

The Economic Impact of the High Banks Wind Project

Donna K. Ginther

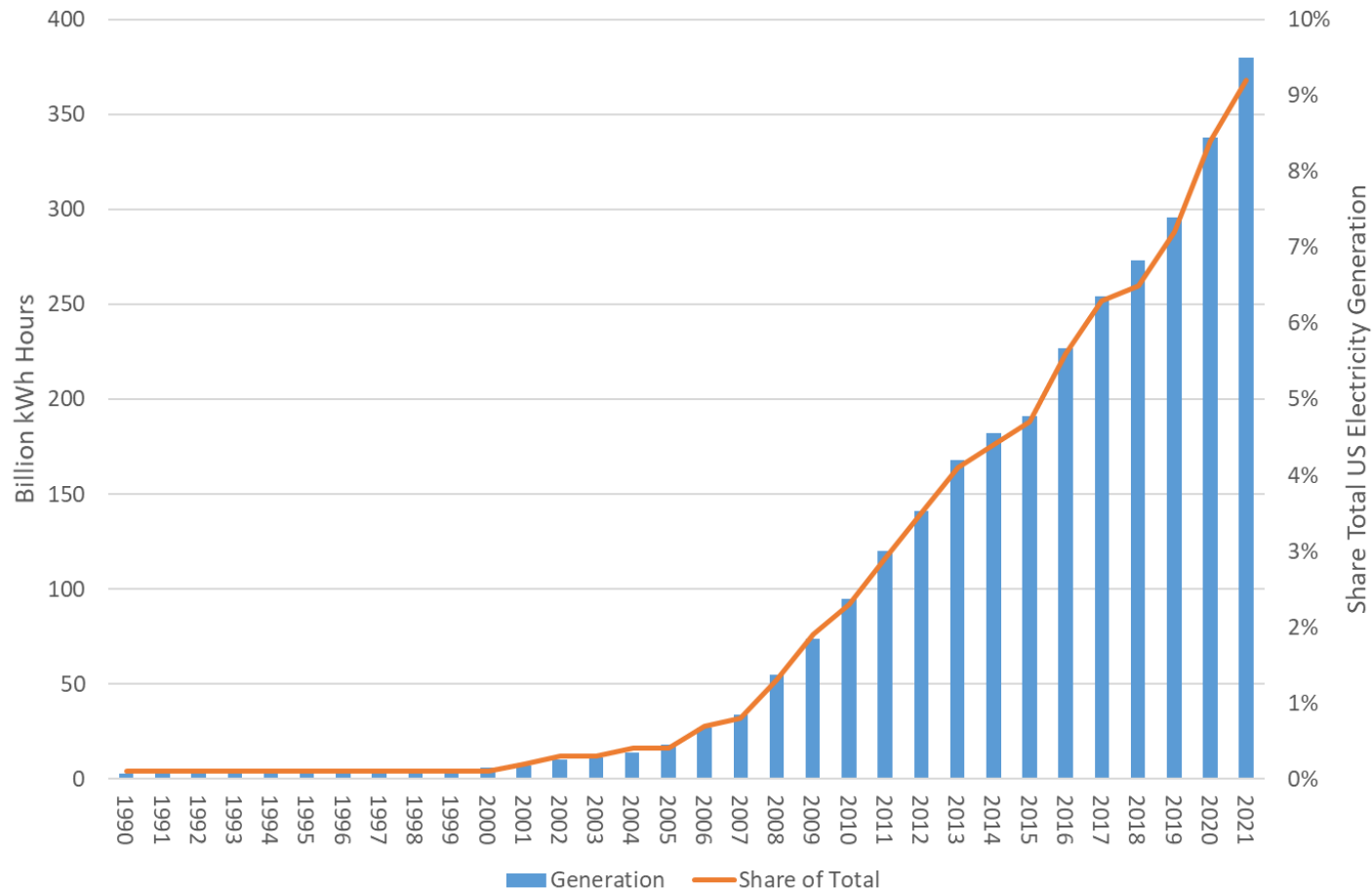
Roy A. Roberts Distinguished Professor of Economics
Director, Institute for Policy & Social Research, University of Kansas
Research Associate, National Bureau of Economic Research

