



The Role of Forestry and Agriculture in Energy Policy Duke Energy Perspective



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Duke Energy...

- Is one of the largest electric power companies in the U.S.
- Is headquartered in Charlotte, North Carolina
- Has more than 18,000 employees
- Is a Fortune 500 company traded on the NYSE under the symbol DUK
- Supplies and delivers electricity to approximately 11 million people in the U.S.





Duke Energy...

- Generates approximately 35,000 net megawatts of electric power in the Midwest and the Carolinas
- Provides natural gas distribution services in Ohio and Kentucky
- Produces more than 4,000 net megawatts of electric generation in Latin America





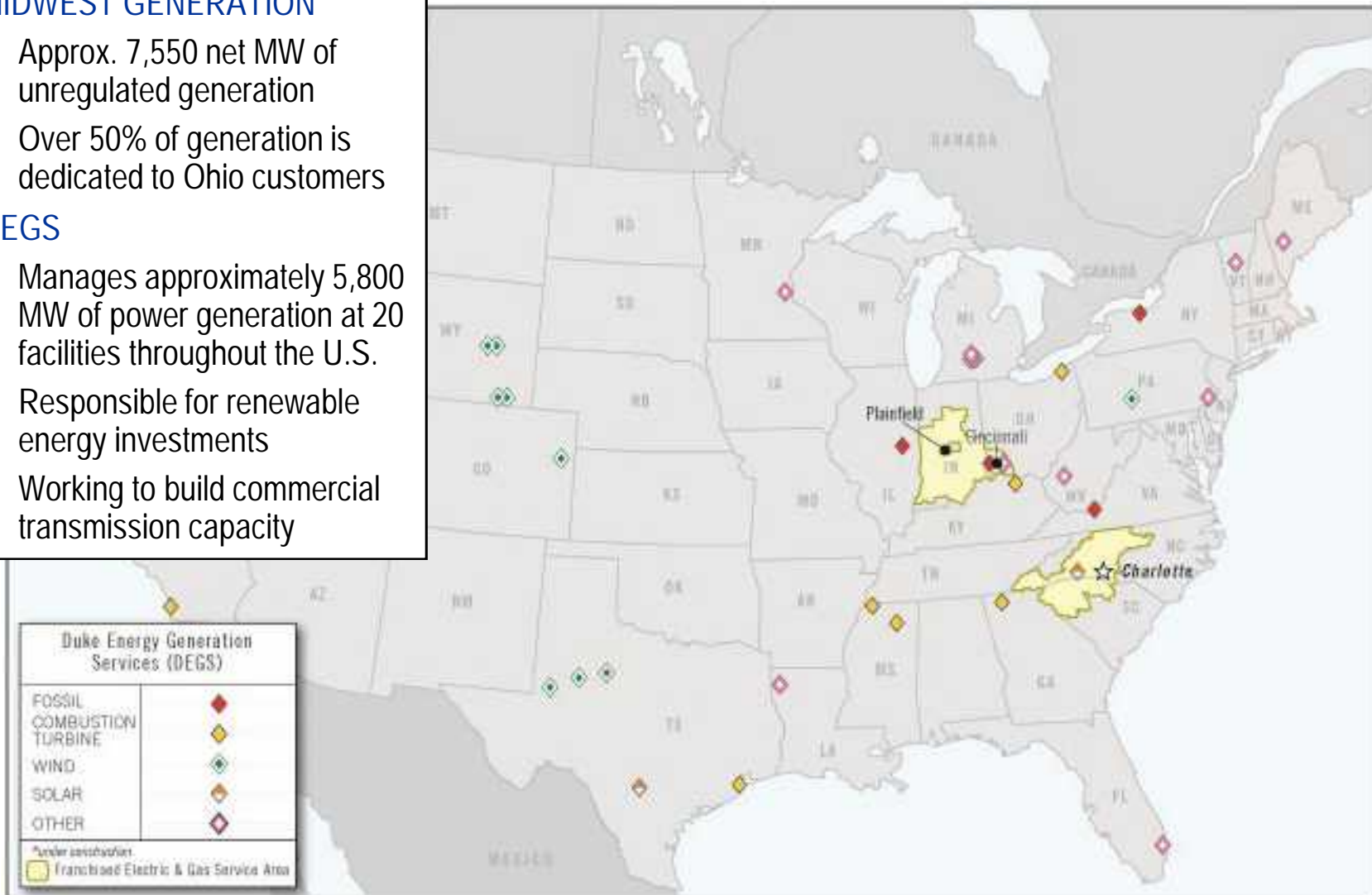
COMMERCIAL POWER

MIDWEST GENERATION

- Approx. 7,550 net MW of unregulated generation
- Over 50% of generation is dedicated to Ohio customers

DEGS

- Manages approximately 5,800 MW of power generation at 20 facilities throughout the U.S.
- Responsible for renewable energy investments
- Working to build commercial transmission capacity

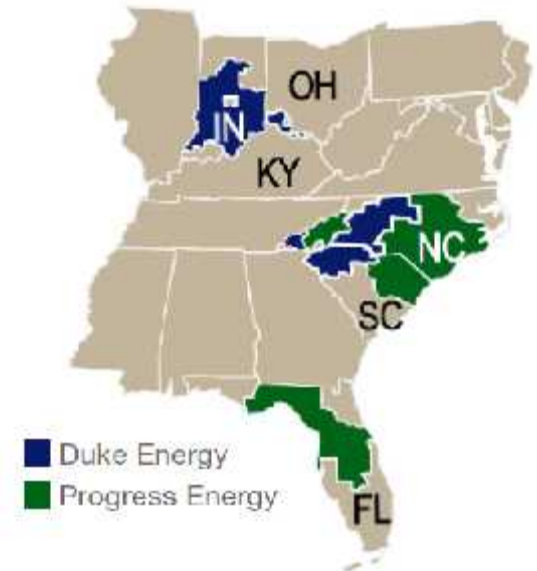




Pending acquisition of Progress Energy will make us largest utility in U.S -- approximately mirror U.S. portfolio

U.S. generation well positioned for pending environmental regulations:
Mitigate cost increase and strategic execution risks in era of major change

Generation Capacity by Technology (GW/%)



¹ Duke Energy: Nuclear (15%), Hydro (9%), Renewables (2%); Progress Energy: Nuclear (17%), Hydro (1%); Combined: Nuclear (18%), Hydro (6%), Renewables (1%)
 Note: Generation capacity as of 09/30/10 and excludes purchased power and 4.1 GW of Duke Energy International assets.

