

Montpelier's Energy Future

Gwendolyn Hallsmith
Global Community
Initiatives

Energy and CO2 Data

Electricity

- In 2004, we estimated that residents use 31.1 million KWH per year of electricity, representing 12,158 tons of CO2
- Businesses used an additional 16.5 million KWH, representing 6,410 tons of CO2
- Local Government used 3.5 million KWH

Current Energy and CO2

Heating Fuel

- 2004: Residential light fuel oil 289,937 MMBtus, representing 23,988 tons CO2
- Natural gas: 5,376 MMBtu, 332 tons CO2
- Wood: 15,118 MMBtu, 132 tons CO2

Current Energy and CO2

Transportation

- Diesel: 37,756 MMBtu, 3,275 tons CO2
- Gasoline: 381,285 MMBtu, 32,623 tons CO2

Waste (food, paper, wood)

- 3,654 tons CO2

Energy Goal

- Energy efficiency in Montpelier is maximized. Montpelier's energy is generated by renewable resources of local origin. The delivery of energy is structured to encourage efficient use and affordability.

Energy Targets and Indicators

- By 2013, Montpelier achieves a 50,000 ton annual reduction in greenhouse gas emissions, the equivalent of \$15 million of fuel oil annually and with an investment in the local economy of approximately \$100 million.

Have we met the target? No.

But it's not for lack of effort.

- District Energy Plant
- Vermontivate
- Energy Challenge
- Net Zero State Capital

Energy Targets and Indicators

- By 2030, Montpelier achieves a city-wide 80% reduction in greenhouse gas emissions and fossil fuel use.
- By 2040, the use of low-impact renewable energy increases by 30 percent as a percentage of total energy use.

Energy Targets and Indicators

- By 2040, all new and retro-fitted developments, buildings, vehicles, and equipment are built to be within five percent of the highest energy-efficient design available out of all economically competitive products, as measured on a life cycle basis.

Energy Targets and Indicators

- By 2015, 1,000 Montpelier homes will be weatherized and switch to a carbon neutral fuel source.

Carbon neutral refers to achieving net zero carbon emissions by balancing a measured amount of carbon released with an equivalent amount sequestered or offset.

