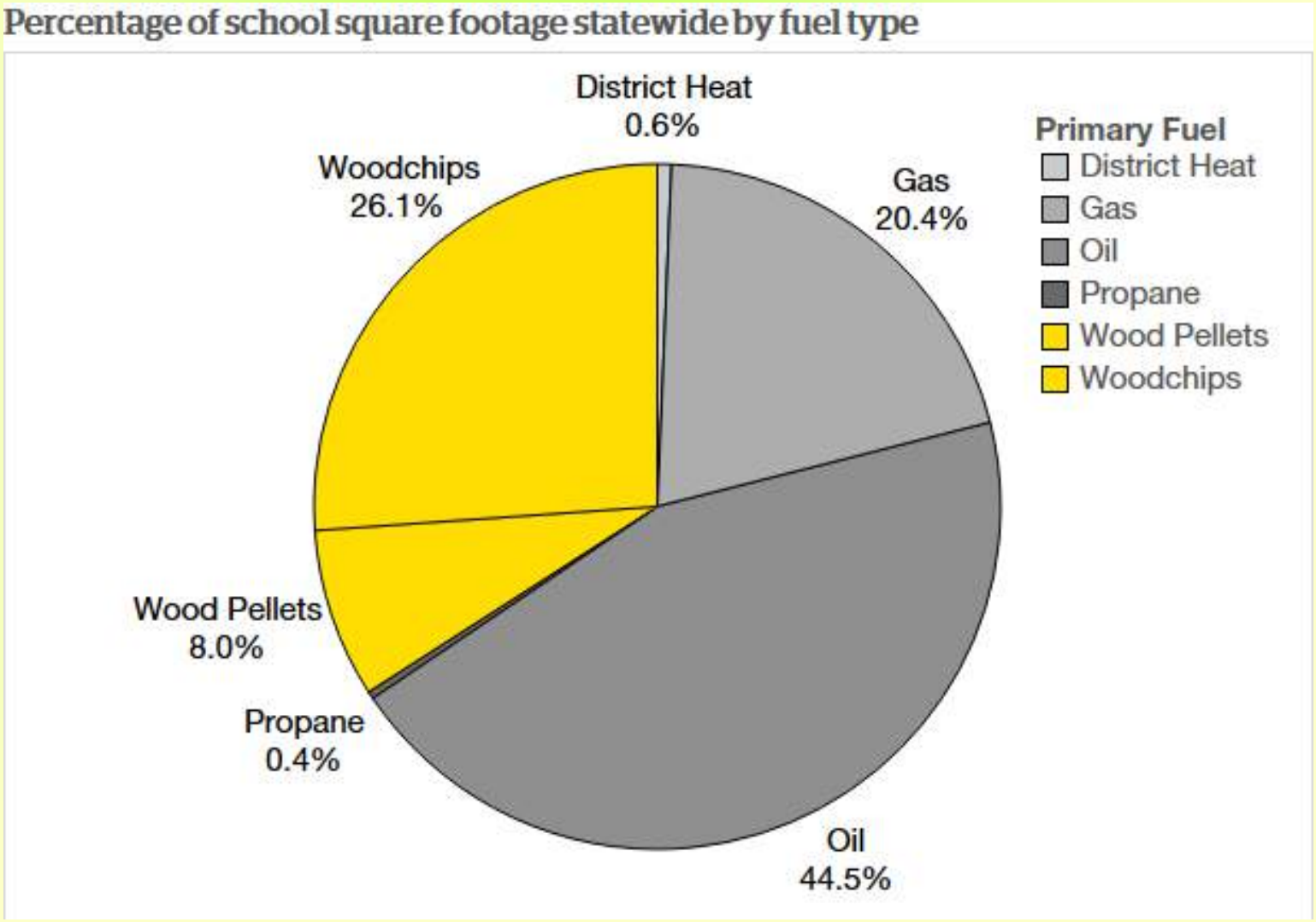


Image from Biomass Energy Resource Center

Vermont Public School Sector