Company Name: Duke Energy Corporation
Corporate Headquarters: Charlotte, N.C.; substantial operations in Raleigh, N.C.
Market Capitalization: \$36.5 billion***
Total Assets: \$90.6 billion*
Revenues: \$22.7 billion**
Customers: 7.1 million electric and 500,000 gas
Generating Capacity: 57,200 megawatts
Service Territory: 104,000 square miles
Executive Chairman: James E. Rogers
President and Chief Executive Officer: William D. Johnson
Board of Directors: The new Duke Energy board will be composed of 18 directors, 11 designated by Duke Energy, including the lead director, and 7 designated by Progress Energy

* As of stock close: September 30, 2010
 ** As of December 31, 2009
 *** As of December 31, 2010

Very roughly: 1,000 MW (1 GW) can power 1 million



Renewable Generation Portfolio

Wind Generation

- Nationwide about 1,000MW in operation
- 5,500MW in development

Solar Power

- 17 MW in commercial operation
- Joint development with ENN Group China to develop utility scale solar power in US
- North Carolina Distributed Solar Generation Project

Biomass Generation

- Duke Energy and AREVA formed ADAGE, currently "mothballed"
- Test plots of biomass crops in the Carolinas
- Co-fire small amounts of woody biomass at several of our existing coal-fired generation plants





Where is Energy/Climate Policy Going

- Our Beliefs
 - Risk of CO₂ limits continues to influence the market (no new coal build out)
 - Now a political non-starter
 - Dormant, not dead
 - The direction of EPA CO₂ regulation is unclear
 - Low carbon technology development /deployment (especially nuclear & CCS) will stall without a policy driver.