District Energy in Montpelier



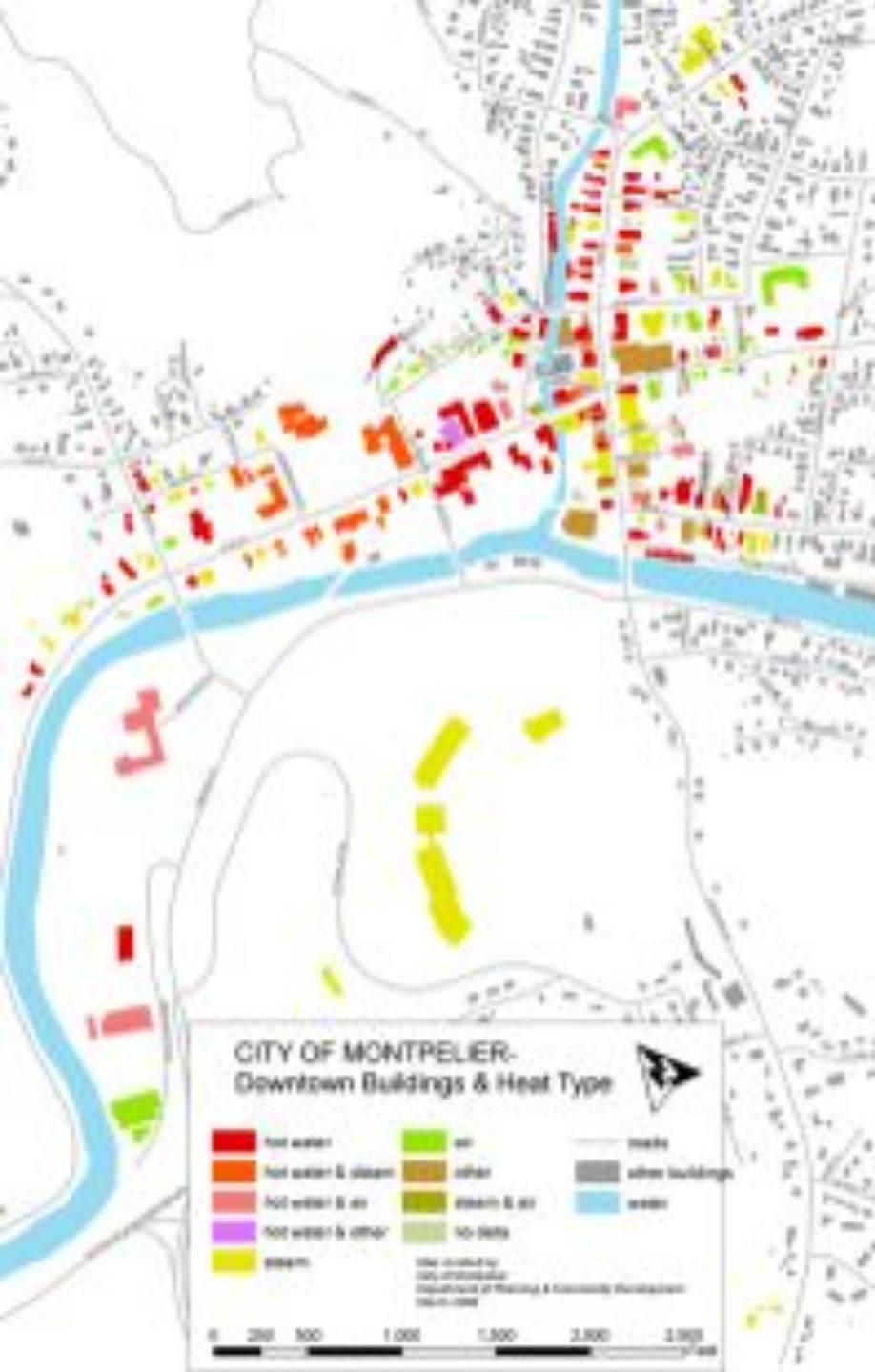
State Heating Plant



District Energy

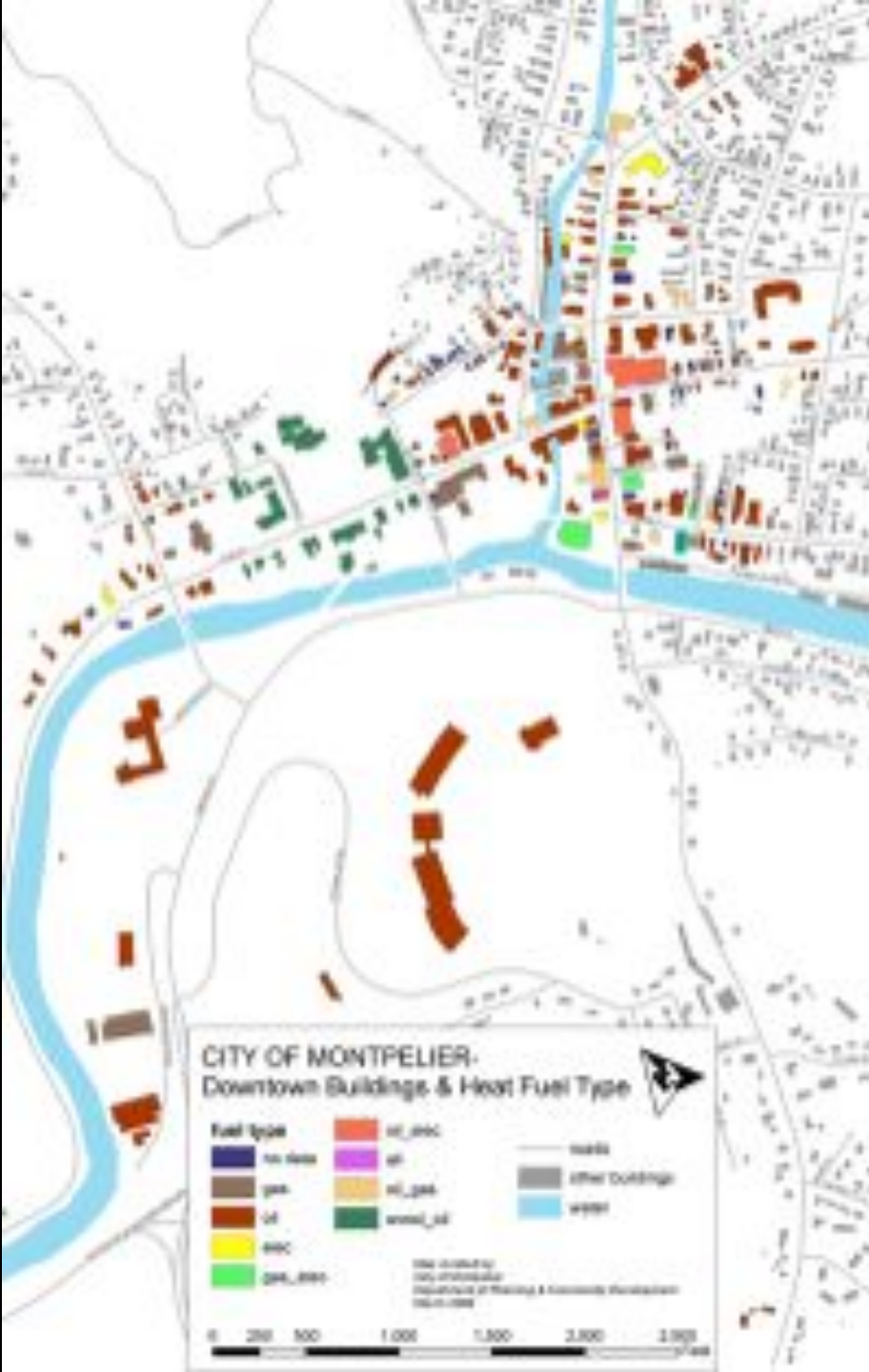
Heating system type

- Hot water
- Hot water & steam
- Hot water & air
- Hot water & other
- Steam
- Air



District Energy

- Building Fuel Type:
 - Gas
 - Oil
 - Electric
 - Gas/Electric
 - Oil/Electric
 - All
 - Oil/Gas
 - Wood/Oil



District Heat --

The Pipe







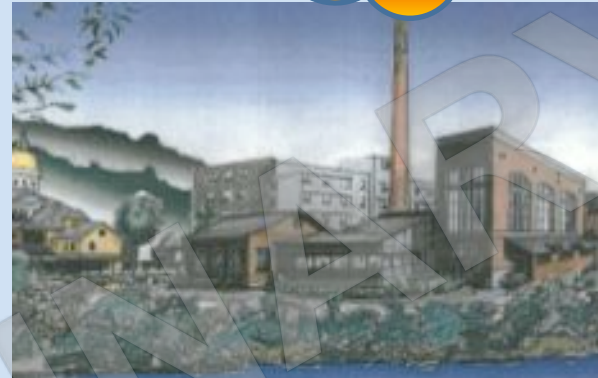
District Heat --
'Phase 1'
Air
Emissions

