

Virginia Commission on Electric Utility Restructuring Renewable Energy Briefing

Richmond, Virginia

September 8, 2004



Harnessing the power of *markets* . . .
to improve the *environment*.

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Agenda

- Ozone Non-Attainment
- Health
- MWCOCG Report/Wind for SIP
- Buying Renewable Energy
- Virginia Renewable Energy Market

Ozone Non-Attainment

- Region is under ‘severe’ non-attainment
- Penalties for failure to lower ozone
- 50% of ozone precursors come from Western Allegheny region
- Wind has been proven to replace some fossil generation if placed in the Allegheny region

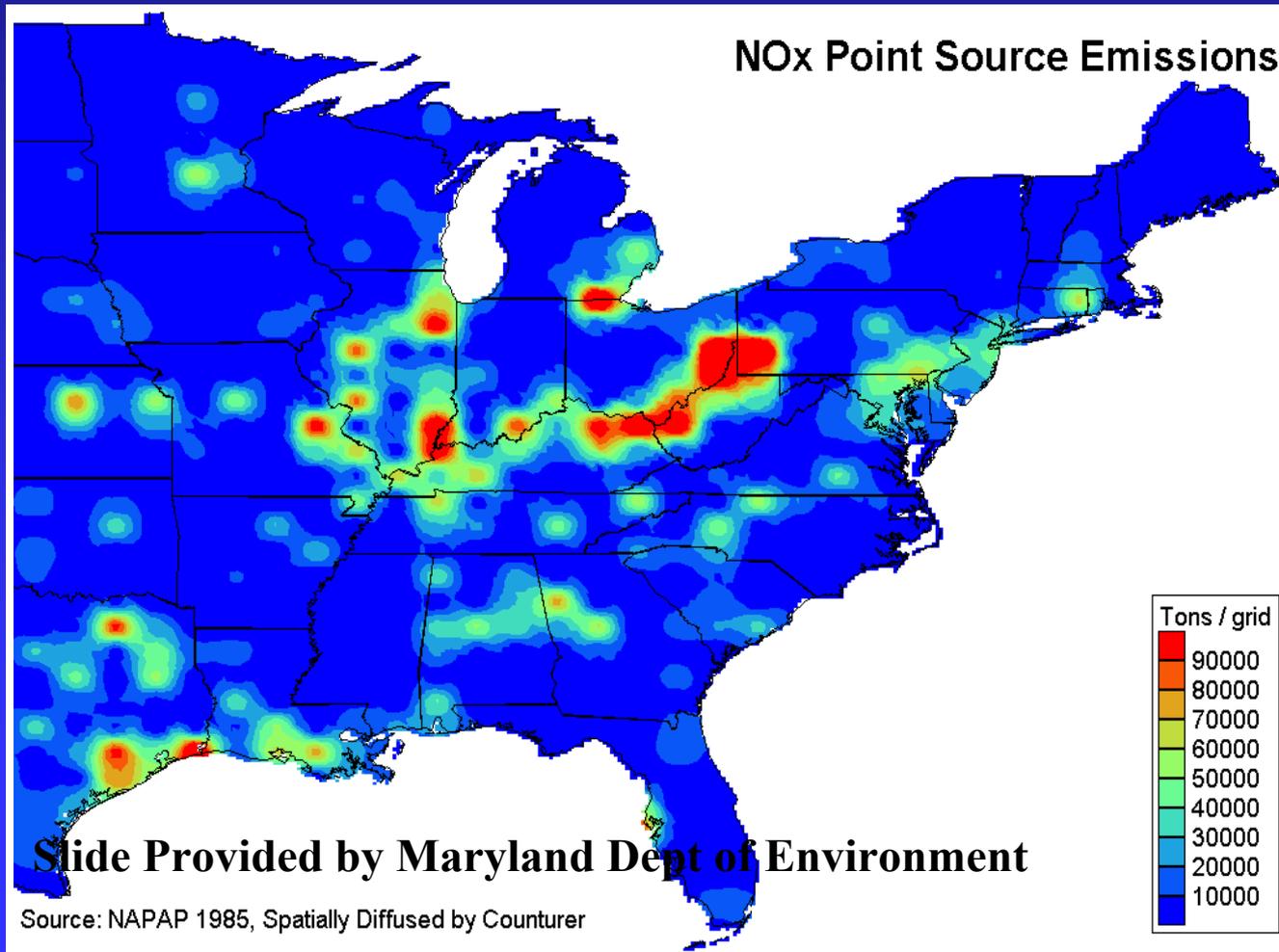
Penalties for Failure to Lower Ozone

- Could include loss of hundreds of millions of Federal Highway dollars
 - City of Atlanta/Georgia lost 600 million in Federal Highway dollars and currently has restrictions placed on how additional funds are being spent

