

NAEMI Biomass Training Workshop

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Residential Wood Heating Economics



What's the Competition?

Natural Gas?

Propane?

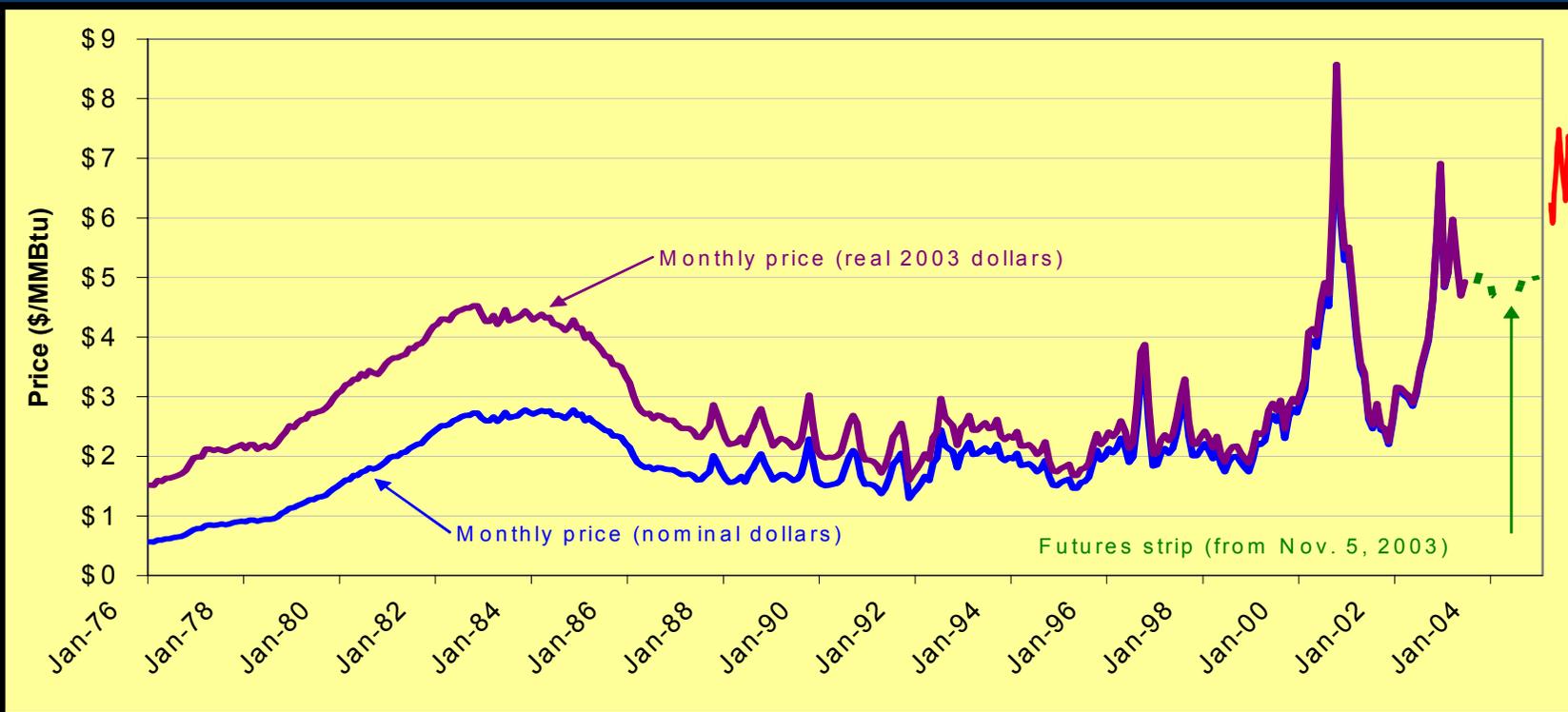
Heating Oil?

Electricity?

After a decade of low prices, natural gas prices are now more volatile at a higher level.