~80 Tons
NO_x, SO₂,
PM, CO,
HAPs



~73 Tons
NO_x, SO₂,
PM, CO,
HAPs

- 7 Tons



4 Tons
NO_x, SO₂, PM,
CO, HAPs

~~4 Tons
NO_x, SO₂, PM,
CO, HAPs~~

- 4 Tons

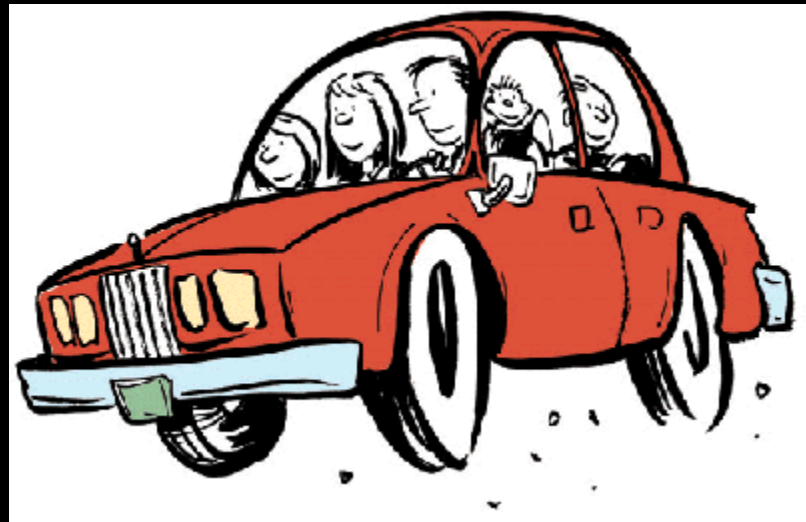
Total Emissions Reduction 11 Tons

PACE District

- \$3 million fund for renewables and energy efficiency measures outside of the area served by the plant
- Half for efficiency – 100 properties with approximately 20% savings
- Half for renewables – 50 renewable facilities displacing 25% of energy demand

