

UNIVERSITY OF MINNESOTA

EXTENSION

Heating Saint Paul with Wood

Michael Burns & Jeff Guillemette, Ever-Green Energy

Fueling the Future:

The Role of Woody and Agriculture Biomass for Energy Workshop

March 19, 2009

Morris

Sponsored by:

University of Minnesota Extension, WesMin RC&D; Minnesota Department of
Natural Resources

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Vice President, Production Operations

and

Jeff Guillemette

Supervisor, Biomass Fuel Procurement



EVER-GREEN ENERGY™

Saint Paul's community energy system

Based on:

- Locally-derived renewable fuels
- Combined heat and power



Saint Paul's community energy system

Most energy from urban wood residuals:

- 1000 tons per day
- Created a new industry for collecting and processing wood waste into fuel
 - More than \$10 million into local economy from wood operations
 - Even more indirect benefits

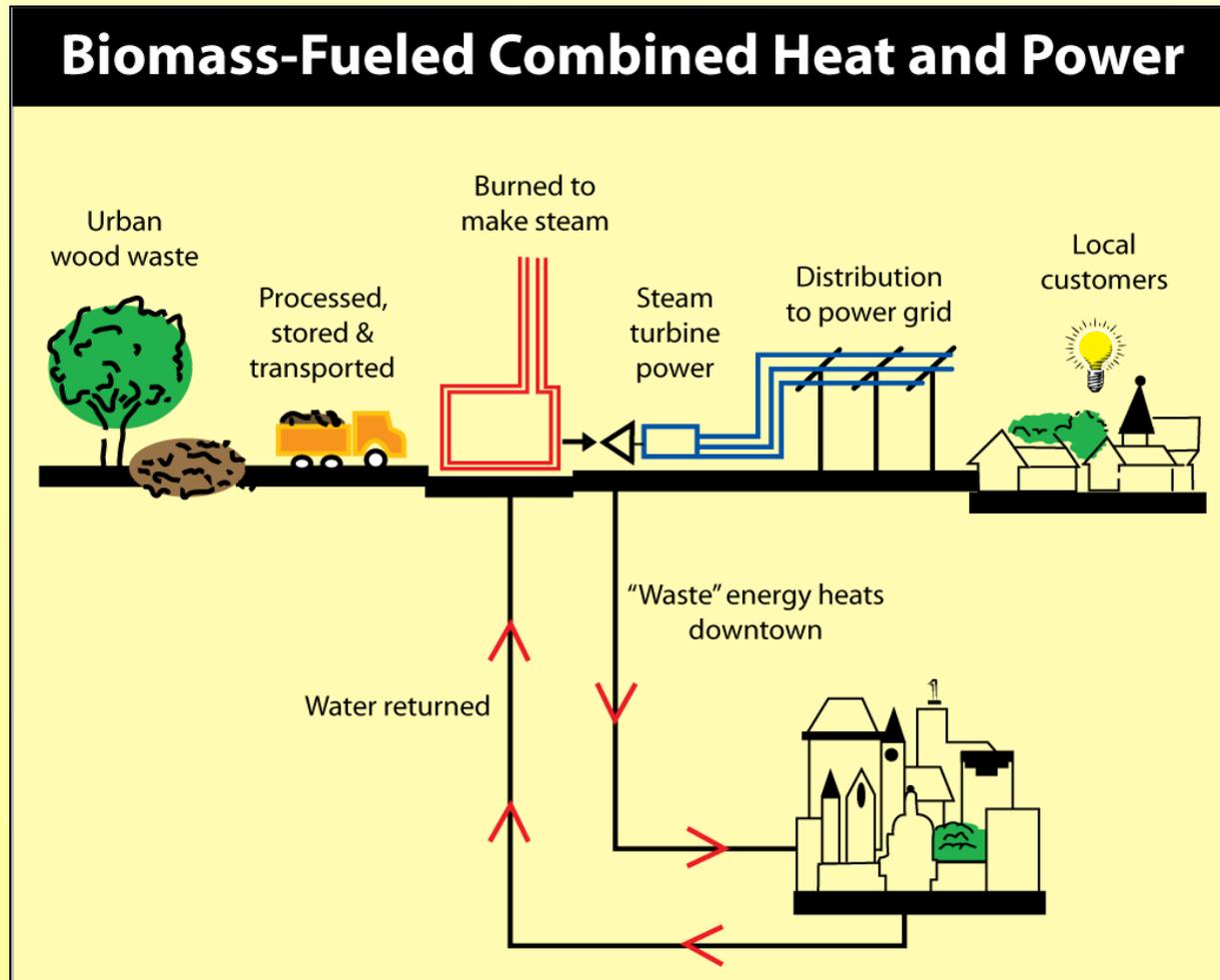


St Paul's community energy system

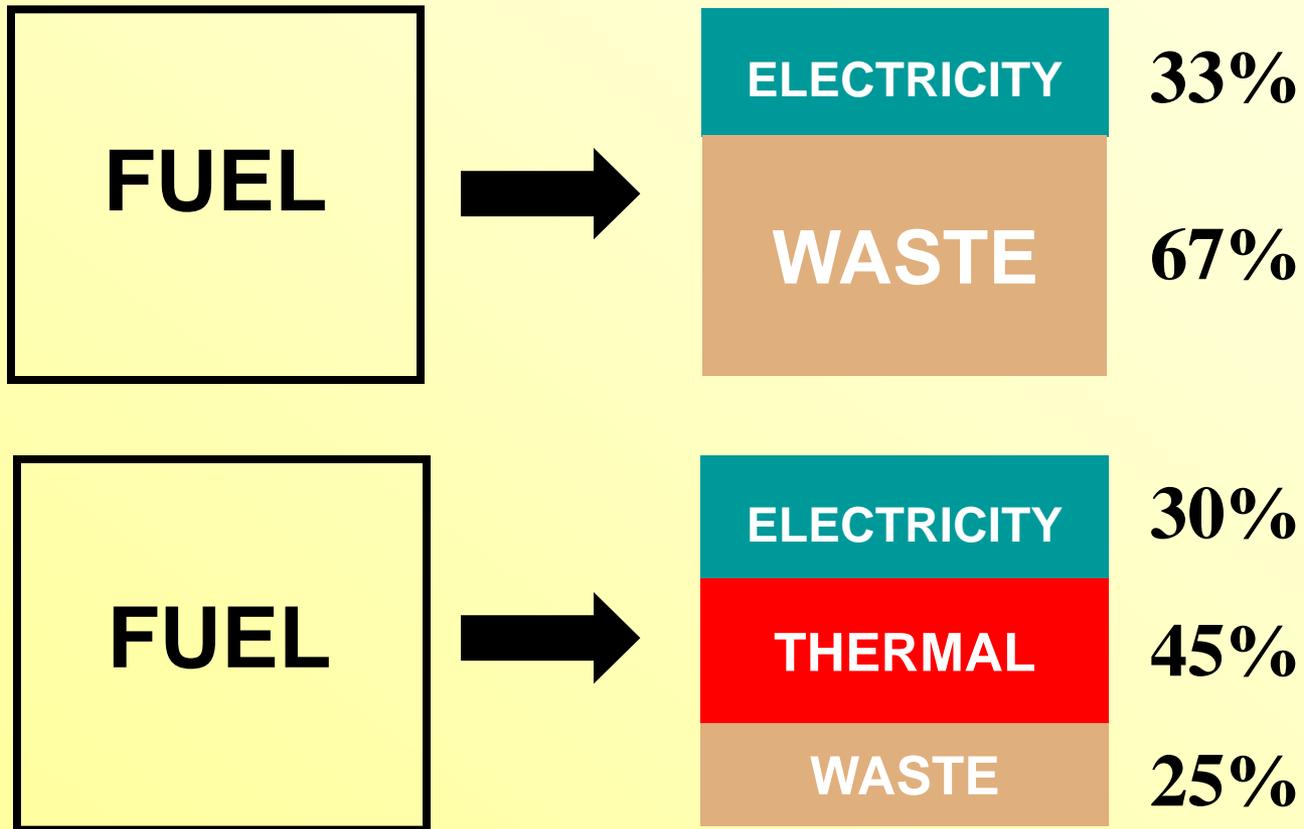
- Heats 80% of downtown Saint Paul's buildings
- 25 MW of electricity; 65 MW thermal energy
- Primary fuel is renewable, clean, urban wood and forest residuals
- Combined heat and power - double the efficiency of conventional electricity-only power plants
- CO₂ reduced by 280,000 tons per year



What is combined heat & power?

