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STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

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INDIANA UTILITY REGULATORY COMMISSION

JOINT PETITION AND APPLICATION OF PSI ENERGY, INC., D/B/A DUKE ENERGY INDIANA, INC., AND SOUTHERN INDIANA GAS AND ELECTRIC COMPANY, D/B/A VECTREN ENERGY DELIVERY OF INDIANA, INC., PURSUANT TO INDIANA CODE CHAPTERS 8-1-8.5, 8-1-8.7, 8-1-8.8, AND SECTIONS 8-1-2-6.8, 8-1-2-6.7, 8-1-2-42 (A) REQUESTING THAT THE COMMISSION: (1) ISSUE APPLICABLE CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY AND APPLICABLE CERTIFICATES OF CLEAN COAL TECHNOLOGY TO EACH JOINT PETITIONER FOR THE CONSTRUCTION OF AN INTEGRATED GASIFICATION COMBINED CYCLE GENERATING FACILITY ("IGCC PROJECT") TO BE USED IN THE PROVISION OF ELECTRIC UTILITY SERVICE TO THE PUBLIC; (2) APPROVE THE ESTIMATED COSTS AND SCHEDULE OF THE IGCC PROJECT; (3) AUTHORIZE EACH JOINT PETITIONER TO RECOVER ITS CONSTRUCTION AND OPERATING COSTS ASSOCIATED WITH THE IGCC PROJECT ON A TIMELY BASIS VIA APPLICABLE RATE ADJUSTMENT MECHANISMS; (4) AUTHORIZE EACH JOINT PETITIONER TO USE ACCELERATED DEPRECIATION FOR THE IGCC PROJECT; (5) APPROVE CERTAIN OTHER FINANCIAL INCENTIVES FOR EACH JOINT PETITIONER ASSOCIATED WITH THE IGCC PROJECT; (6) GRANT EACH JOINT PETITIONER THE AUTHORITY TO DEFER ITS PROPERTY TAX EXPENSE, POST-IN-SERVICE CARRYING COSTS, DEPRECIATION COSTS, AND OPERATION AND MAINTENANCE COSTS ASSOCIATED WITH THE IGCC PROJECT ON AN INTERIM BASIS UNTIL THE APPLICABLE COSTS ARE REFLECTED IN EACH JOINT PETITIONER'S RESPECTIVE RETAIL ELECTRIC RATES; (7) AUTHORIZE EACH JOINT PETITIONER TO RECOVER ITS OTHER RELATED COSTS ASSOCIATED WITH THE IGCC PROJECT; AND (8) CONDUCT AN ONGOING REVIEW OF THE CONSTRUCTION OF THE IGCC PROJECT	CAUSE NO. 43114
VERIFIED PETITION OF DUKE ENERGY INDIANA, INC. FOR AUTHORITY PURSUANT TO AN ALTERNATIVE REGULATORY PLAN AUTHORIZED UNDER I.C. 8-1-2.5 ET SEQ. AND I.C. 8-1-6.1,8-1-8.7, AND 8-1-8.8 TO DEFER AND SUBSEQUENTLY RECOVER ENGINEERING AND PRECONSTRUCTION COSTS ASSOCIATED WITH THE CONTINUED INVESTIGATION AND ANALYSIS OF CONSTRUCTING AN INTEGRATED COAL GASIFICATION COMBINED CYCLE ELECTRIC GENERATING FACILITY	CAUSE NO. 43114 S1

CROSS ANSWERING TESTIMONY OF BRUCE E. BIEWALD
ON BEHALF OF THE
CITIZENS ACTION COALITION OF INDIANA
SAVE THE VALLEY
VALLEY WATCH
SIERRA CLUB
May 31, 2007

PUBLIC

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1. INTRODUCTION AND QUALIFICATIONS

Q. What is your name, position and business address?

A. My name is Bruce Biewald. I am the President of Synapse Energy Economics, Inc, 22 Pearl Street, Cambridge, MA 02139.

Q. Are you the same Bruce Biewald who submitted Direct Testimony in this Cause on May 15, 2007.

A. Yes.

Q. On whose behalf are you testifying in this case?

A. I am testifying on behalf of the Citizens Action Coalition of Indiana, Valley Watch, Save the Valley and the Sierra Club.

Q. What is the purpose of your Cross Answering testimony?

A. I respond to the testimony of Mr. J. Nathan Noland, President of the Indiana Coal Council, and the testimony of Ms. Joan M. Soller of the Indiana Office of Utility Consumer Counselor ("OUCC").

Q. Please summarize your Cross Answering testimony.

A. While Mr. Noland of the Indiana Coal Council asserts economic development benefits associated with Edwardsport, I note that the implementation of cost-effective demand-side management ("DSM"), development of the best wind resource areas in the state, and installation of economic combined heat and power ("CHP") systems at selected sites can all result in increased economic development, job creation and increased local tax bases. These macroeconomic benefits flow from the direct, indirect and induced effects of labor, equipment and service needs associated with these supply and demand resources.

