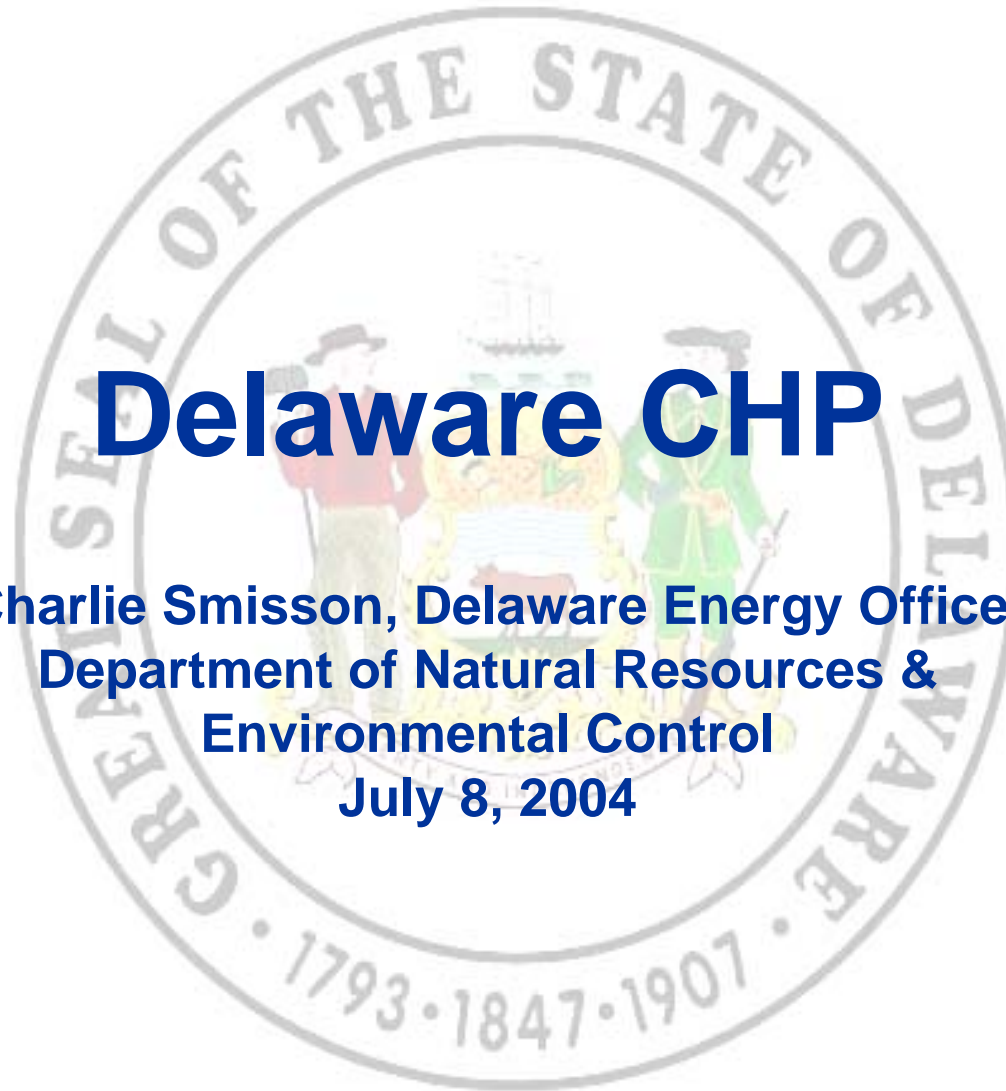




Delaware CHP

**Charlie Smisson, Delaware Energy Office
Department of Natural Resources &
Environmental Control
July 8, 2004**

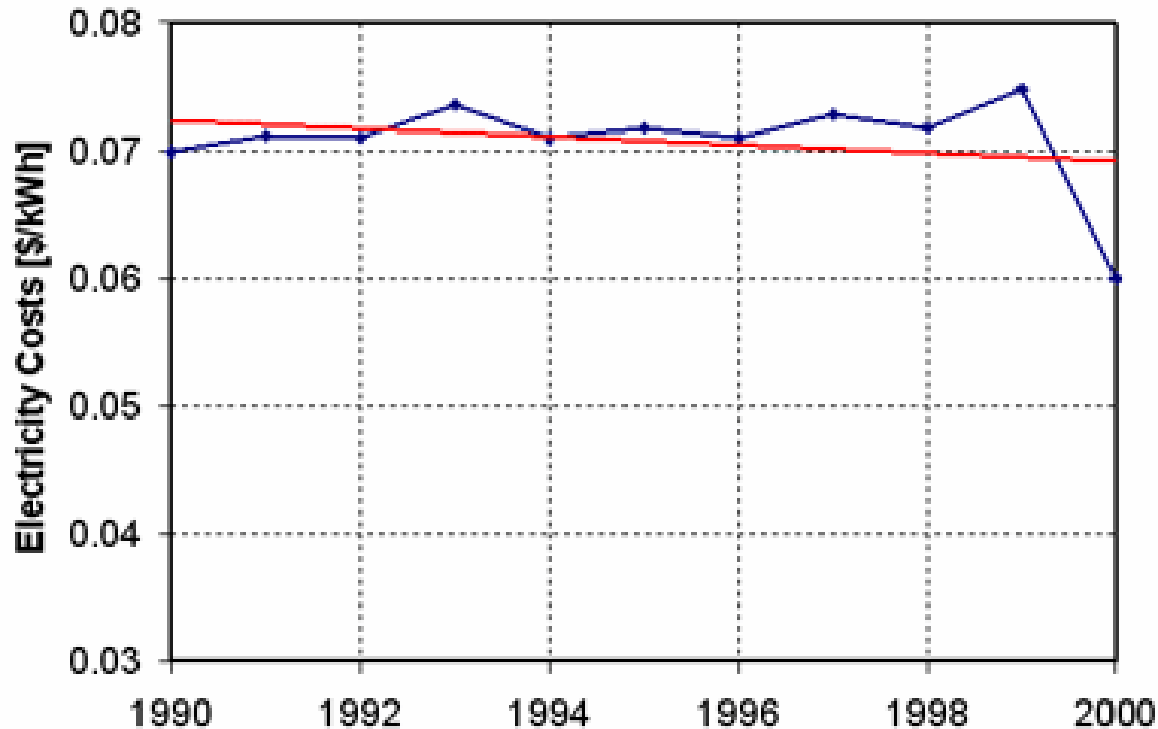




Summary of DE Activity

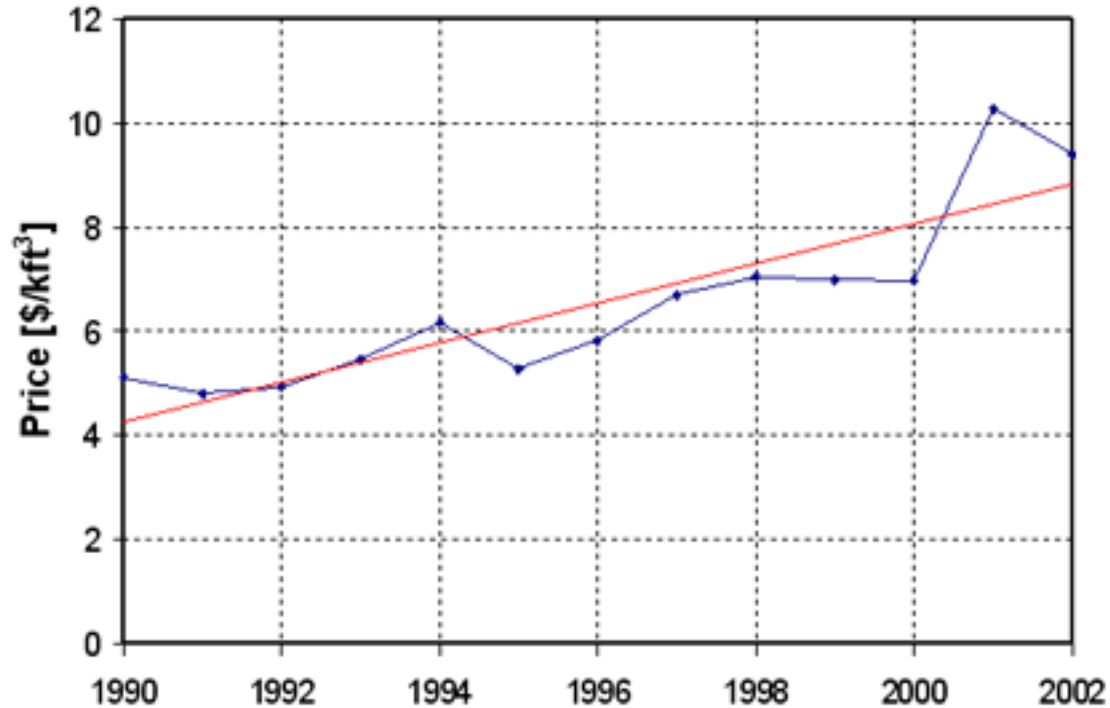
- 17.4 % of Total Generating Capacity takes advantage of Waste Heat
- 8% Above National Average in 2003
- Electricity Prices below National Average
- Natural Gas Prices have risen significantly
- 2452 MW of CHP Potential remains in DE with most in the Industrial Sector