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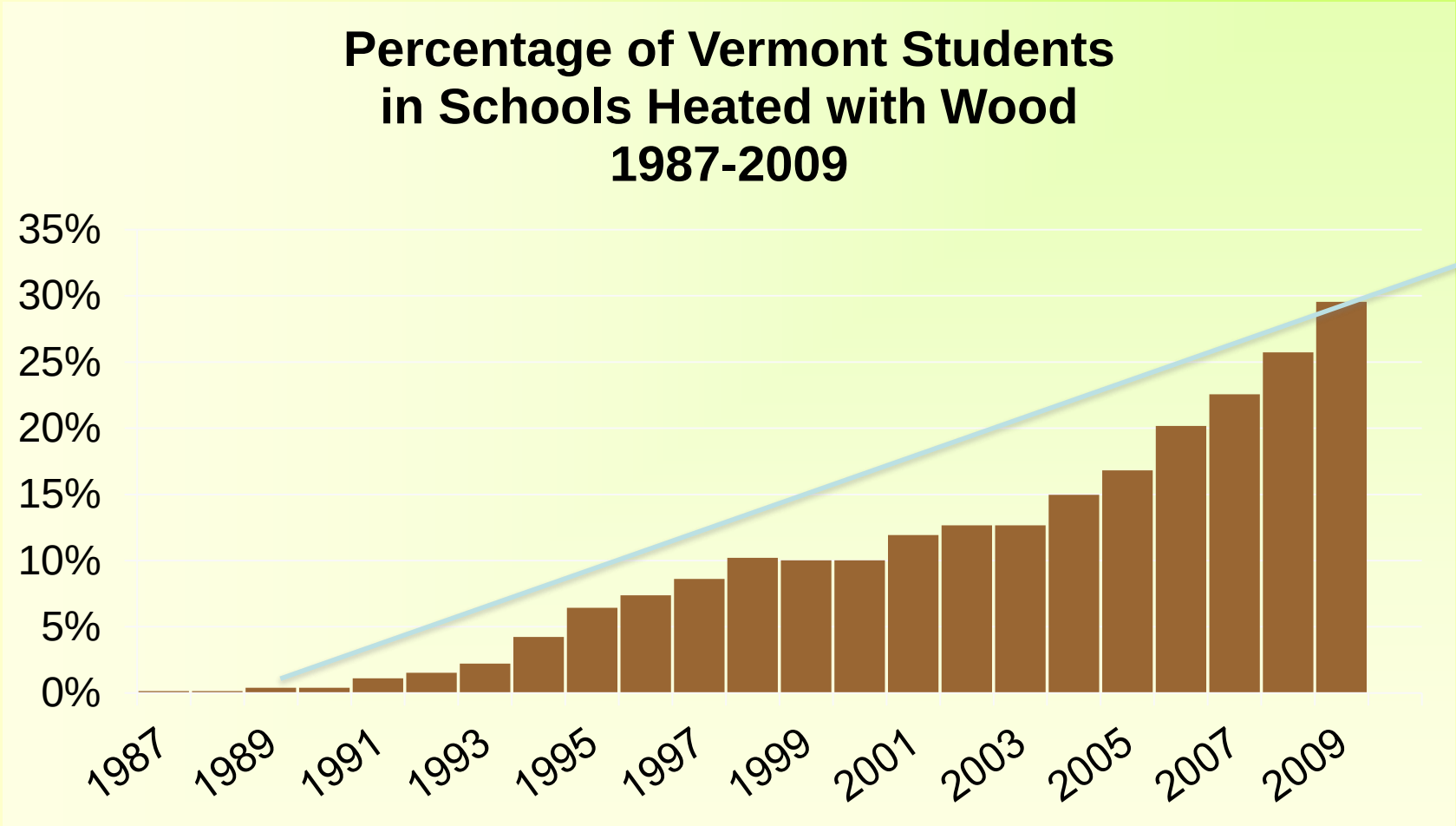
Public School Sector