Furthermore, lower relative electricity prices resulting from the selection of energy efficiency, wind and CHP systems instead of the more costly Edwardsport coal plant will result in macroeconomic benefits. The roughly two billion dollars in excessive resource costs associated with the Edwardsport coal plant (see page 47, lines 5 to 10 of my May 15, 2007 Direct Testimony) will be a drag on, not a

boon to, Indiana's economic development, relative to alternative resource scenarios. Indiana consumers who must spend more to pay for electricity if Edwardsport is built will have less money to spend in other areas of Indiana's economy.

The Indiana Office of Consumer Counsel praises the potential benefits and promise of carbon capture and sequestration ("CCS"). However, rather than wasting two billion dollars of Indiana consumers' money on the proposed Edwardsport coal plant in hope of one day considering some limited amount of CCS at that site, it would make sense for Indiana to instead first explore the technological frontier of CCS at one of the few sites in the nation with existing IGCC, Wabash River, while at the same time develop the untapped potential in for cost-effective energy efficiency and renewable resources in the State.

Indiana is well-positioned relative to other states for CCS technology exploration or demonstration at a coal-fired facility because it has an existing IGCC plant. This opportunity should not be overlooked in favor of a more expensive one. Edwardsport only promises to increase carbon emissions; constructing it would foreclose opportunities for higher-performing investments in DSM, wind and combined heat and power that will lower carbon emissions. By targeting Wabash River for CCS exploration, Indiana can attain what the OUCC seeks, and in the meanwhile meet its electric service needs at lower cost and lower emissions than with the proposed Edwardsport coal plant.

I recommend that the Indiana Utility Regulatory Commission deny the Certificate of Need application for Edwardsport. If desired, the Commission can explore through other mechanisms consideration of CCS technology exploration at Wabash River.

2. RESPONSE TO COAL COUNCIL TESTIMONY ON ECONOMIC DEVELOPMENT

Q. What portion of Mr. Noland's testimony are you responding to?

A. I respond to the general thrust of Mr. Noland's testimony on the impact of power plant construction on Indiana job creation, increased tax base, and increased economic development. In particular, I address the following statements from Mr. Noland's conclusion:

> "The IGCC Project will reduce our dependence on imported electricity and produce electricity from Indiana's most abundant natural resource – coal. Further, it will create jobs, increase the tax base and spur economic development. In this day and age, it is important to find innovative new ways to use our existing resources, and the IGCC Project represents a great opportunity for all of Indiana and not just the coal industry." (Noland, 8: 1-10)

Q. What is your response to these statements?

A. I agree that "it is important to find innovative new ways to use our existing resources". It's also better to use the existing, less expensive resource first: for example, the DSM and wind power resources are less expensive than the coal resource and thus consumers will have more money available for spending on other goods and services if electric costs are lower. The "innovation" that is required is to recognize the fundamental tenet that these resources, rather than the proposed IGCC facility, are less expensive and thus a better value for Indiana.

The implementation of inexpensive demand-side resources and wind power plant construction and combined heat and power installations at facilities and sites statewide (rather than just at Edwardsport) represent an opportunity for Indiana to spread the effect of job creation, economic development and expanding tax bases to many of Indiana's counties, rather than concentrate it in one area.

I also note that Mr. Noland assumes coal is Indiana's most abundant natural resource. Coal may be Indiana's most abundant fossil-fuel resource, but the indigenous wind resource of Indiana – a truly inexhaustible resource – is technically a more abundant resource. While the question is mostly academic, I respond to this assertion here because it is important that the record reflect the fact

that wind resources in Indiana are technically and economically capable of producing as much or more electricity as new coal-fired power plants and at lower cost.

In addition, as Mr. Mosenthal's May 15, 2007 testimony shows DSM is also an abundant and cheap indigenous resource that can meet all load growth over the planning horizon. It will do this while substantially lowering ratepayer bills, improving comfort and productivity, and providing economic stimulus to the building and design trades.

Q. What material is available to help ascertain the relative job creation, economic development and increased tax base effects that arise from wind power resource development?

A. Macroeconomic modeling tools can be used to estimate direct, indirect and induced effects of capital investment in alternative resource strategies. NREL developed a tool that has been used to estimate the macroeconomic effects of wind power plant construction in a given state.[1] This tool can gauge the effect of investment as it spreads through the affected communities.

Q. Are wind power resources likely to produce at least as much direct, indirect and induced economic effect as a coal-fired plant at Edwardsport?