Smart Jitneys

- Real time car pooling
- Cell phone enabled ride share



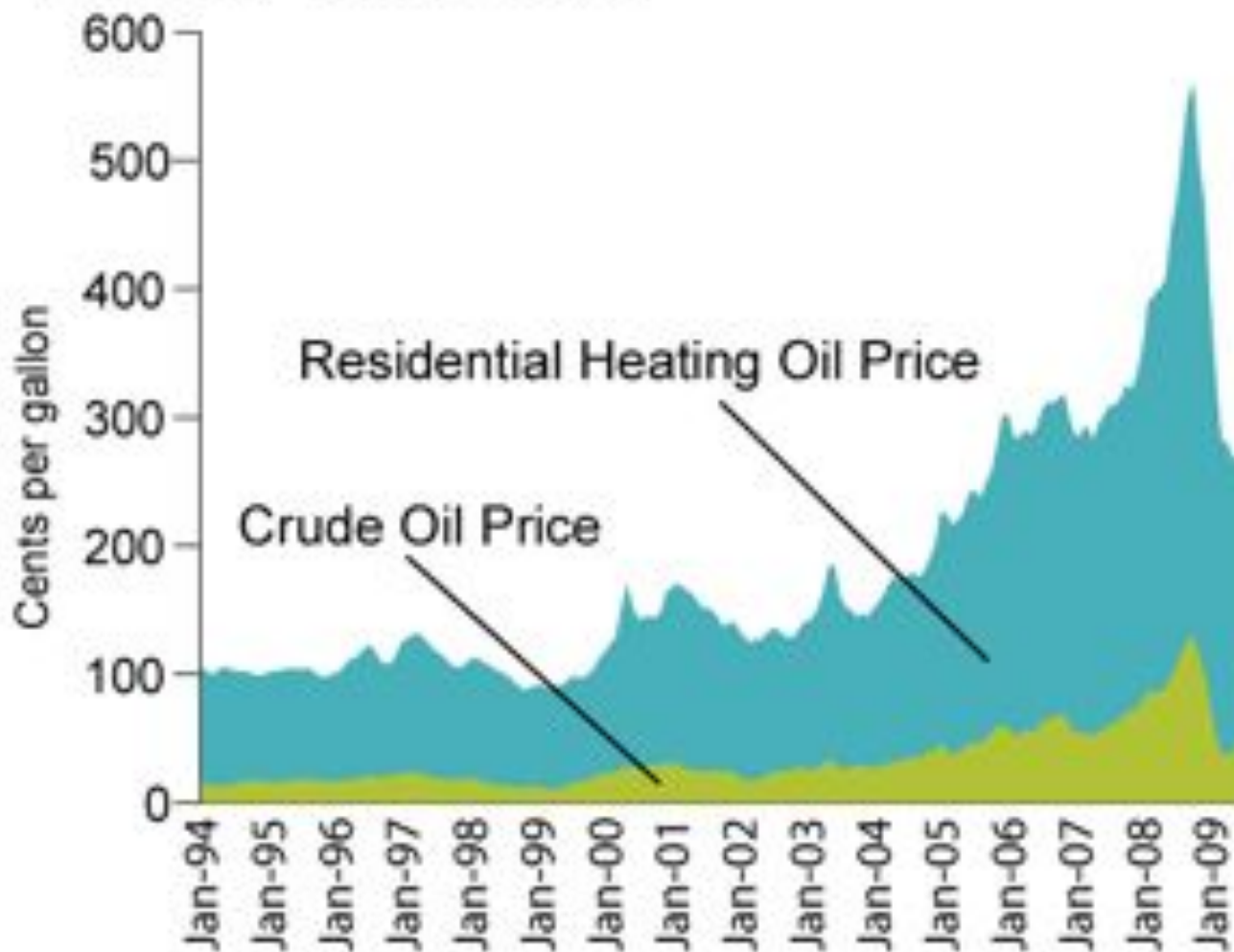
Electric Car Parking



Future Cost of Fuel Oil



Heating Oil Prices Follow Crude Oil Prices, 1994-2009