- Possible Policy Initiatives for Low Carbon Technology Development
 - Federal or state loan guarantees
 - Federal or state tax credits
 - Federal or state grants
 - R&D wire charges or fuel surcharges
 - Expanded State renewable portfolio standards to include CCS and nuclear
 - Federal renewable/clean energy standards
 - EPA BACT CO₂ Regulation



Policy Framing is Critical -- will impact the speed with which issue can be advanced

- Emissions or technology focused?
- Congress in no mood to deal with GHG emissions
 - Advocates need to convince the public the issue matters – politicians afraid to defend (let alone advance) climate
- Public generally supportive of new clean energy technologies
- A carbon policy cloaked in technology won't fool anyone



Agriculture, Forestry, Land Use and Energy

- Production of bioenergy
 - Low carbon, dispatchable generation
 - Help meet RPS and CES requirements
- Opportunities for cost-effective carbon mitigation – offsets
 - Tillage practices
 - Fertilizer management
 - Forestry management
 - Reforestation
 - Avoided deforestation/grassland conversion
- Opportunities for adaptation mechanisms
 - Create corridors for ecosystem and species migration
 - Response to changes in weather patterns
 - Response to sea level changes



Defining Biomass in a Bioenergy Context

- a commodity: reasonably homogenous good or material, bought and sold freely as an article of commerce. commodities include agricultural products, fuels, metals, etc., and are traded in bulk on a commodity exchange or on spot market.
- a compliance alternative: an alternative to purchasing renewable energy certificates (RECs)
- a special part of the renewable energy portfolio - in contrast to wind and solar, can be dispatched.



Dealing with bioenergy uncertainties

- Will the policy last?
- Federal preempt states?
- Which technology?
- Enough fuel?
- Can I get a permit?
- How much will this cost?
- Land use changes?
- Emissions?
- Habitat impacts?
- Recreational use impacts?
- Invasive species?
- Monocultures?
- Unanticipated consequences?



Duke Energy Bioenergy Initiatives

- Combined heat and power plant – St Paul Minnesota
- Co-fire small amounts at some of our coal-fired generation stations
- Engineering studies on potential conversion of coal-fired units
- Pilot plantings of herbaceous crops with biomass potential
- Adage Joint Venture
- Council for Sustainable Biomass Production