A. Yes. First, using less expensive alternatives to the coal plant will leave more money available for spending on products other than electricity. This has beneficial impacts through the State's economy as the money is spent and re-spent on goods and services. Second, wind turbine construction itself uses local labor and equipment to create much of the underlying infrastructure needed for a wind farm, including roads, concrete foundations and associated electrical components. This investment can be spread across more Indiana counties because the best wind regimes in Indiana occur in more than just one town in the state, unlike

[1] NREL JEDI (Jobs and Economic Development Impact Model) Wind Model. A description of the model, how to use it, and additional material is available at:
http://www.eere.energy.gov/windandhydro/windpoweringamerica/filter_detail.asp?itemid=707.

investment at Edwardsport. Lastly, while Indiana doesn't currently host major wind turbine component manufacturing, its manufacturing base could benefit from state and region-wide increases in wind power installations.

Q. Is it possible that Indiana could become a manufacturing center for wind power generation and related equipment, if increased penetration of wind power in the region occurred?

A. Yes. A report by the Renewable Energy Policy Project[2] indicates that Indiana is one of a number of states that could benefit from increased wind power penetration in the region because of Indiana's ability to support a manufacturing base for major wind turbine generation components such as towers, blades, gearboxes and other parts of the wind turbine itself. The report estimates an incremental job gain of over 8,000 jobs in Indiana under scenarios of increased wind penetration in the US (the baseline in the report was development of 50,000 MW of wind power in the US).

Q. Does Duke Energy Indiana understand the economic development effects of wind power on Indiana?

A. Yes. In the Benton Country wind farm proceeding (IURC Cause No. 43097) Mr. Lefeld of Duke Energy Indiana testified to this effect. I reproduce the relevant portion of his testimony here[3]:

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[2] The report is "Wind Turbine Development: Location of Manufacturing Activity ", Technical Report, September, 2004. Authors: George Sterzinger and Matt Svreck. Available at http://www.repp.org/articles/static/1/binaries/WindLocator.pdf.

[3] James Lefeld, Direct Testimony, Cause No. 43097, 9: 6-20.

Section of Testimony from Mr. Lefeld in Cause No. 43097:

> **Q. WHAT BENEFITS MAY THE BENTON COUNTY WIND ENERGY PROJECT BRING TO INDIANA?**
>
> A. In addition to providing a necessary source of electricity without consumption of fossil fuel or emissions of any type, the Benton County Wind Energy Project should help foster economic development and job creation in Indiana. This occurs for several reasons. Orion has approximately 10,000 acres under wind lease in Benton County with estimated land payments to seventy land owners that will total more than $10 million over the life of the wind project. Those leases provide income to the local agricultural areas and help stimulate the local, and in turn Indiana's, economy. Taxing bodies that serve this community will benefit from this substantial investment and in turn benefit Benton County residents. The success of this wind project will likely spur future wind energy development in the state, and the environmental and economic benefits will multiply. The installation and construction of these facilities will create both construction and approximately eight permanent jobs in Indiana.

As his testimony indicates, wind power development has the potential to spread economic benefits to many landowners, local agricultural areas, and communities throughout central Indiana.

Q. Does the Indiana Governor's Energy Plan recognize the economic development benefits of wind power?

A. Yes. The Governor's energy plan states the following:

> Maximize Indiana's Wind Energy Potential:
>
> Wind power, electricity generated by capturing the wind's energy with modern wind turbines, is one of the lowest-cost, renewable electricity alternatives currently available. Utility-scale wind farms can provide rural areas with significant investment and provide farmers with new sources of revenue by opening their land to new energy development, while at the same time allowing present farming activities to continue virtually unchanged. Indiana

possesses viable wind resources in limited pockets scattered across the northern half of the state. Wind power could provide the electricity capacity of a new baseload power plant within the next ten years. As wind power technology improves, wholesale markets increase and green energy becomes more valuable, Indiana can maximize its wind resources by selling wind power into markets with higher electricity costs. This would allow wind producers to find the best markets without jeopardizing Indiana's low electricity rates.[4]

Q. Is there other evidence of the economic development benefits of wind energy?

A. Yes. I include here as Exhibit BEB-CA1 a summary of information on economic development effects of wind power from a Wind Powering America update.[5] This information includes a collection of case studies showing the economic development benefits that wind power can bring to a state.

Q. What is the thrust of the information contained in this Exhibit?

A. This exhibit illustrates the fundamental workings of economic development arising from utility-scale wind farms in several states. It shows the actual economic impact from wind farms of land lease payments, local property tax revenue, construction and ongoing operations jobs, local industry employment for construction of towers and related infrastructure, and the potential for manufacturing and assembly plant expansion. It contains case study information for Iowa, Texas, New Mexico, South Dakota, Minnesota and Colorado.

Q. What material is available to help ascertain the relative job creation, economic development and increased tax base effects that arise from DSM resource development?

A. Numerous technical reports have been completed in both the Midwest and throughout the nation that either focus on or include sections on the economic

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[4] "Economic Growth from Hoosier Homegrown Energy: Indiana's Strategic Energy Plan", pages 4-5.