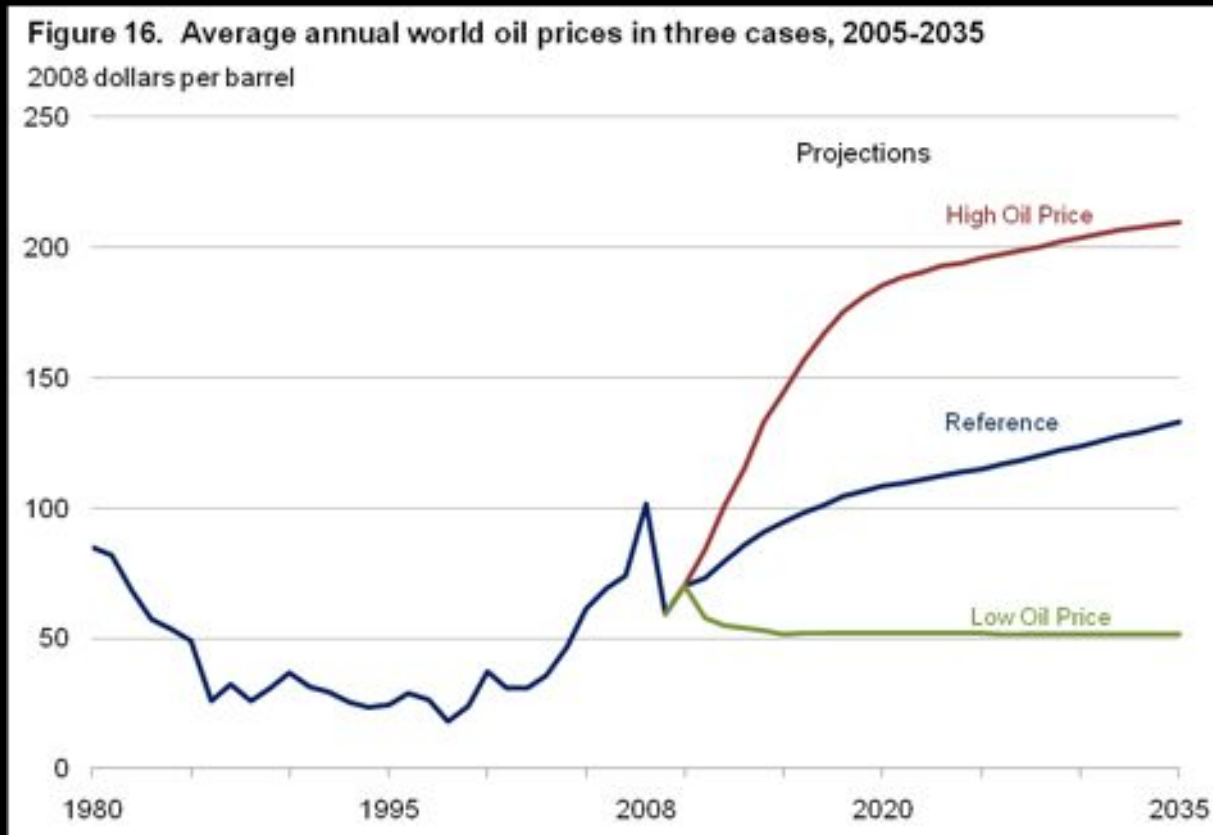


Source: Energy Information Administration, *Petroleum Marketing Monthly* (January 1995 to present).

West Texas Intermediate (WTI)