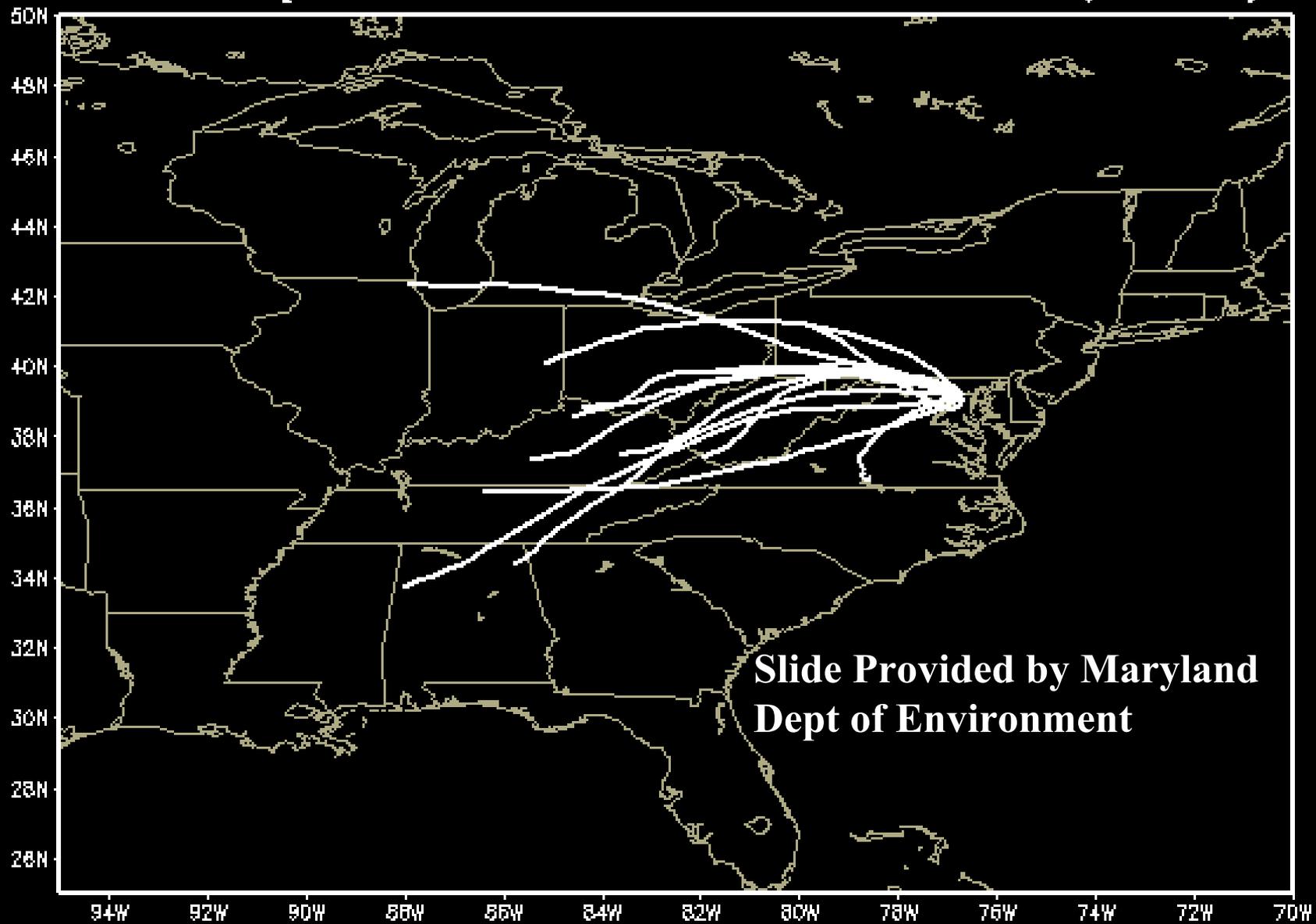
Where is this Ozone coming from?

- At least 40% of ozone precursors are coming from Western Allegheny Mountains and Ohio Valley Fossil Power Plants

These emissions from Western plants create a lion's share of the emissions problems in the Metropolitan Washington area



Back Trajectories 90th Percentile BWI 2000 (500 m)



Health Issues

Summer, of 2002, as a direct result of air emissions there were:

- 28 Red and Orange Alert days in summer alone
- Over 2400 Emergency Room visits
- Over 200 deaths
- Over 130,000 people impacted by air emission related asthma and respiratory problems. The most affected group is children and the elderly.