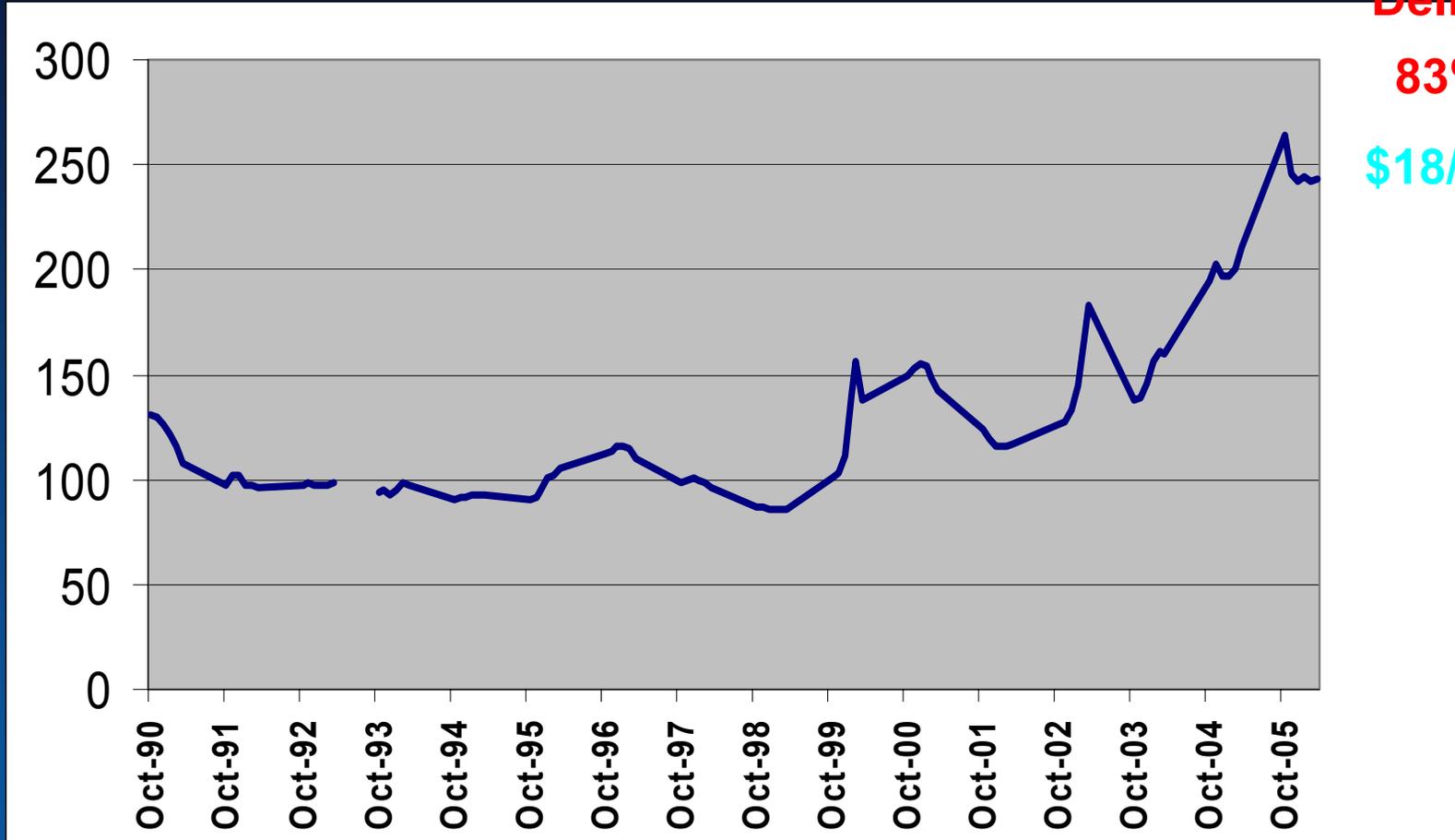
~\$15
MMBTU
Henry
Hub

~\$8
MMBTU



Residential Heating Oil Prices

¢/gal



\$21.68/MBTU

Delivered

83% η ↑

\$18/MBTU

Source: EIA

Residential Propane Prices

\$/gal

250

200

150

100

50

0

Oct-90

Oct-91

Oct-92

Oct-93

Oct-94

Oct-95

Oct-96

Oct-97

Oct-98

Oct-99

Oct-00

Oct-01

Oct-02

Oct-03

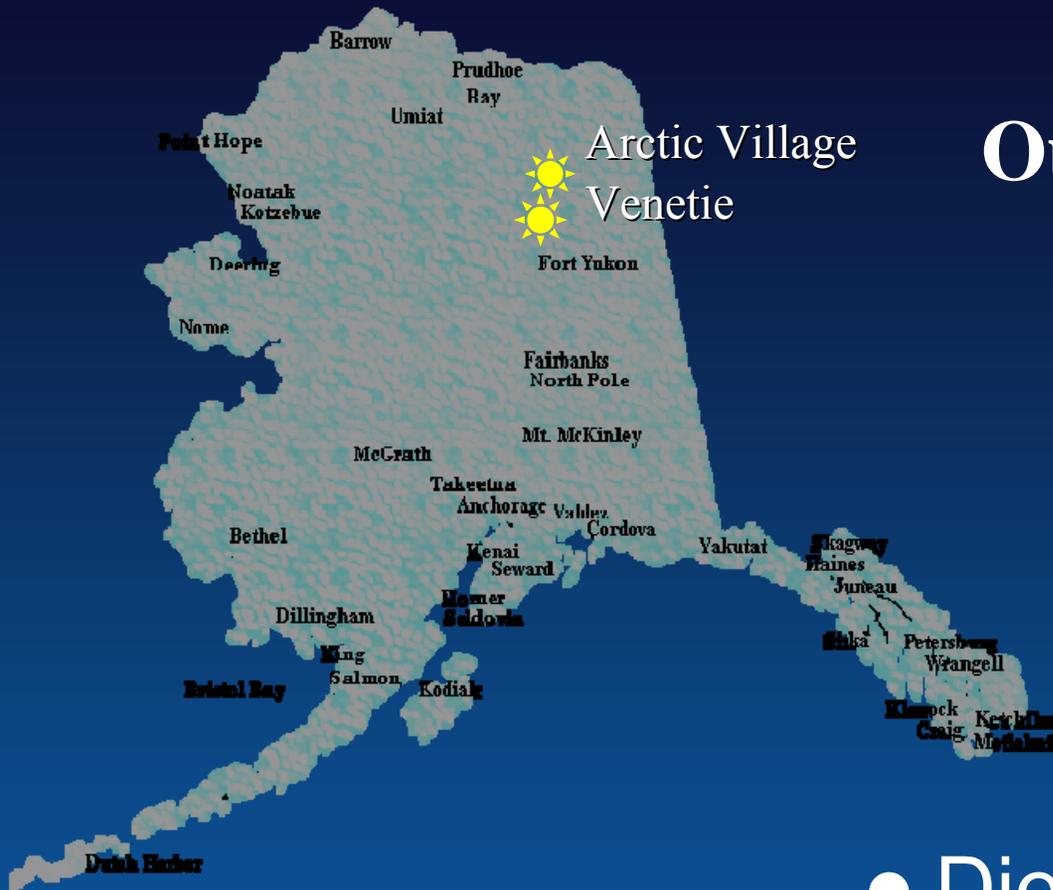
Oct-04

Oct-05

**\$35.20/MBTU
Delivered**
79% η ↑

\$27.80/MBTU

Source: EIA



Our village electricity depends on diesel



- Diesel fuel is not: **\$4.75 per gal** ~~that was last week,~~ today it's **\$5.75**

\$41.42/MBTU in the Tank Farm



We face high energy costs:

- \$0.51 per kWh electricity
- \$6.75 per gallon gasoline
- \$5.75 per gallon heating fuel
- \$130 per 100 lb propane

