

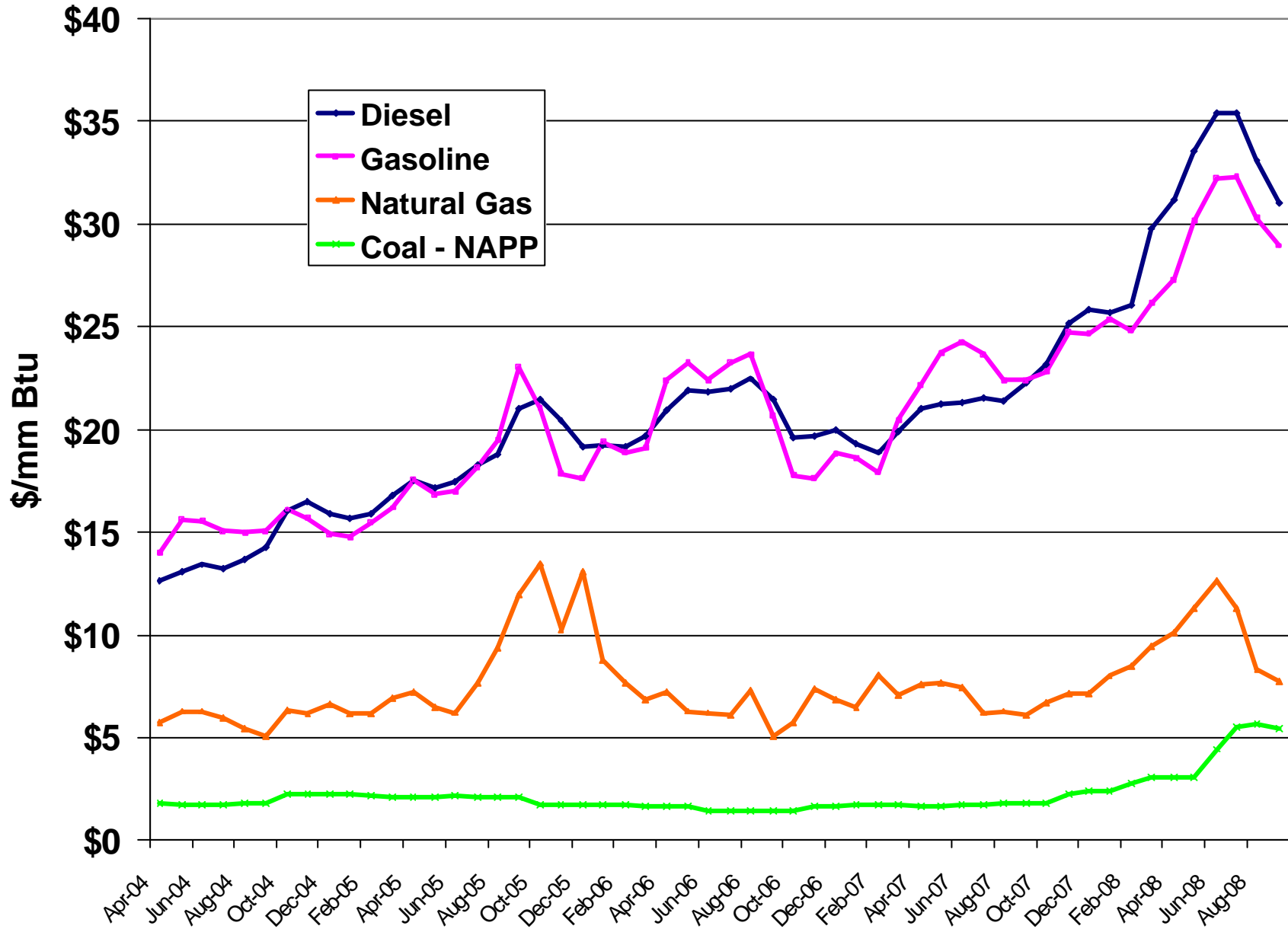
Energy from Biomass & Waste

Finance & Investment Forum
Pittsburgh, PA
October 15, 2008