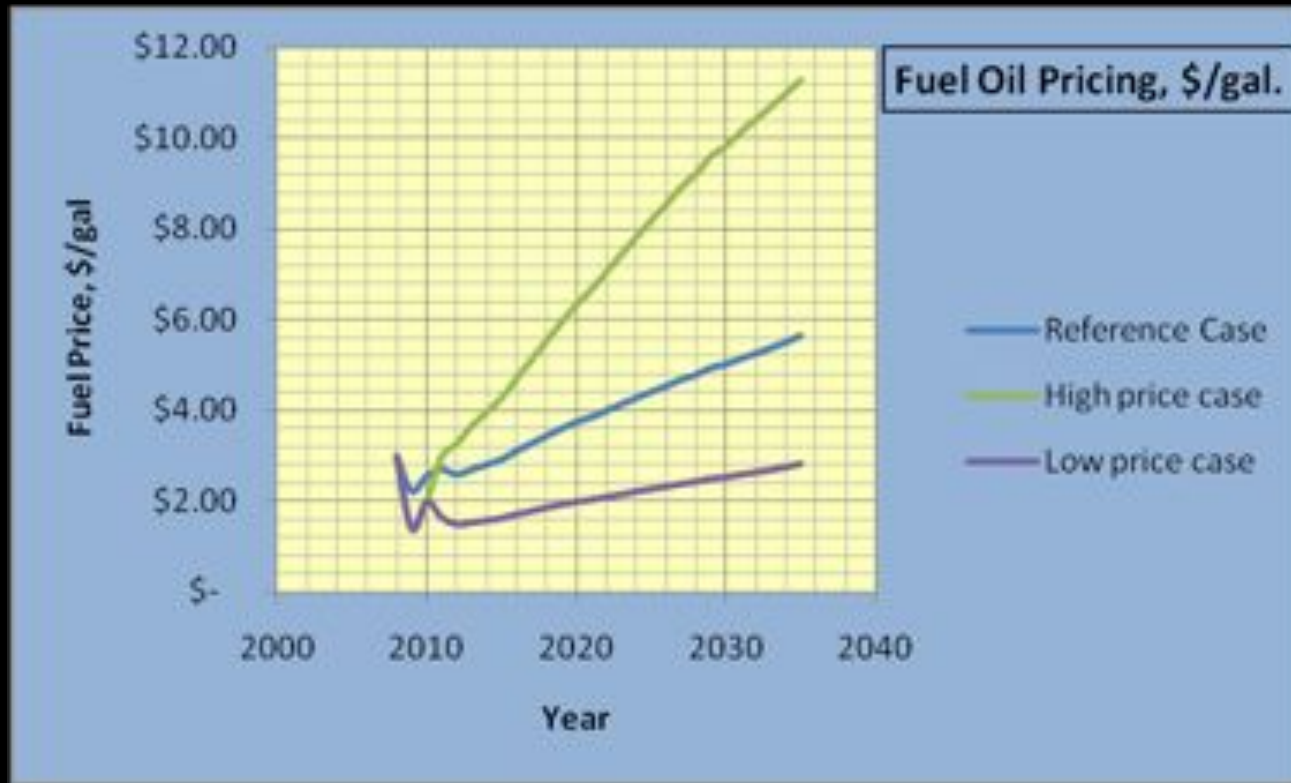


EIA Produces Annual Energy Outlook; AEO 2011