[5] Wind Powering America is a US Department of Energy/NREL program designed in part to disseminate information about and analytical tools for wind power across the country.

development benefits associated with DSM resource deployment. I list a few of them here:

- *Job Jolt: The Economic Impacts of Repowering the Midwest, An Economic Study*, by the Regional Economics Applications Laboratory for the Environmental Law & Policy Center, 2001.
- *Energy Efficiency and Economic Development in the Midwest*, Report ED951, by Skip Laitner, John DeCicco, Neal Elliott, Howard Geller, and Marshall Goldberg, Robert Mowris, and Steven Nadel, American Council for an Energy Efficient Economy ("ACEEE"), 1995.
- *The Economic Benefits of Energy Efficiency Development and Onsite Renewable Energy Strategy to Meet Growing Electricity Needs in Texas*, Report E073, John "Skip" Laitner, Maggie Eldridge, and R. Neal Elliott, ACEEE, May 2007.
- *Potential for Energy Efficiency and Renewable Energy to Meet Florida's Growing Energy Demands,* Report Number E072, R. Neal Elliott, Maggie Eldridge, Anna M. Shipley, John "Skip" Laitner, and Steven Nadel, ACEEE; Philip Fairey, Robin Vieira, and Jeff Sonne, Florida Solar Energy Center; Alison Silverstein, Independent Consultant; Bruce Hedman and Ken Darrow, Energy and Environmental Analysis, Inc., February 2007.

Q. Can you give examples of the economic development benefits that arise from energy efficiency as documented in these reports?

A. Yes, I can. Recent analyses of efficiency compared to coal fired power supply have shown significantly higher job creation and macroeconomic benefits from efficiency than alternative supply solutions. For example, in Florida ACEEE estimated the creation of over 12,000 new jobs - equivalent to 100 new manufacturing plants relocating to Florida - over 15 years from efficiency and renewable programs as compared to conventional coal supply.[6] In Texas, ACEEE

[6] ACEEE, "Potential for Energy efficiency and Renewable Energy to Meet Florida's Growing Energy Demands," April 2007.

estimated a job increase over 15 years from efficiency and renewables as an alternative to conventional coal plants of over 38,000.[7]

In addition, the "Job Jolt" report listed above contains economic development impacts for both energy efficiency and renewable energy development impacts. The text and table below, from that report, highlight the potential job growth benefits in Indiana from implementation of aggressive, cost-effective energy efficiency, and describes in brief how energy efficiency implementation can help economic development of manufacturing regions:

> Many of the largest beneficiaries of a conversion to energy efficiency are manufacturers already located in the Midwest. More workers will be needed, for example, to make triple-glazed windows for Andersen Windows, smart thermostats for Honeywell and Johnson Controls, energy efficient lighting equipment for Osram Sylvania, and Energy Star® appliances for Whirlpool.
>
> Each state in the region has different manufacturing capabilities and, thus, different economic impacts from implementing the energy efficiency plan. Highly industrialized states such as Illinois, Indiana, Michigan and Ohio achieve the most substantial job gains from increased use of clean energy efficiency technologies. The REAL model incorporates these variables to compute the average state-by-state impacts described in Figure 5.[8]

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[7] Forthcoming report: Laitner, et. al., "The Economic Benefits from an Energy Efficiency and On-site Renewable Energy Strategy to Meet Growing Electricity Needs in Texas," May 2007, p. iv.

[8] Job Jolt report, pages 6-7.

Figure 5 from the "Job Jolt" report:

Energy Efficiency Impacts

State	Net New Employment		Increased Annual Economic Output	
	2010	2020	2010	2020
IL	26,000	43,400	$2.6 Billion	$4.6 Billion
IN	8,800	15,500	$7 Billion	$1.2 Billion
IA	3,700	6,800	$200 Million	$300 Million
MI	16,100	29,100	$1.3 Billion	$2.4 Billion
MN	4,000	8,200	$200 Million	$400 Million
NE	1,500	2,900	0	$100 Million
ND	400	900	0	0
OH	18,900	25,500	$2 Billion	$3.4 Billion
SD	600	1,200	0	0
WI	3,900	7,400	$ 100 Million	$2.7 Billion
Total Region	**83,900**	**140,900**	**$7.1 Billion**	**$12.7 Billion**

Figure 5: Energy Efficiency: Summary of Economic Impacts by State
Source: Regional Economics Applications Laboratory. Represents Impacts of Clean Energy Development Plan versus the Business-As-Usual baseline projections for Employment and Economic Growth.