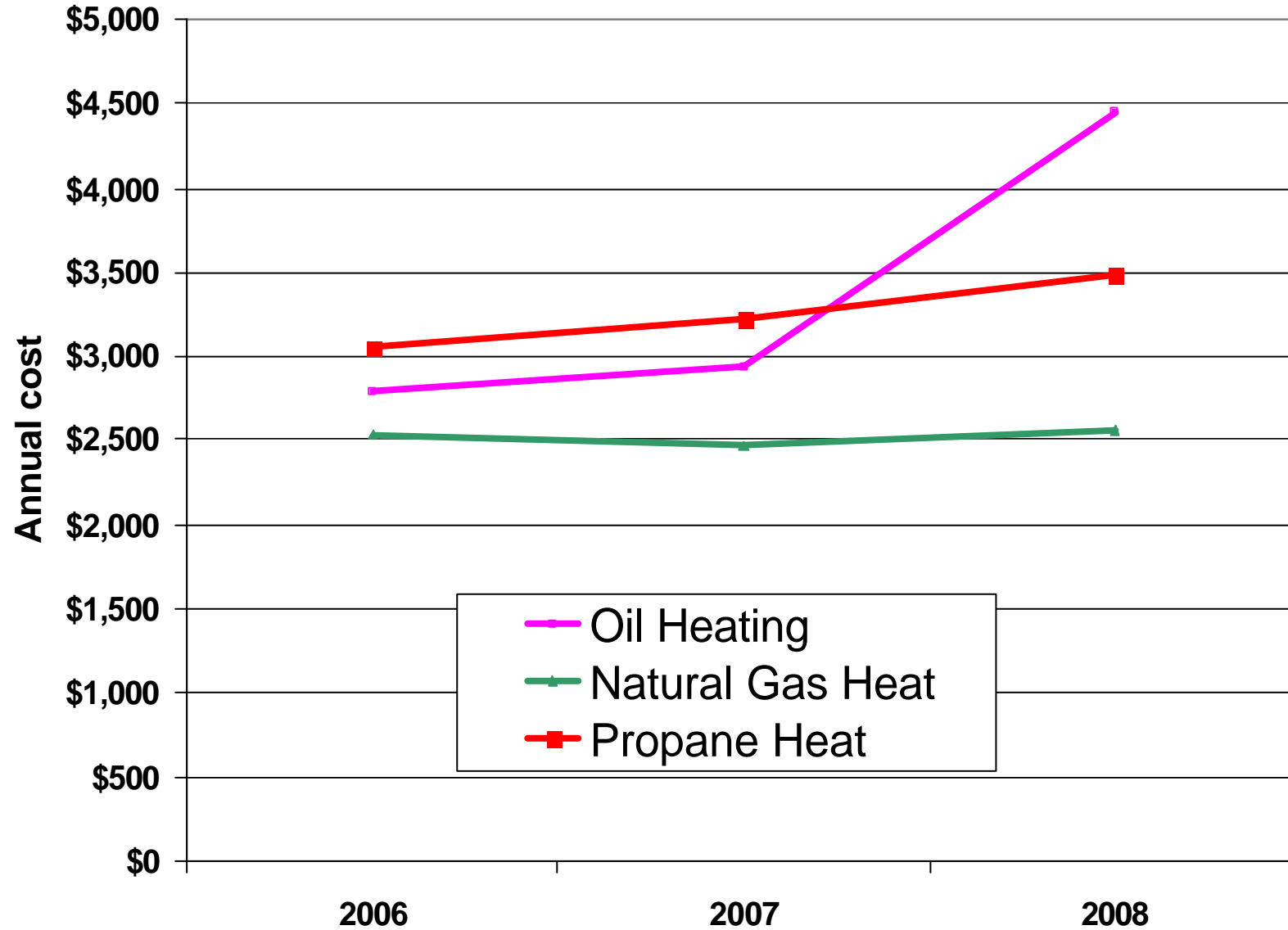
Dan Griffiths, Deputy Secretary
Pennsylvania Department of Environmental Protection