\$/MBTU

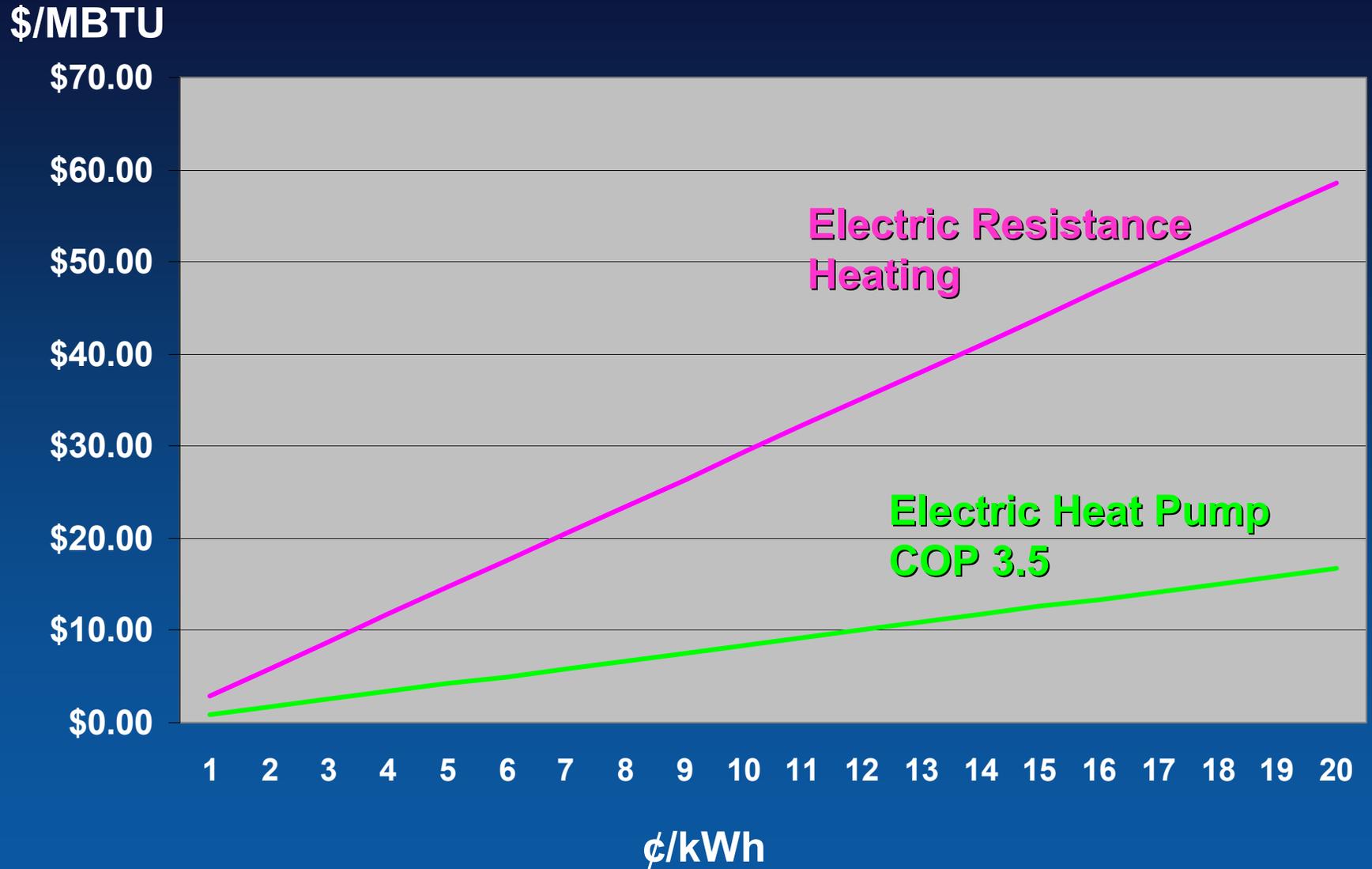
\$149

\$52.70

\$46.30

\$60.30

Electric Heating



Wood Stove Heating



Seasoned firewood (20% moisture) @ \$200/cord (~\$100/ton)