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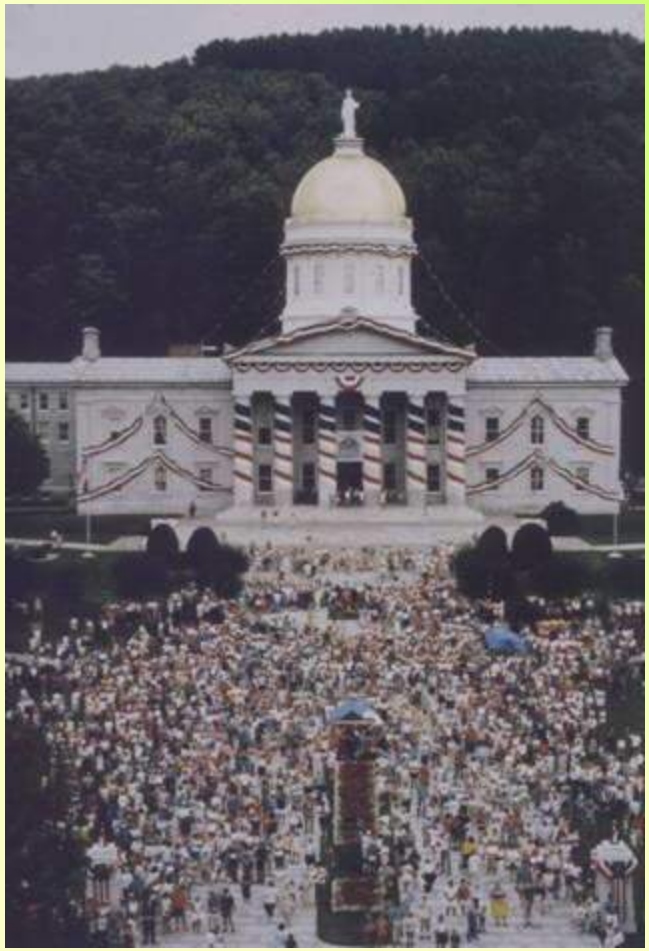
School Wood Systems

Attached

Integrated

Separate

Vermont's Most Famous Wood Heating Building



Vermont Statehouse
Montpelier, Vermont

Why public schools?

- Larger buildings with higher heating demands
- Capable full time maintenance staff
- Long term planning horizon
- Access to long term/low interest financing