Fuel Prices - \$ per Million Btu

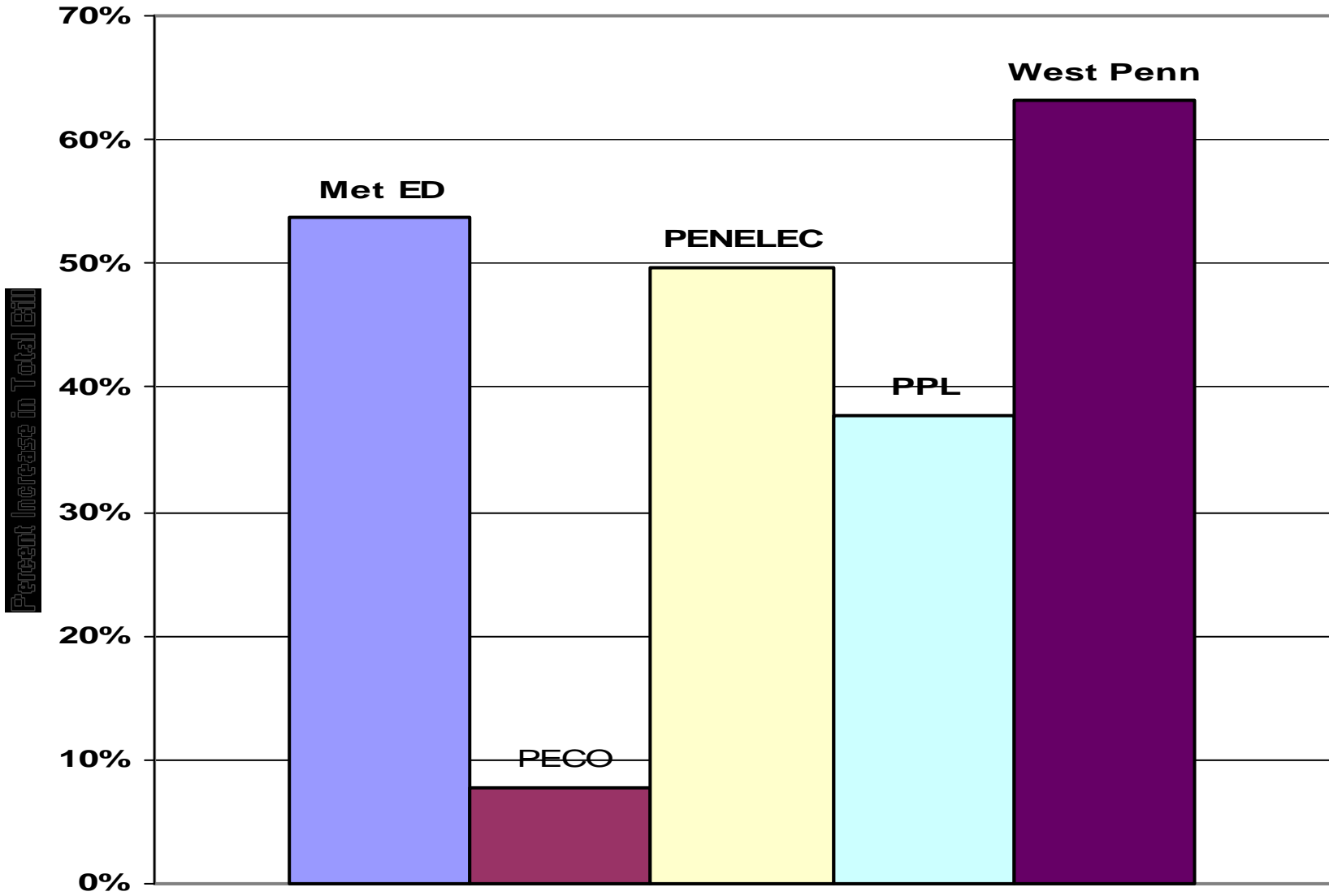
April 2004 - September 2008



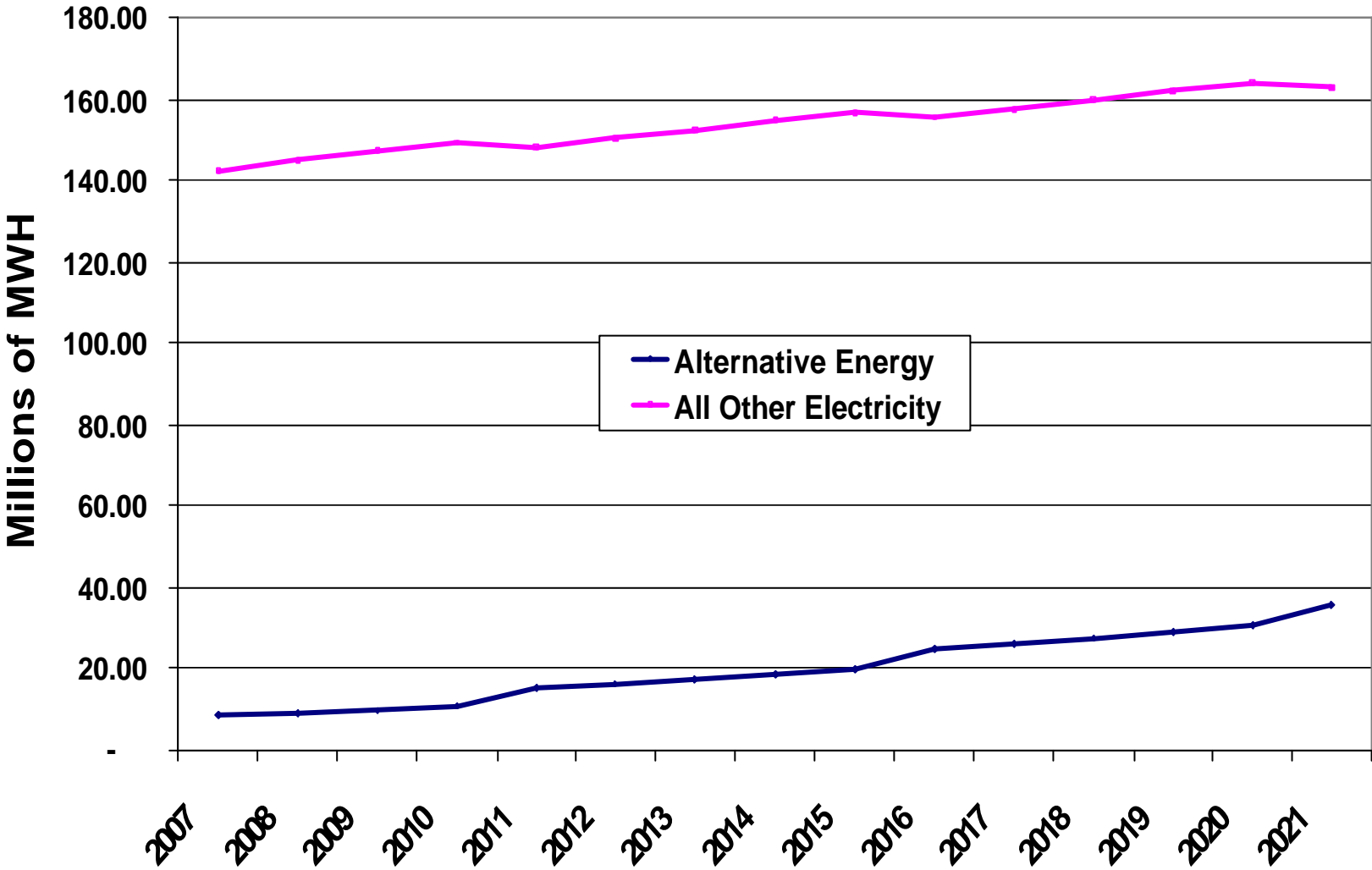
Home Energy Costs in Pennsylvania



Electricity Bill Increases After Rate Caps



Projected Electricity Sources for Pennsylvania



Critical Trends

- The cost of all energy sources will continue to push upward – on average.
- Prices of most fuels, including coal, are now driven by international markets that we cannot control.
- The prices of key renewables are coming down relative to existing sources.
- Other alternatives including MSW look attractive.
- Conservation and energy efficiency are key.
- Overall, renewables and conservation fall short of addressing future energy needs.

PA Residential Energy Conservation Potential

- In single family dwellings over 27 years old, achievement of **30% energy conservation** for **only 1%** of that pool (32,000 homes) can result in:
 - **\$22.5 million/yr** in consumer savings
 - **1.17 trillion BTUs/yr** in energy savings

Guiding Principle

- Energy is tightly bound into economic development.
 - Renewables
 - Energy efficiency
 - Conventional generation with a focus on carbon capture and sequestration
 - Our industrial focus: Axion, SPI, Plextronics, AE Poly, Gamesa, Iberdrola
 - Advanced coal w/ CCS

Achieving Our Goals

- Focus on retention and expansion of jobs.
- Cross-government collaboration.
- Funding where it makes the most sense
 - Retain, expand existing
 - Attract new
- International scope

Energy Independence Strategy

- Cleanest possible power production from existing sources.
- Efficiency in production, transportation and consumption.