MWCOG Report

Wind has been proven to replace some fossil generation if placed in the Western Allegheny region

- Analysis from Report shows that renewable energy backs down fossil fuel plants, coal, oil, gas rather than nuclear or hydro
- Renewable energy backs down fossil fuel plants because of zero or near zero marginal operating costs
- Analysis utilizes actual power plant dispatch ranking data – specific plants dispatched in order of economic cost

Emissions Reductions

Displaced Emissions from wind power for PJM West Area

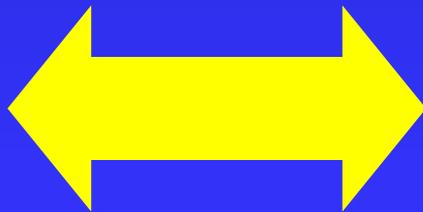
Pollutant	PJM West Coal Only Group
	Ibs/MWh
<i>CO</i> ₂	2113.18
<i>NOx</i>	5.72
<i>SO</i> ₂	17.66

New EPA Guidance Document

- Helps States (and counties & municipalities) use renewable energy purchases to count towards SIP (ozone reduction plan);
- More cost-effective than commuter parking garage or CNG buses, etc;



Eg: NO_x
Emissions



Avg 5.72 lbs/MWH



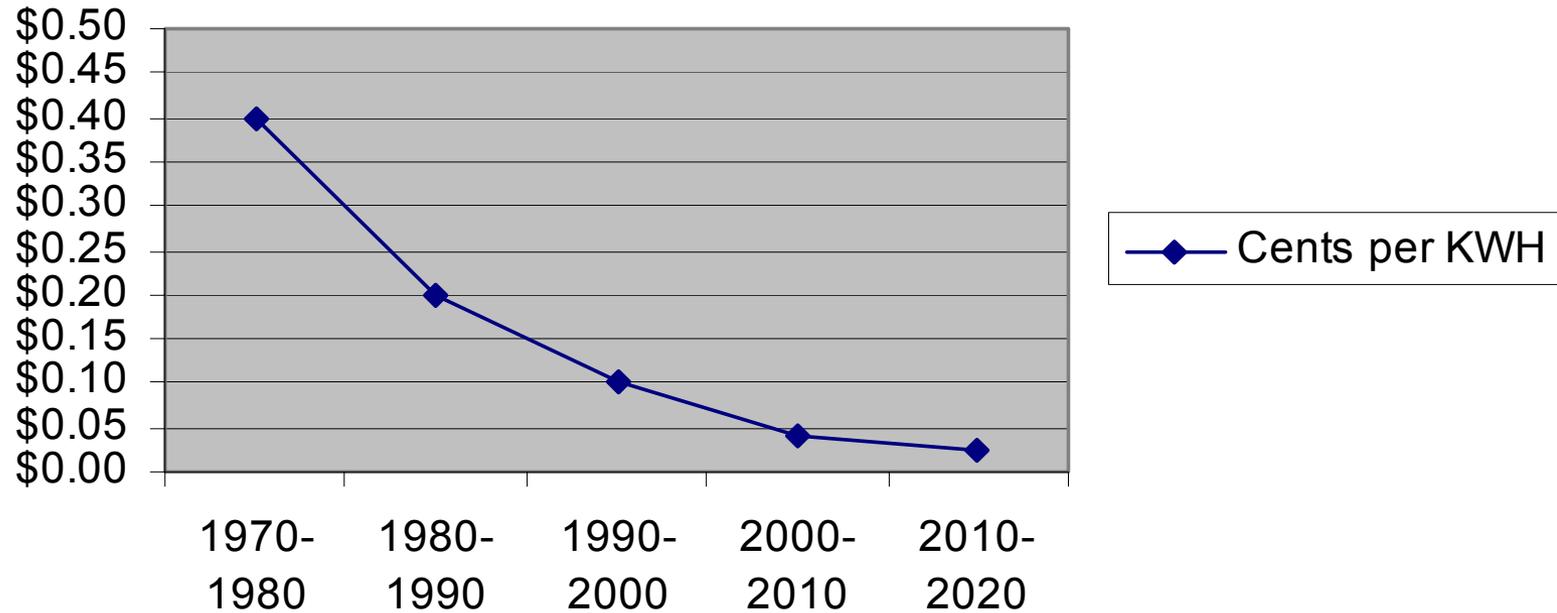
Wind Turbine Technology

- Cost of Wind Energy
- Wind Turbine Manufacturers
- Wind Power Plant Economics



Wind Turbine Technology

Declining Costs of Wind Energy



Wind Turbine Technology

Manufacturers

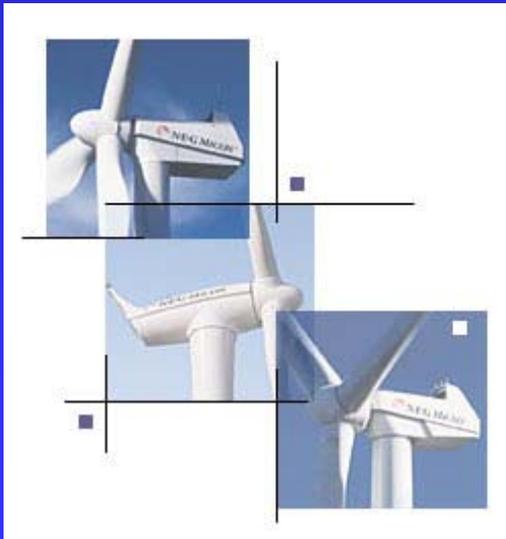
- GE Wind Turbines
 - 1.5; 2.3; 2.5; 2.7 MW
 - 3.6 MW (Off-Shore)



Wind Turbine Technology

Manufacturers

- Vestas/NEG Micon Wind Turbines
 - 750 - 950 KW
 - 1.0 – 1.65 MW
 - 2.75 – 4.2 MW



Wind Turbine Technology

Manufacturers

- Bonus
- Mitsubishi
- Gamesa



Gamesa 750 KW Turbines in Illinois

Wind Power Plant Economics*

Example: 99 MW Wind Plant (60 1.65 MW Turbines)

- 150 Labor Years of Employment from Construction;
- \$15 - \$20 MM in Local Steel Revenues (Towers)?;
- \$375,000 per Year in Local Tax Revenue;
- \$180,000 per Year in Landowner Lease Payments

* Based on Financial Statistics from Mountaineer Wind

Buying Renewable Power



Number

MegaWatt Hours
Certificate



EcoPower™ Certificates from ComEd

The City of Chicago

This certifies that

Is the owner of

60,000 Megawatt hours of EcoPower™ Annually
Renewable Energy

Energy Resource(s):



Renewable Energy Certificates