Good Prospect Woodchip Sites

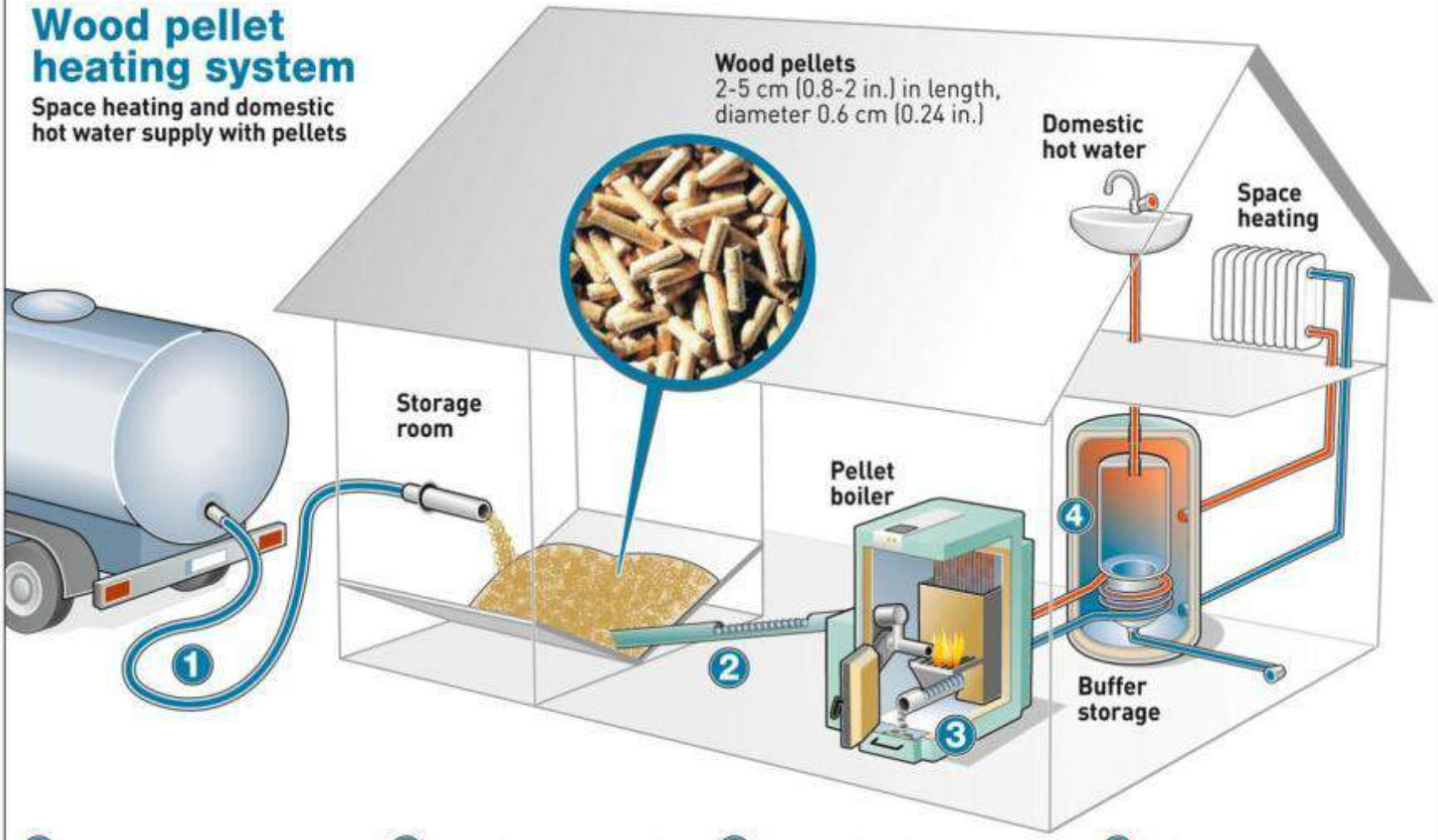
- **Have good access to wood chip fuel within 100 miles**
- **High heating fuel bills, $50,000+**
- **50,000 SF – 1 mil SF+**
- **Fossil fuel boilers in good repair**
- **Have hot water or steam distribution that is in good repair**
- **Sufficient space for new boiler house and chip storage and deliveries**
- **Considering expansion or new construction**

Good Prospect Pellet Fuel Sites

- **Access to bulk delivery of pellet fuel within 200 miles**
- **Heating fuel bills, 2,500 – 25,000 gallons of fuel oil**
- **5,000 – 50,000 SF of conditioned space**
- **Space available for boiler and pellet storage on site**
- **Have at least one hot water boiler that is in good repair**
- **Staff available for cleaning several times per week**
- **Incremental equipment costs can be $15,000 - $100,000 +**