- Fuels grown and refined in Pennsylvania.
- Sustainable power sources.

Existing Waste & Biofuels Generation

Fuel	Nameplate Capacity (MW)
MSW*	247.6
LFG	135.5
Wood and wood waste*	30.5

* All constructed prior to 1995.

Obstacles

- MSW is waste
 - The down-side: nobody likes waste
 - The up-side: we have lots and the waste to energy technology is readily available and well understood
- Biofuels and food costs
- Cost of transportation
- Siting...

Energy Investment Opportunities

- \$165 million for alternative energy, fuels and related infrastructure.
- Support for distributed generation.
 - Our portfolio standard.
 - As a strategy to avoid transmission expansion.
- Production incentives for biofuels (biodiesel).

Areas of Interest

- Expanded and new MSW
- CHP – Existing cogeneration projects and a limited number of steam systems that also produce energy
- Crops used for energy production.
 - Huge potential in mine spoil piles.
- Forest products, as a major industry, produces enormous amounts of wood waste

Alternative Energy Potential

- Wind: Currently 323 mw
 - By 12/31/08 – 690 mw
 - If half of sites with good resource are developed – 2,500 mw. That's about 5% of Pennsylvania's consumption.
 - Additional possibilities: community wind, off-shore Lake Erie
- Solar: Where is grid parity?
 - Our target: 850 MW by 2021.
 - Downward trend in delivered energy price vs. upward trend in grid electricity
 - Possible game changers: non-silicon based technologies, CO2 cap and trade

Waste to Energy Potential

- MSW disposed of annually in Pennsylvania.
 - 10 mm tons produced in state
 - 8.2 mm tons imported from NY and NJ
 - 46 active landfills