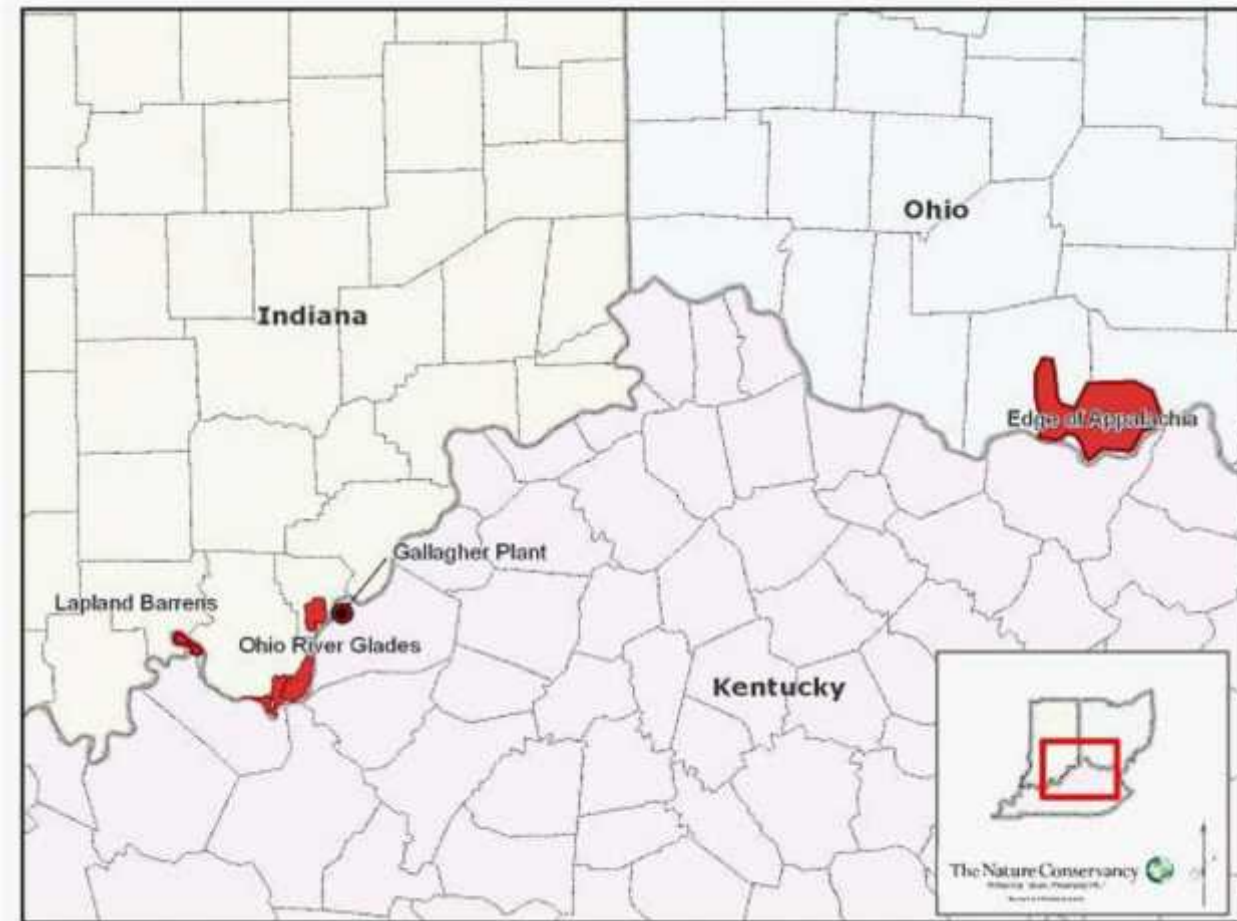


Carbon Mitigation/Adaptation

- Offset advocacy during climate change legislative debate
 - The Coalition for Emission Reduction Policy (CERP)
 - Forest Carbon Dialogue
 - Tropical Forest Climate Coalition
- Numerous reforestation projects in Indiana, Ohio and Kentucky
- Sponsor EPRI fertilizer management project
- GreenTrees project in lower Mississippi River Valley
- The Forest Health Initiative
- Albemarle Peninsula climate adaptation project
- Gallagher Station NSR suit Consent Decree Required Supplemental Environmental Projects
- Sponsor EPRI REDD infrastructure project
- Utilitree/PowerTree
- Sponsor EPRI carbon offset supply project