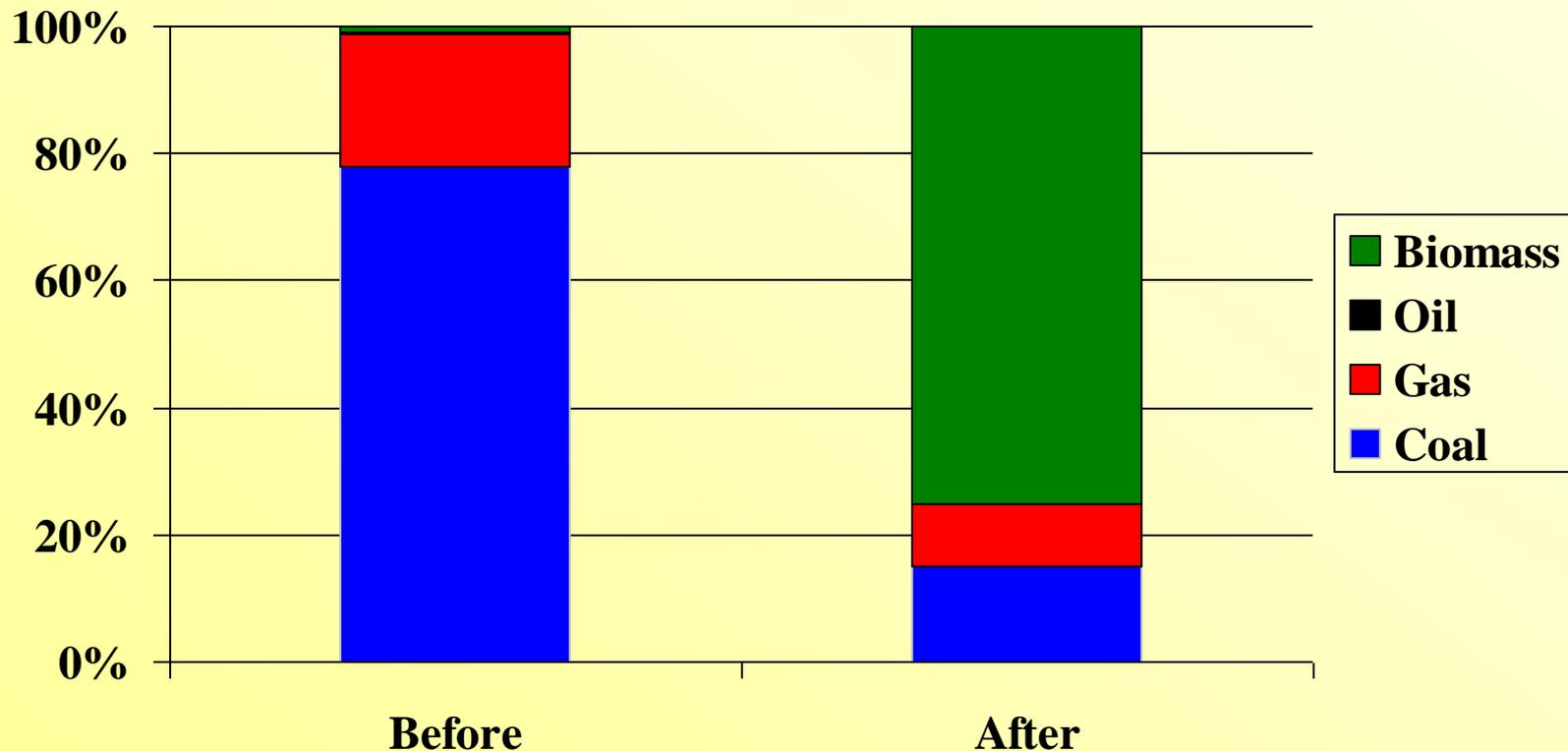


Energy efficiency of CHP



Fuel diversification (2009)

Before and after wood-fired CHP project...



Where does the wood come from?

Tree Waste:

- Municipal parks and forestry operations
- DNR projects
- Land clearers
- Tree removal contractors
- Storm damage
- Diseased trees
- Forest residuals



Fuel Characteristics

- Primarily tree residuals; some clean pallet or construction wood
- High fuel quality standards driven by site logistics and permitted fuel
- All fuel is procured and processed by our affiliate, Environmental Wood Supply



Fuel Statistics

- 280,000 tons per year consumed
- Sized to less than 4 inches
- Typical mixture includes mulch and chips to improve handling
- 25 to 50 percent moisture; long-term average is 35 percent



Thank You!



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