~20 MBTU/cord in a high efficiency wood stove @ 77% efficiency

= \$13/MBTU delivered to home

Commercial-Scale Wood Heating



Green wood chips (50% moisture) @ \$40/ton

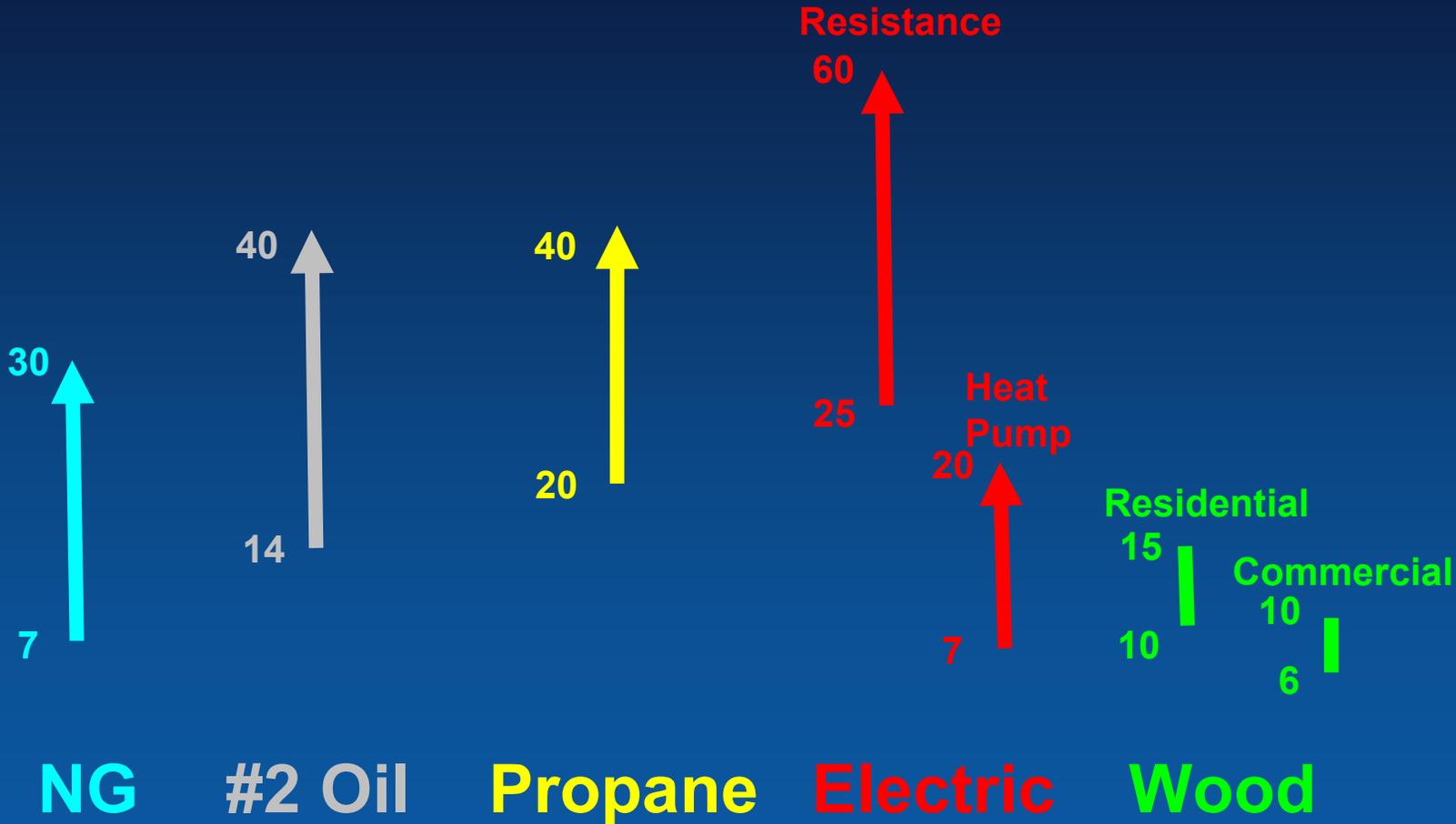
~8.6 MBTU/ton in a high efficiency wood boiler @ 67% efficiency

= \$7.00/MBTU delivered to building

Heating Option Price Comparison

\$/MBTU

50
40
30
20
10
0



Summary

Uncertainty in future commodity fuel prices is huge

Appliance efficiency is very important

Wood is THE potentially low cost alternative, if

- **A reliable (large), sustainable (managed), timber resource is available,**
- **Cost-effective harvesting and a reliable community-based delivery system is developed, and**
- **A financing system can be established to assist in appliance conversion.**