The ACEEE Midwest report cited above, from 1995, indicated that for the states of Indiana, Michigan, Illinois and Ohio,

> The investment in energy efficiency technologies would increase net employment in the region from a modest increase of 3,000 jobs in 1995 to 205,000 jobs by 2010. The latter figure is equivalent to the number of jobs supported by the output, expansion, or relocation to the region of 1,367 small manufacturing plants.[9]

[9] ACEEE Midwest Report ED 951, text from online version, at http://www.aceee.org/store/proddetail.cfm?CFID=1940167&CFTOKEN=47727042&ItemID=120&CategoryID=7

The recent ACEEE report on the economic development impacts of energy efficiency installation in Texas (third in the bulleted list above) states the following:

> In this follow-up report, we review the macroeconomic impacts that likely would unfold under these alternative policy recommendations. Generally, we find that cost-effective investments in the combination of energy efficiency and alternative generation technologies can actually reduce overall electricity costs, boost net employment, and reduce air pollutants within the state. For example, by 2023 (the last year of this analysis), businesses and households in Texas are expected to enjoy a net savings of more than $5 billion. **As a result of this greater energy productivity, the state is projected to show a net employment increase of about 38,300 jobs. This is roughly equivalent to the employment that would be directly and indirectly supported by the construction and operation of 300 small manufacturing plants within Texas.** In addition, air emissions from power plants might be reduced by 20–22 % (also by 2023). The extent to which these benefits are realized will depend on the willingness of business and policy leaders to implement the recommendations that are found in the earlier assessment.[10] (emphasis added)

ACEEE also estimates that Texas economic multipliers for business efficiency improvements ranged from 11.9 (jobs/million dollars invested) for general increased consumer spending spurred by bill savings to 13.5 for direct efficiency investments, compared to only 2.4 for traditional utility increased spending.[11]

Q. In summary, what is the thrust of the economic development information contained in these reports and others that address the macroeconomic benefits of energy efficiency implementation?

A. All of these reports present information on the sizable macroeconomic benefits associated with implementation of increased energy efficiency resources. Energy

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[10] ACEEE Texas Report E073, from the abstract on page iv of the report.

[11] Laitner, op. cit., Table 2, p. 6.

efficiency is a distributed resource, utilizing local labor and supplies from a given region. The outcomes described in these reports reflect the known economic multiplier effects associated with investment, and thus are readily understandable. Energy efficiency or DSM implementation uses local skilled labor – electricians, HVAC technicians, engineers, energy auditors, accountants, computer technicians, database managers, etc. – in addition to the other support staff required to administer DSM efforts.

Q. What does the National Action Plan for Energy Efficiency say about energy efficiency and economic development?

A. The National Action Plan for Energy Efficiency[12] states the following:

> "**Economic development**. Greater investment in energy efficiency helps build jobs and improve state economies. Energy efficiency users often redirect their bill savings toward other activities that increase local and national employment, with a higher employment impact than if the money had been spent to purchase energy (Kushler et al., 2005; NYSERDA, 2004). Many energy efficiency programs create construction and installation jobs, with multiplier impacts on employment and local economies. Local investments in energy efficiency can offset imports from out-of-state, improving the state balance of trade. Lastly, energy efficiency investments usually create long-lasting infrastructure changes to building, equipment and appliance stocks, creating long-term property improvements that deliver long-term economic value (Innovest, 2002)."[13]

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[12] US DOE / EPA, July 2006. Duke CEO Jim Rodgers was one of the co-leaders of the Leadership Group that helped to put this report together.

[13] National Action Plan for Energy Efficiency, page ES-4.

3. RESPONSE TO OUCC TESTIMONY ON CARBON CAPTURE AND SEQUESTRATION

Q. What portion of Ms. Soller's testimony are you responding to?

A. I am responding to the sections of Ms. Soller's testimony on the need to address climate change and develop carbon capture and sequestration (CCS) technology. Ms. Soller states:

> "If coal is to be part of the solution for Indiana's energy future, IGCC with CCS must be explored" (Soller 6: 5-6)

Q. Does Ms. Soller propose a specific CCS target?

A. Yes. She proposes 20% carbon capture at Edwardsport in her concluding statement.[14]

Q. Will the construction of Edwardsport with 20% CCS result in CO_2 emission increases on Duke's system?

A. Yes.

Q. How do you respond to Ms. Soller's suggestion?

A. I agree with Ms. Soller's general concerns about climate change and the need for carbon capture and sequestration to be tested. However I believe there may be better solutions to those concerns, that would allow Indiana to explore CCS while avoiding the need to spend an extraordinary sum on a new supply resource that will ***increase*** Indiana's CO_2 emissions (even if outfitted with 20% CCS). As described in CACI, *et al.*'s direct testimony, there are also more cost-effective means to meet Duke's electric service need from low or no emission alternatives.

Q. What do you propose?

A. I propose that there be some investigation of the possibility to gain CCS knowledge by exploring the technological options for CCS at the existing IGCC plant in Indiana, Wabash River. This could allow the stated aim of the OUCC to

[14] Testimony of Joan Soller, 19: 19-22.

be met – gain experience with CCS technology so it can be used in the future – without incurring the unreasonable costs associated with building Edwardsport or the increase in CO_2 emissions associated with operating Edwardsport IGCC.

Q. Doesn't Wabash River employ a different type of IGCC technology than the Edwardsport facility would use?

A. Yes, it uses Conoco-Phillips' E-Gas technology. While I have not performed a study of carbon capture and sequestration applicable to the Wabash River Station specifically, to my knowledge there is no reason why CCS could not be successfully employed there. In fact, Exhibit 2 of the testimony of Douglas H. Cortez on behalf of the CATF and IWF describes a partial carbon dioxide capture case at a facility employing E-Gas technology.