Wood pellet heating system

Space heating and domestic hot water supply with pellets

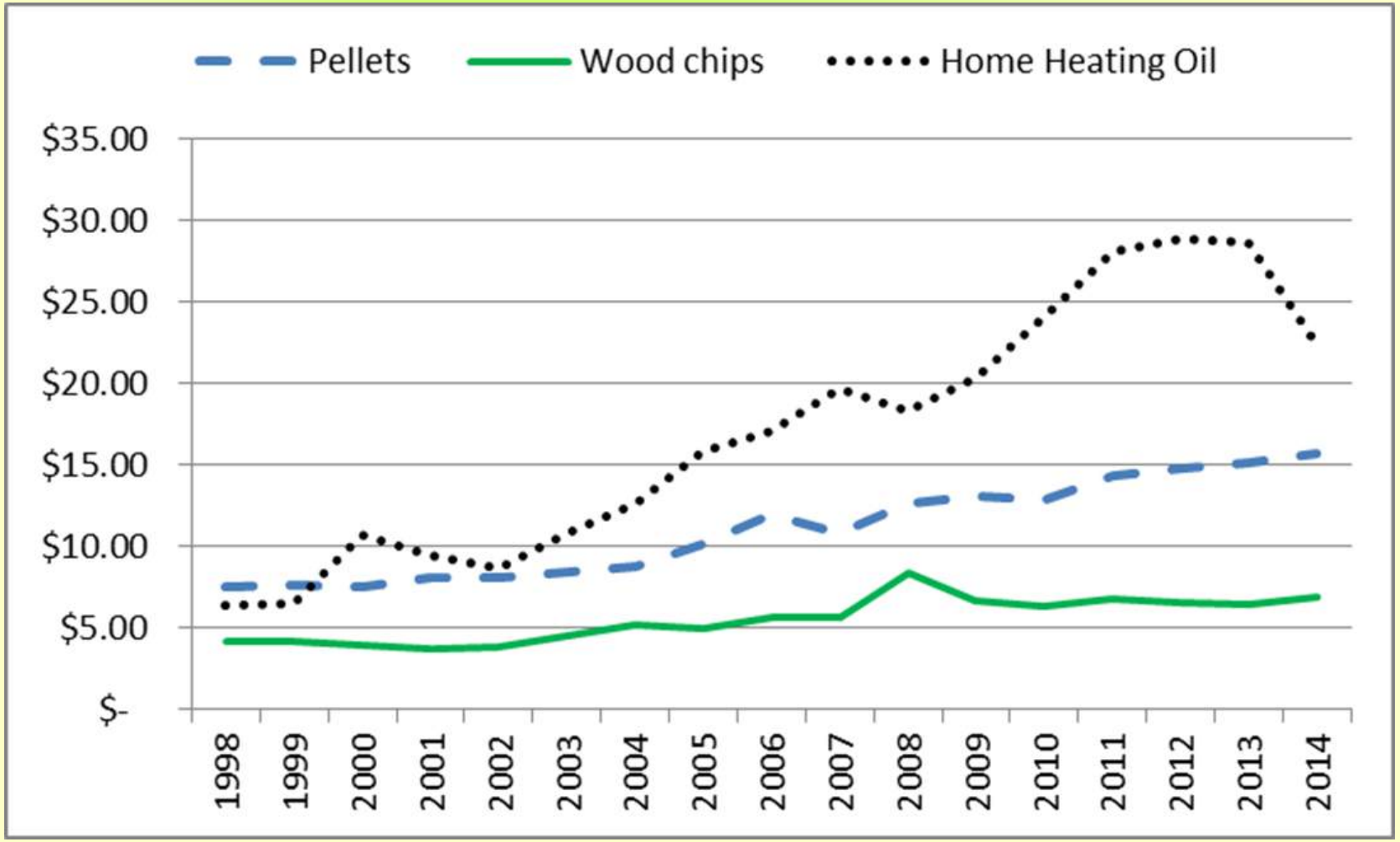


1. Once or twice a year the pellets are delivered by a silo tanker. A loaded storage room of 4.5 m² is enough to keep a single-family house warm for one year.
2. The pellets are carried from the storage room to the boiler by a fully automatic pellet feed.
3. After the burning process all that's left is ash – with a weight of only 0.5 per cent of the original pellet. The ash can be disposed of with the domestic waste.
4. If the pellet boiler is interconnected with a buffer storage, emissions can be reduced and efficiency increased.