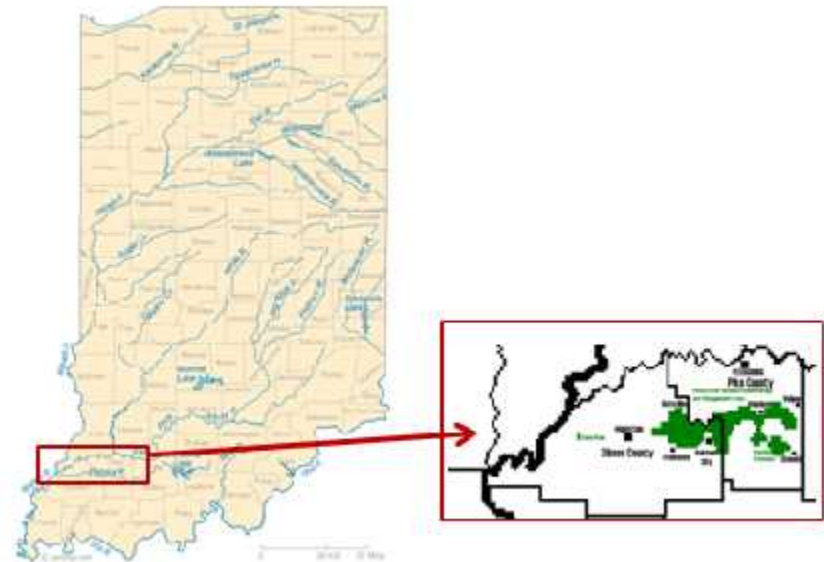
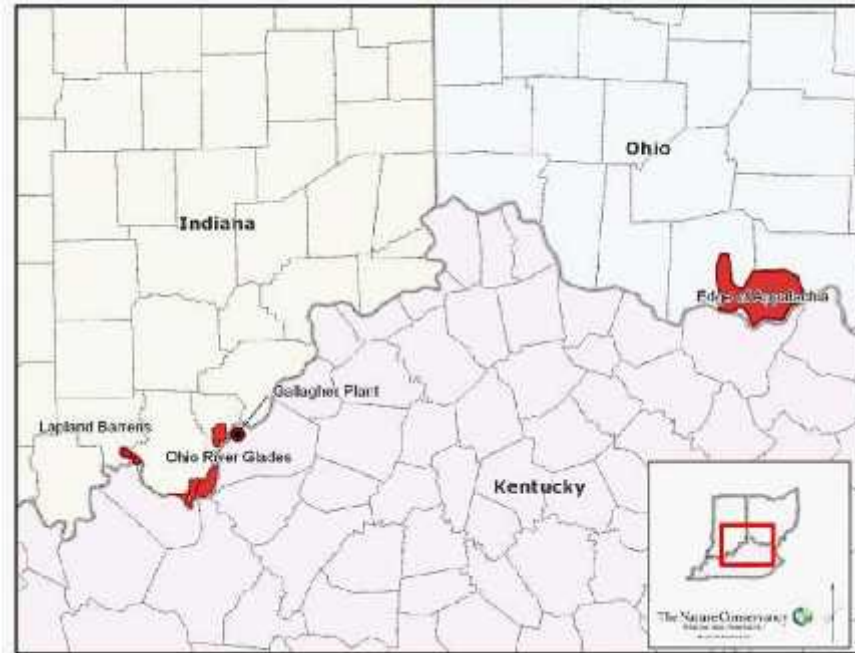


Gallegher SEP projects





Gallagher Station SEP Projects

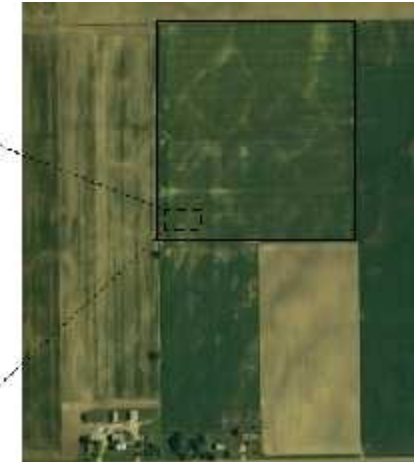




EPRI/Michigan State N₂O project



	Rep 1	Rep 2	Rep 3	Rep 4
Nitrogen Rate (kg N ha ⁻¹)				
↑ 36 m	0	135	180	45
	90	225	225	0
	180	180	90	90
	225	0	45	135
	135	45	0	225
↓ 36 m	45	90	135	180
	← 60 m →			



- Five sites (8 site years)
- Commercial corn– soybean
- Conventional tillage
- Six N fertilizer (urea) rates
- Static chamber methodology



Albemarle Peninsula Project