Q. Isn't Duke in the process of transferring its portion of the Wabash River IGCC to the Wabash Valley Power Association (WVPA)?

A. Yes, however, my understanding is that the IURC has not ruled on the sale. As a product of this Cause, I would not expect that the IURC would or could mandate partial carbon capture and sequestration at the Wabash River IGCC; however, it could certainly encourage Duke to pursue that course of action.

Q. But can't the Edwardsport facility also employ partial carbon capture and sequestration?

A. Again, it doesn't make sense to build Edwardsport to capture and sequester CO2 because the underlying economics of building the Edwardsport IGCC in the first place are much less attractive than alternative options, as described in my direct testimony. Not only are there other resource approaches that are *both* less expensive and cleaner, but the negative economic development impact associated with higher electricity prices (due to Edwardsport) will hurt the state economy.

It is a far better and more reasonable proposition to explore the technological frontier of CCS at one of the few sites in the nation with coal-fired IGCC, Wabash River. Indiana is well-positioned relative to other states for CCS technology exploration or demonstration at a coal-fired facility because it has an existing IGCC plant. In the event that CCS at the Wabash River IGCC station is successful, an IGCC with 90% capture and sequestration could be built. As the

testimony of Mr. Cortez indicates, the addition of "water shift reaction equipment to [to the Edwardsport IGCC at this point] would almost certainly necessitate a re-design and re-engineering"[15] of the project. I would expect that the addition of shift reaction equipment, necessary to achieve 90% capture, would not be any easier once the facility is built and operating. As with retrofits of other environmental controls, it is my understanding that it is more straightforward and generally less costly to include them in the initial design.

Another benefit of implementing CCS at the existing Wabash River plant rather than at the "new" Edwardsport IGCC facility is that the experience from the CCS operations could be available in a more timely manner. With Edwardsport IGCC, the plant itself would be under construction until 2011. With CCS at Wabash River the CCS effort could likely be commenced earlier.

The opportunity to capture and sequester at an existing facility should not be overlooked in favor of a more expensive alternative that only promises to increase carbon emissions and foreclose opportunities for higher-performing investments in DSM, wind and combined heat and power. By targeting Wabash River for CCS exploration, Indiana can, in the meanwhile, meet its electric service needs at lower cost than with the proposed Edwardsport coal plant using lower-carbon or carbon-free resources such as DSM, wind power and combined heat and power applications.

Q. Does your ultimate recommendation to the IURC remain the same as you stated in your Direct testimony?

A. Yes. I recommend that the IURC reject the Joint Petitioners' Application for an IGCC plant at Edwardsport.

Q. Does this conclude your testimony?

A. Yes, it does.

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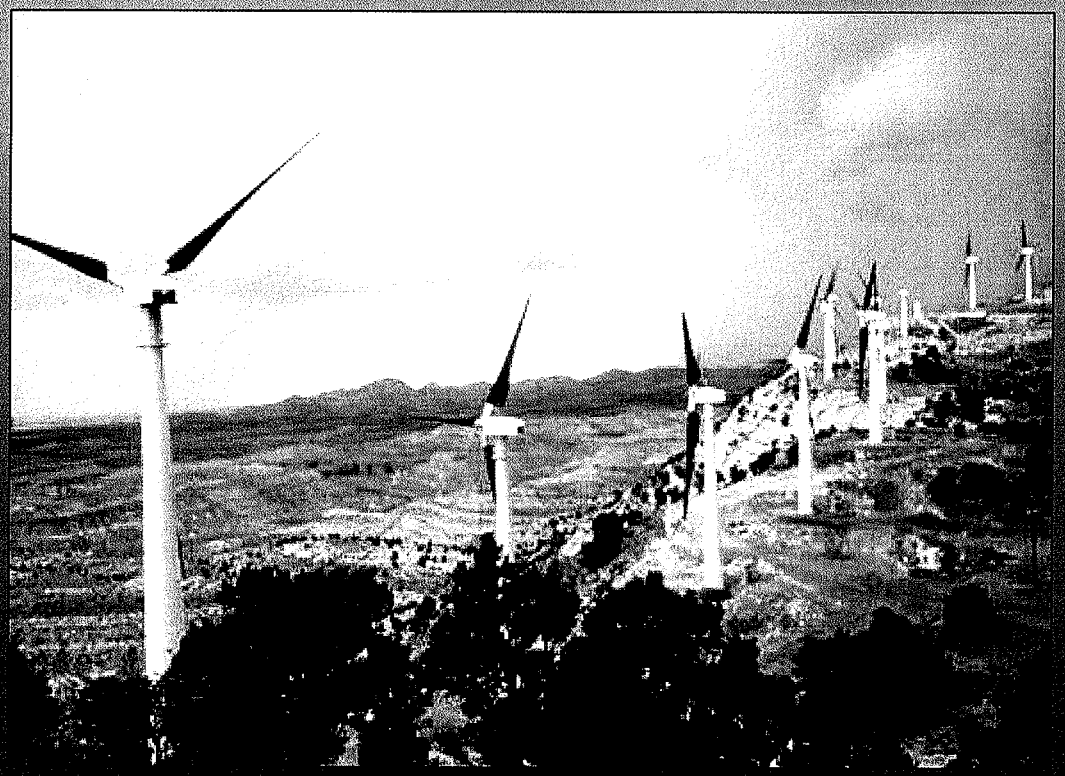
[15] Direct Testimony of Douglas Cortez, page 11, lines 15-16.