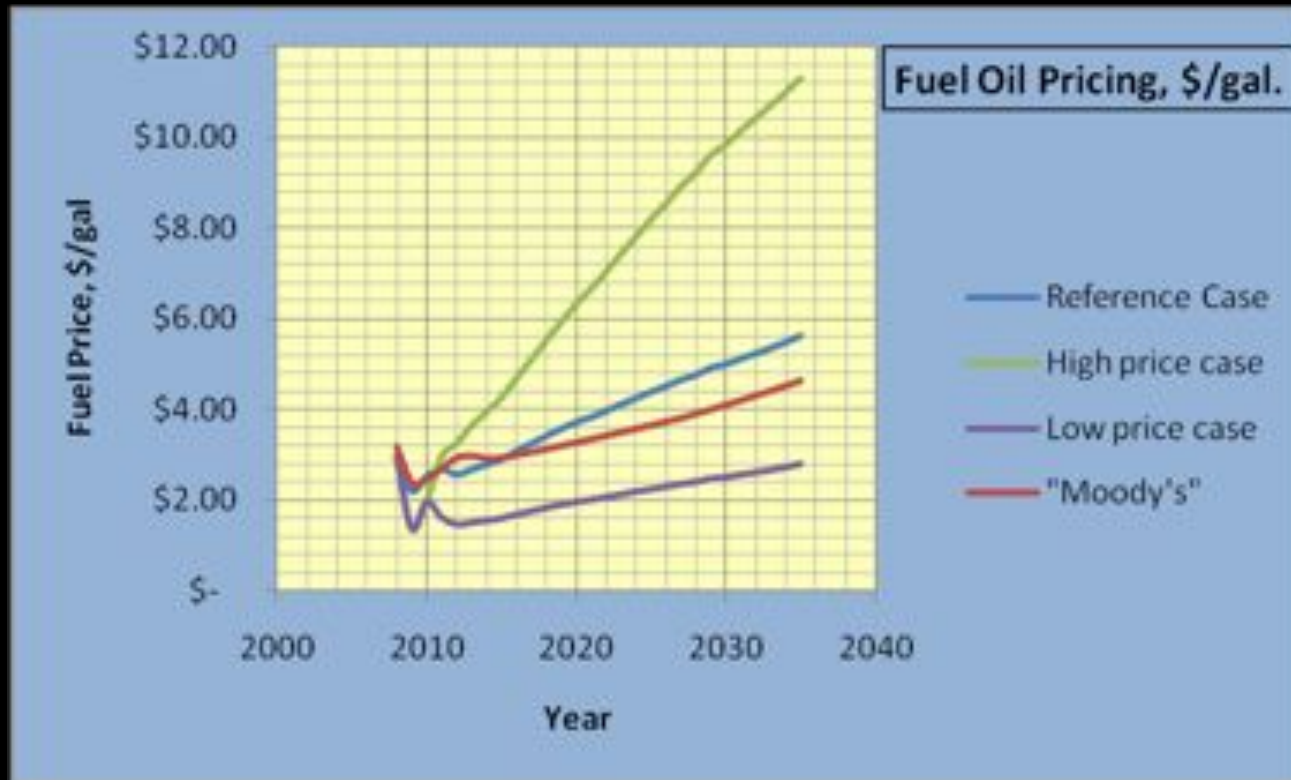


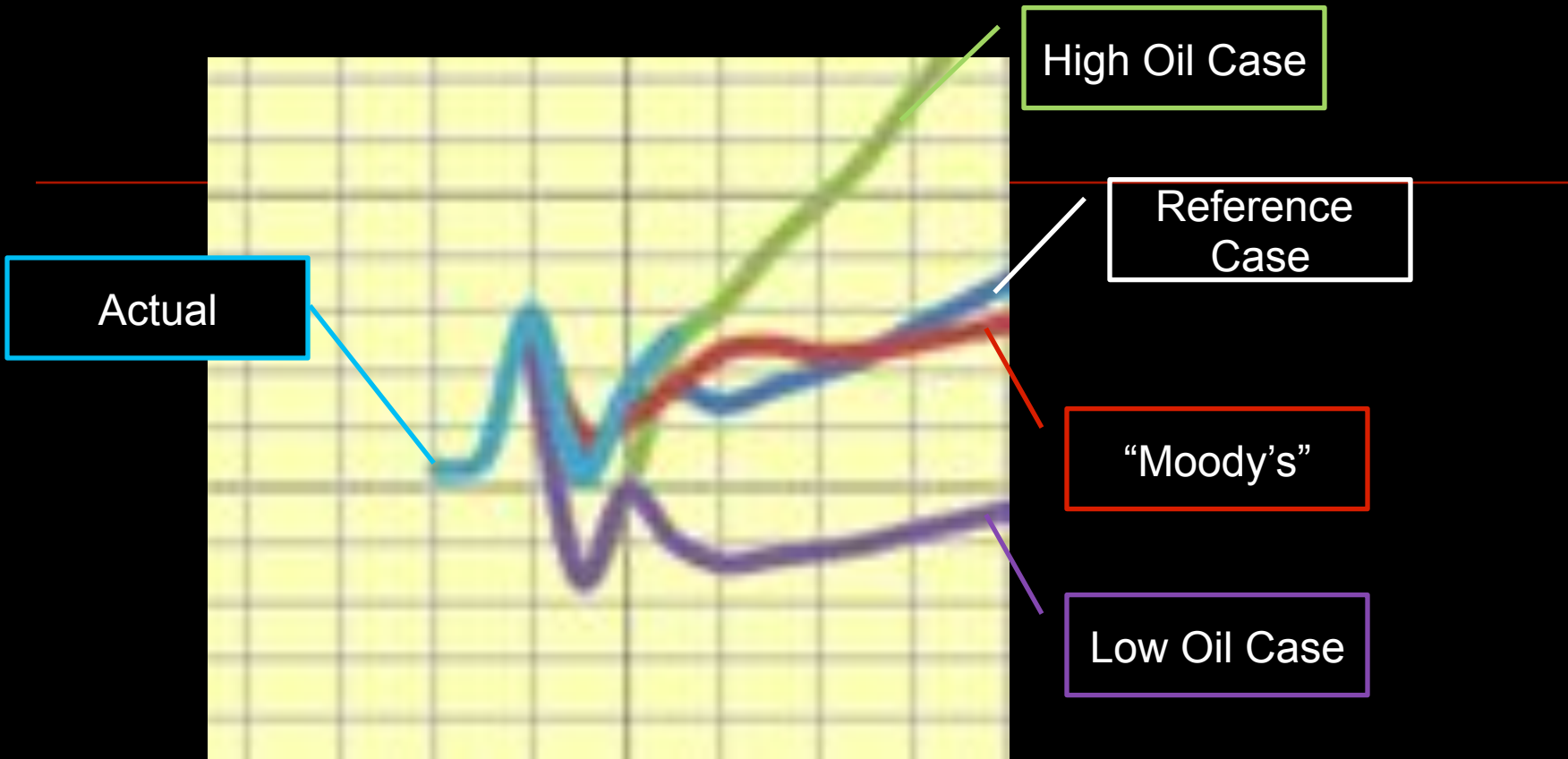
What does this mean to the case at hand?