Electric Rates in Delaware



Average Electrical Rates in DE 1990 - 2000

DE Natural Gas Prices



Average Natural Gas Rates 1990-2002



Installed CHP Systems

- DE's CHP market generates 17.4 % of total energy market
- Capacity is 2452 MW
- Five (5) Primary Industrial Sites
- Produce 20% of total CHP Capacity



CHP Potential

- US DOE estimates that additional CHP installations in the Commercial/Industrial Sectors in Delaware will generate 150 to 380 MW or 0.3% - 0.8% of DOE's 47GW long term goal



CHP Profitability

- Falling Electric prices + Rising Natural Prices makes the "spark spread" between these fuel sources smaller which tightens CHP profitability
- Reliability issues in the Grid are motivating users to explore DG options
- Electricity Price Caps from Deregulation set to expire in 2006



Restructuring Activities

- Restructuring Act of 1999 had little affect on Electricity Suppliers in Delaware
 - 5 Industrial/Commercial customers switched representing only about 11 MW electric consumption
- Restructuring Act created a "Public Benefits" Fund amounting to \$ 1.5 Million/year collected from Conectiv rate payers



Green Energy Program

(Previously know as the Energy Alternatives Rebate Program)

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Background

- 1999 General Assembly enacted House Bill 10 - "The Electric Restructuring Act of 1999" which created the Environmental Incentive Fund
- August of 2002 Senate Resolution 30 allowed EIF monies to be used for renewable energy property grants
- Grant levels set at 35% of installed cost of solar water heating, solar electric (photovoltaic), geothermal heat pump, and small wind turbines
- Fund based in the Delaware Economic Development Office