Economic Development Impacts

- Land Lease Payments: 2-3% of gross revenue $2500-4000/MW/year
- Local property tax revenue: 100 MW generates $500K-$1 million/yr
- 100-200 jobs/100 MW during construction
- 2-6 permanent O&M jobs per 50-100 MW
- Local industry: concrete, towers, electrical services
- Manufacturing and Assembly plants expanding in U.S. (e.g. IL, CA, ND, PA)

Source: NREL and Wind Powering America, April 3, 2007 Update

Case Study: Texas



Utilities and wind companies invested $1B in 2001 to build 912 MW of new wind power, resulting in:

- **2,500 quality jobs with a payroll of $75M**
- $13.3M in tax revenues for schools and counties
- $2.5M in 2002 royalty income to landowners
- Another 2,900 indirect jobs as a result of the multiplier effect
- $4.6M increase in Pecos County property tax revenue in 2002

Source: NREL and Wind Powering America, April 3, 2007 Update

Case Study: Minnesota

107-MW Minnesota wind project

- **$500,000/yr in lease payments to farmers**
- $611,000 in property taxes in 2000 = 13% of total county taxes
- 31 long-term local jobs and $909,000 in income from O&M (includes multiplier effect)

Source: NREL and Wind Powering America, April 3, 2007 Update

Case Study: Iowa

240-MW Iowa wind project

- $640,000/yr in lease payments to farmers ($2,000/turbine/yr)
- $2M/yr in property taxes
- $5.5M/yr in O&M income
- **40 long-term O&M jobs**
- **200 short-term construction jobs**
- Doesn't include multiplier effect

Source: NREL and Wind Powering America, April 3, 2007 Update

Case Study: New Mexico

- 204-MW wind project built in 2003 in DeBaca and Quay counties for PNM
- 150 construction jobs
- 12 permanent jobs and $550,000/yr in salaries for operation and maintenance
- $550,000/year in lease payments to landowners
- **$450,000/year in payments in lieu of taxes to county and school districts**
- Over $40M in economic benefits for area over 25 years