We can translate the AEO forecasts of Crude oil to refined product, and present it as the three cases



Can overlay the fuel price forecast using in analysis of District Heat Project

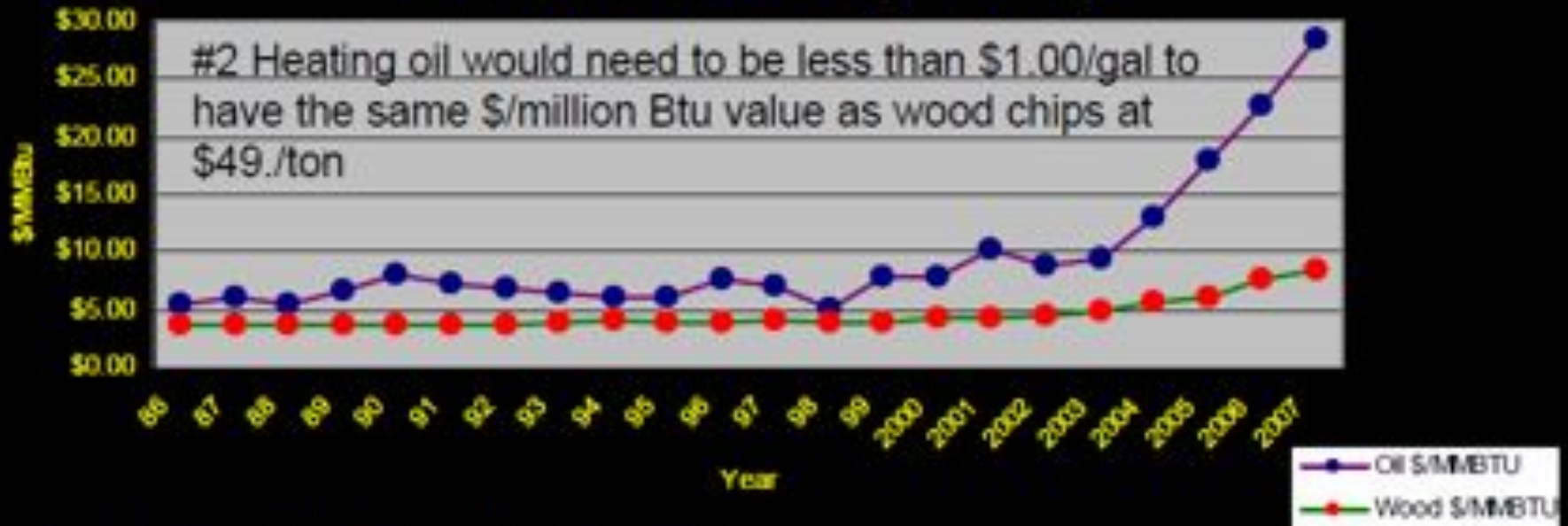




A closer look.

The Wood Fuel Situation in Vermont

Vermont Wood and Oil Energy Price History



Schools paid an average of:

- 2003-04: Wood \$32/green ton. #2 oil \$1.01/gal.
- 2004-05: Wood \$36/green ton. #2 oil \$1.40/gal.
- 2005-06: Wood \$40/green ton #2 oil \$1.96/gal.
- 2006-07: Wood \$44/green ton. #2 oil \$2.31/gal.
- 2007-08: Wood \$49/green ton. #2 oil \$2.94/gal.





The End