www.unendlich-viel-energie.de

Analyzing the Economics

Fuel Prices


Pellets
Wood chips
Home Heating Oil
$35.00
$30.00
$25.00
$20.00
$15.00
$10.00
$5.00
$-
1998
1999
2000
2001
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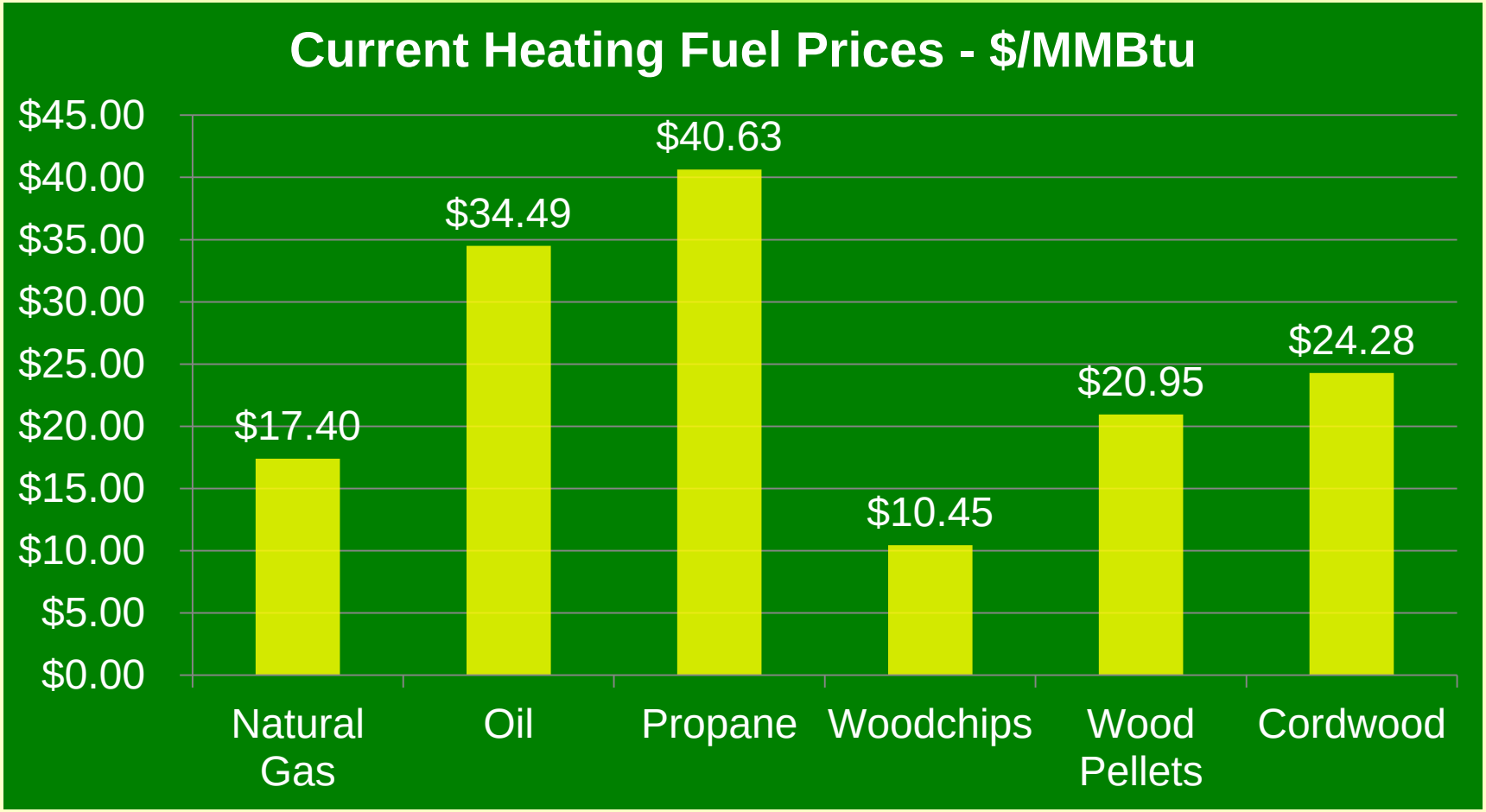
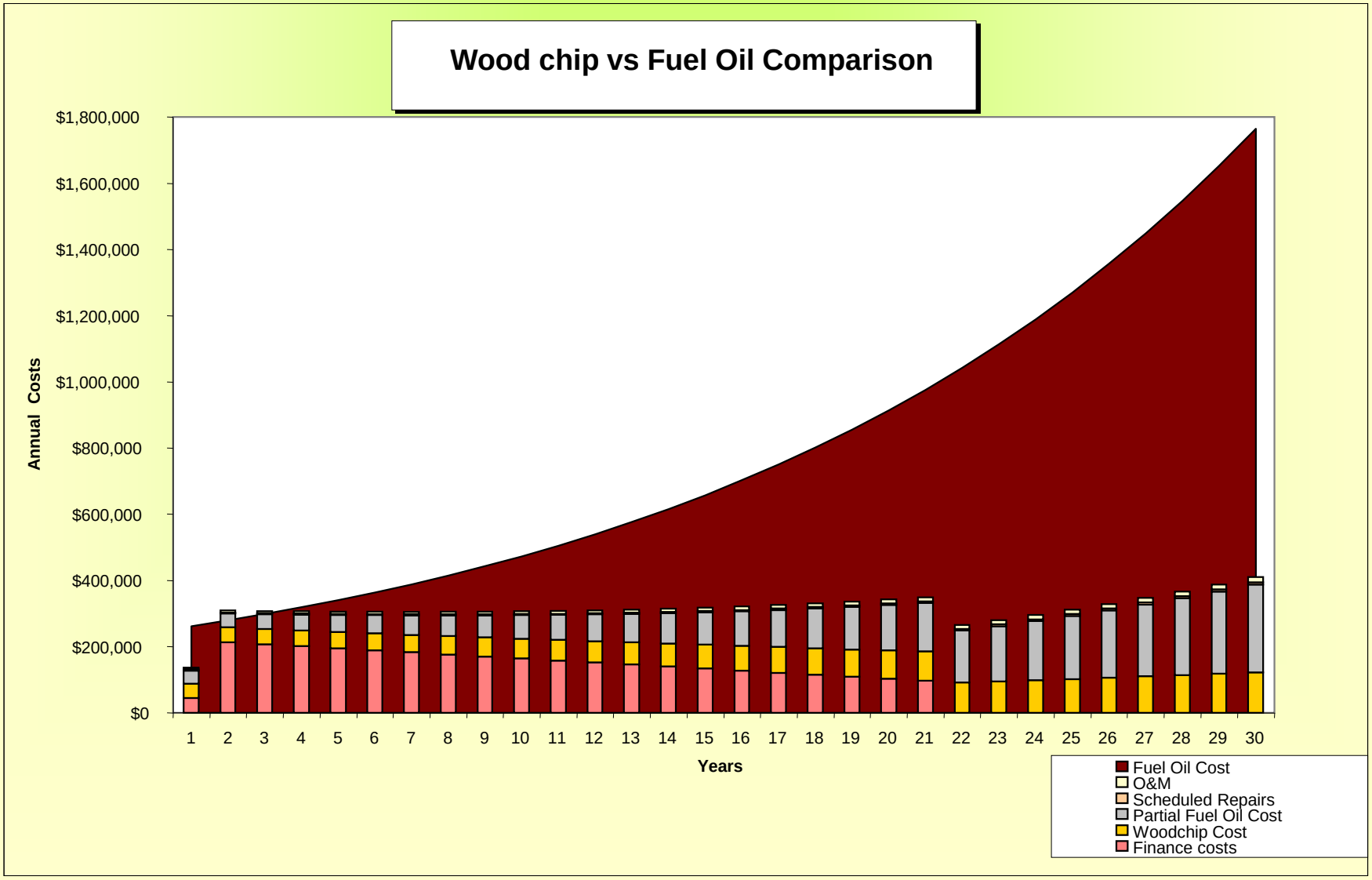
2013
2014

Wood Systems: The Money Side



Costs are net of retail cost, energy content and equipment efficiency

Typical Impact on budget




WE NEED
YOU!

Questions?

CONTACT INFORMATION

Jeff Forward
Forward Thinking Consultants, LLC
2899 Hinesburg Rd
Richmond, VT 05477
(802) 434-3770
forward@gmavt.net