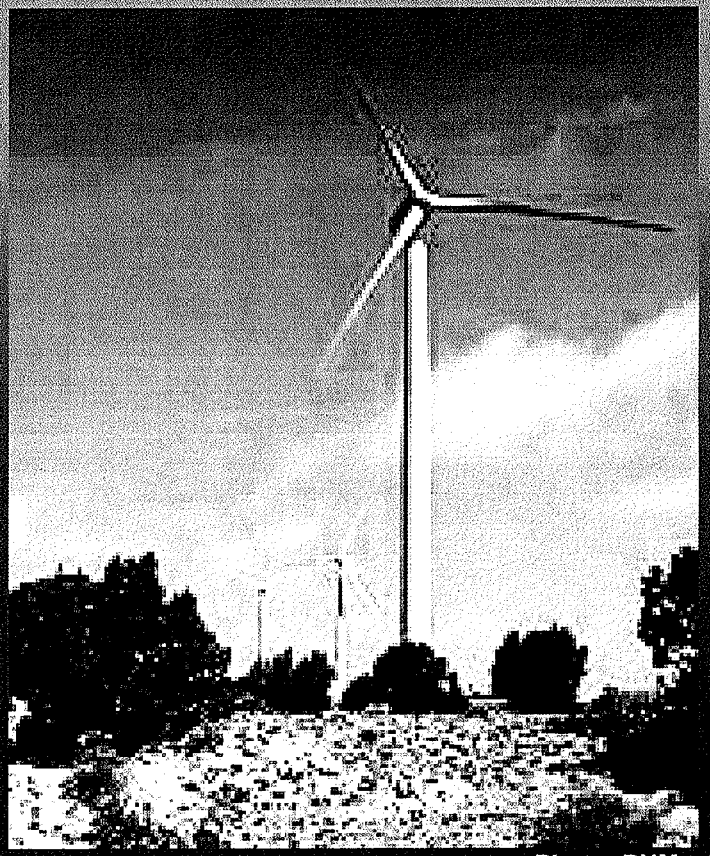


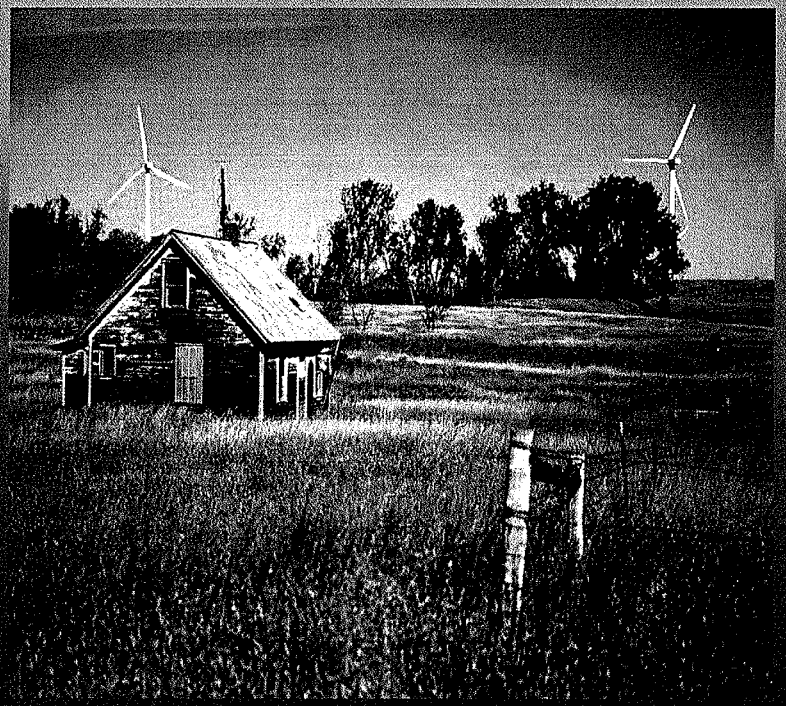
Photo: PNM

Source: PNM, New Mexico Wind Energy Center Quick Facts, 2003.

Case Study: Hyde County, South Dakota

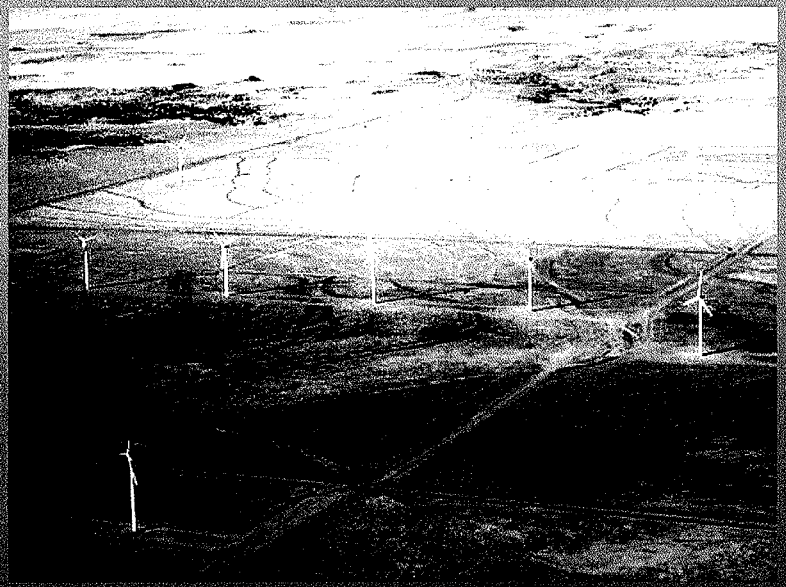
40-MW wind project in South Dakota creates $400,000 - $450,000/yr for Hyde County, including:

- More than $100,000/yr in annual lease payments to farmers ($3,000 - $4,000/turbine/yr)
- $250,000/yr in property taxes (25% of Highmore's education budget)
- 75 -100 construction jobs for 6 months
- 5 permanent O&M jobs
- Sales taxes up more than 40%
- Doesn't include multiplier effect



Source: NREL and Wind Powering America, April 3, 2007 Update

Case Study: Prowers County, Colorado



- 162-MW Colorado Green Wind Farm (108 turbines)
- $200M+ investment
- 400 construction workers
- 14-20 full-time jobs
- Land lease payments $3000-$6000 per turbine
- **Prowers County 2002 assessed value $94M; 2004 assessed value +33% (+$32M)**
- **Local district will receive 12 mil tax reduction**
- Piggyback model

"Converting the wind into a much-needed commodity while providing good jobs, the Colorado Green Wind Farm is a boost to our local economy and tax base."

John Stulp, county commissioner, Prowers County, Colorado

CERTIFICATE OF SERVICE

The undersigned hereby certifies that the foregoing document has been served upon the following by first class, United States mail, postage prepaid on May 31, 2007

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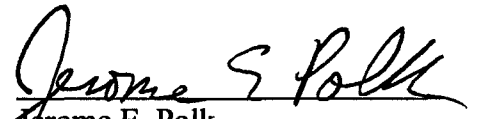

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