Renewable Energy Certificates (RECs) represent the claim that renewable energy was generated in a specified amount at a specified time for a specified customer. Typically, priced per MWH.

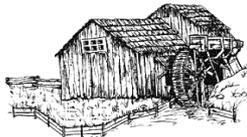
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5 MWh

Renewable Energy Certificates

This certifies that **Virginia Theological Seminary**
Is the owner of 5 MWh of EcoPower® Certificates
Purchased from **Old Mill Power Company**
To Support **7th Diocesan Conference on the Environment & Sustainability**



Old Mill Power Company

Energy Resource: Wind Energy
Generated: Year 2003
Date of Issuance: March, 2003

Certified By : _____

Area REC Prices (\$/MWH)



LFGTE	\$4-6
Wind	\$16-20 (\$13-14)*
Solar	\$100+

* In Quantity

The REC Price represents the premium paid for green power.

Comparative Costs for Electricity

Standard Government Rates

Standard Electricity	\$0.0600
Small Hydroelectricity	\$0.0640
Landfill Gas to Electricity	\$0.0650
Wind Power	\$0.0740
Solar Power	\$0.16 – \$0.20

Comparative Costs for Electricity

Average Monthly Costs for Residential Energy
(1000 KWH per Month)

Standard Electricity	\$80.00
Small Hydroelectricity	\$84.50
Landfill Gas to Electricity	\$87.00
Wind Power	\$100.00
Solar Power	\$250.00

Cost Effective NO_x Reduction

Control Measure	Cost (ton/year)
Wind Energy	\$32,000
CNG Refueling Stations	\$54,701
55 CNG Busses	\$103,063
1967 Bike Lockers	\$247,111

Source: Montgomery County

Renewable Energy Suppliers

Virginia/Maryland/DC

Washington Gas, Metro Washington, DC

PEPCO Energy Services, Metro Washington, DC

Constellation New Energy, Baltimore, MD

Community Energy, Philadelphia, PA

Old Mill Power, Charlottesville, VA

Sterling Planet, Atlanta, GA *

Nat Source, New York, NY *

Native Energy, Vermont *

* National Supplier/Broker

Renewable Energy Buyers

Virginia/Maryland/DC

Arlington, County

General Services Admin

Montgomery County

U.S.E.P.A.

Prince Georges County

U.S.D.O.E.

City of Tacoma Park

Dept of Defense

Catholic University

District of Columbia

Tower Companies

Austin Grille

Nature Conservancy

Dupont

College Park

Kinkos

Questions?



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