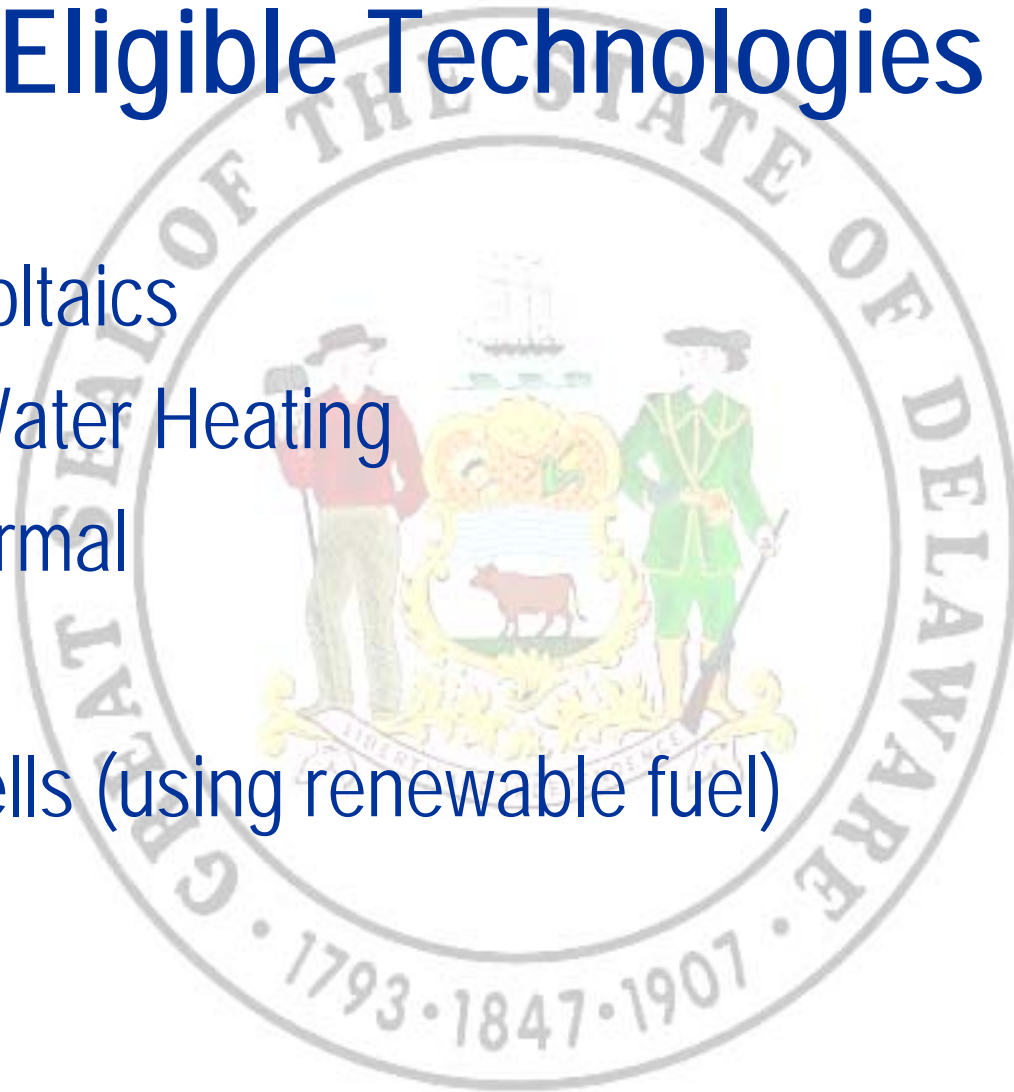
Senate Bill 93 & 145

- Changed the EIF to the Green Energy Program
- Increased incentives levels for eligible technologies
- Established the Technology Demonstration Program and the Research and Development Program
- Allowed for increased outreach and education



Eligible Technologies

- Photovoltaics
- Solar Water Heating
- Geothermal
- Wind
- Fuel Cells (using renewable fuel)





Photovoltaics (Solar Electric)

Limits

- Residential
 - 50% - up to \$22,500 per dwelling unit
- Commercial
 - 50% - up to \$250,000 per non-residential facility for non-residential systems



Solar Water Heating

Limits

– Residential

- 50% - up to \$3,000 per dwelling unit (\$5000 for systems integrated into radiant heating)

– Commercial

- 50% - up to \$250,000 per non-residential facility for non-residential systems



Geothermal

Limits

Residential

- \$600 per ton up to \$3000 or 50% of total cost whichever is less
 - (EER 15.0 & COP 3.4 or greater)
- \$500 per ton up to \$2500 or 50% of the total cost whichever is less
 - (EER 14.0 & COP 3.0 or greater)

Commercial

- \$600 per ton up to \$25,000 or 50% of total cost whichever is less
 - (EER 15.0 & COP 3.4 or greater)
- \$500 per ton up to \$25,000 or 50% of the total cost whichever is less
 - (EER 14.0 & COP 3.0 or greater)



Wind

Limits

- Residential
 - 50% - up to \$22,500 per dwelling unit
- Commercial
 - 50% - up to \$100,000 per non-residential facility for non-residential systems



Fuel Cells

Limits – (Renewable fueled fuels cells only)

– Residential

- 50% - up to \$22,500 per dwelling unit

– Commercial

- 50% - up to \$250,000 per non-residential facility for non-residential systems



Eligibility Requirements

- *Conectiv Power Delivery customers only at this time.*
- New and previously unused equipment
- Approved Equipment Only
- Solar pool heating equipment is *not eligible*



New Developments

- DG Regulatory Development Working Group
 - Develop Regulation to address Emissions from Generators (Proposed DNREC Regulation # 44)
 - May include Combustion Turbines
 - Applies to new and existing stationary generators



Emissions Credits for CHP

- CHP Installations must meet the following to be eligible for emissions credits related to thermal output
 - 20% of fuel's total recovered energy shall be thermal
 - 13% shall be electric
 - Corresponds to an allowable power-to-heat ratio range of between 4.0 and 0.15
 - The design system efficiency shall be at least 55%



Emissions Credits for CHP

- A CHP system that meets requirements receives compliance credit against actual emissions based on the emissions that would have been created by a conventional system generating the same thermal output
- Credit subtracted from the actual generator emissions for purpose of calculating compliance to limits for existing and new non-emergency generators



Governor's Energy Task Force

- Promote Clean Distributed Generation
 - Encourage distributed generation as an alternative to electric transmission and distribution system expansion
 - Identify and encourage combined heat and power opportunities as a means of increasing fuel utilization efficiency



Useful Websites

- Delaware Energy Office - <http://www.delaware-energy.com/>
- DNREC - <http://www.dnrec.state.de.us/dnrec2000/>
- GPE - <http://www.greenplainsenergy.com/>
- Delaware Million Solar Roofs – www.delawaresolar.org
- SRCC - <http://www.solar-rating.org/default.htm>
- FSEC - <http://www.fsec.ucf.edu/>
- US DOE - <http://www.eere.energy.gov/>
- DSIRE - <http://www.dsireusa.org/>