October 4, 2022

KU INSTITUTE FOR
POLICY &
SOCIAL RESEARCH
The University of Kansas

Background: Wind Energy

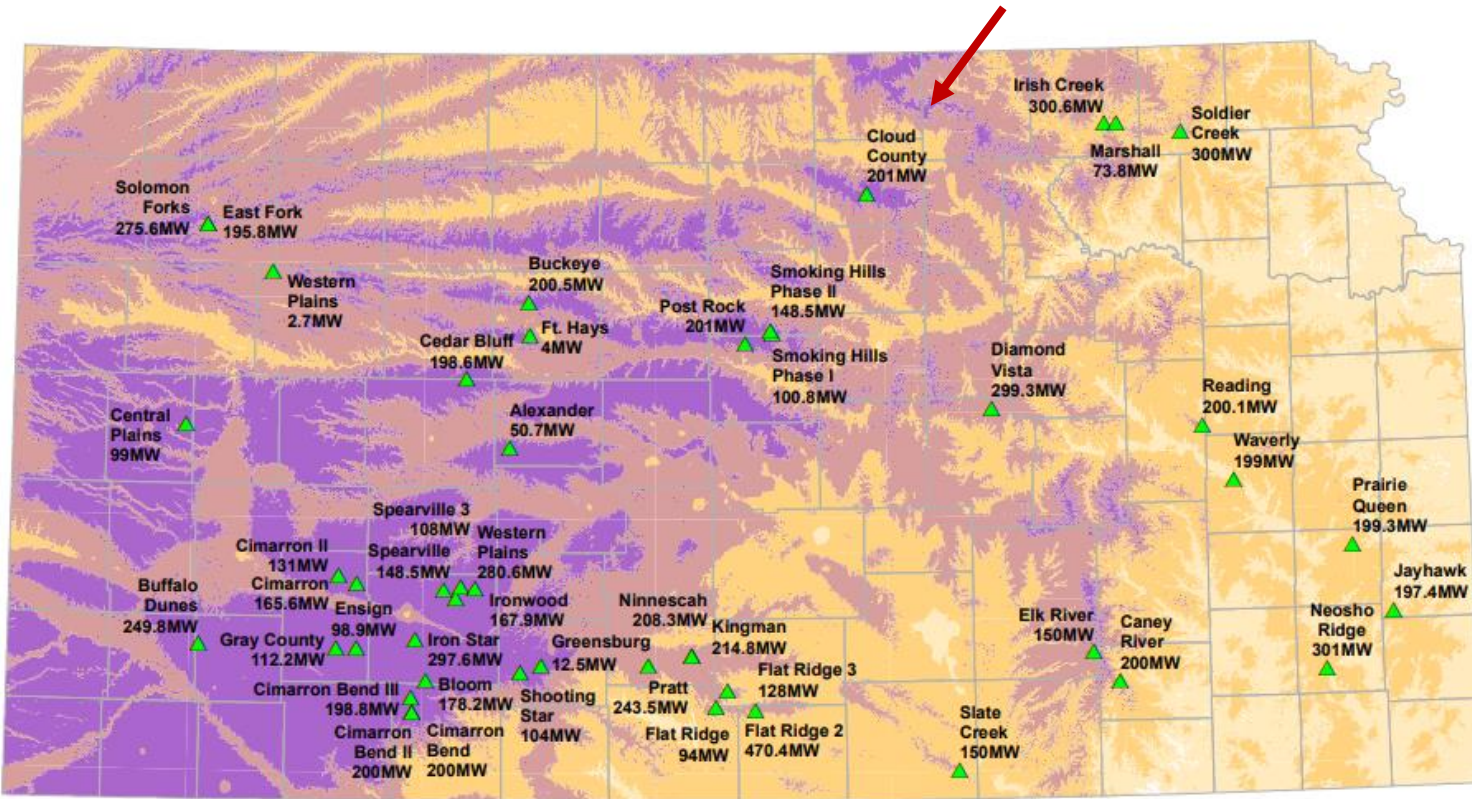
U.S. Wind Energy Generation and Generation as a Share of Total Electricity Generation



- Largest single source of energy in Kansas.
- Largest source of new generating capacity in the nation in 2020.
- Biden administration aims to cut all carbon emissions from electricity generation by 2035.

High Banks Wind

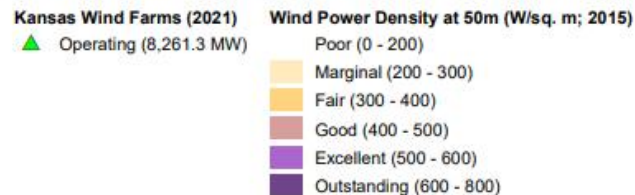
Wind Farms and Wind Resource Potential in Kansas



- Proposed wind farm near Belleview, KS on the border of Washington and Republic Counties.
- Generating capacity of 650 megawatts.
- Would be the largest wind farm in Kansas.
- Approximate location shown left.

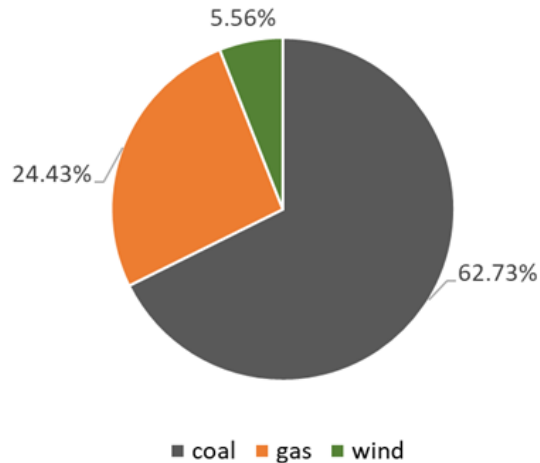
Source: Institute for Policy & Social Research, The University of Kansas; data from the National Renewable Energy Laboratory with wind farm data from the U.S. Energy Information Administration.

MW - megawatts

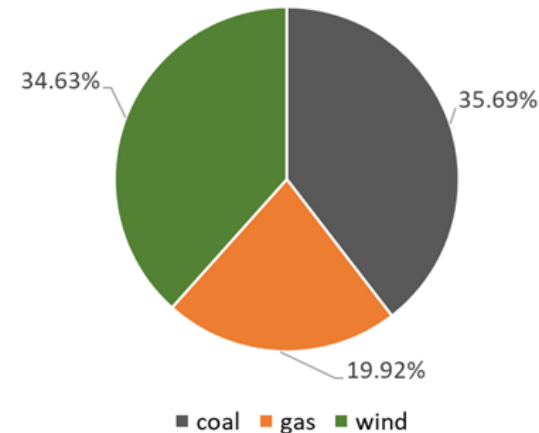


The Southwest Power Pool

Contributions to the Southwest Power Pool:
Electricity Generation by Source, 2011



Contributions to the Southwest Power Pool:
Electricity Generation by Source, 2021

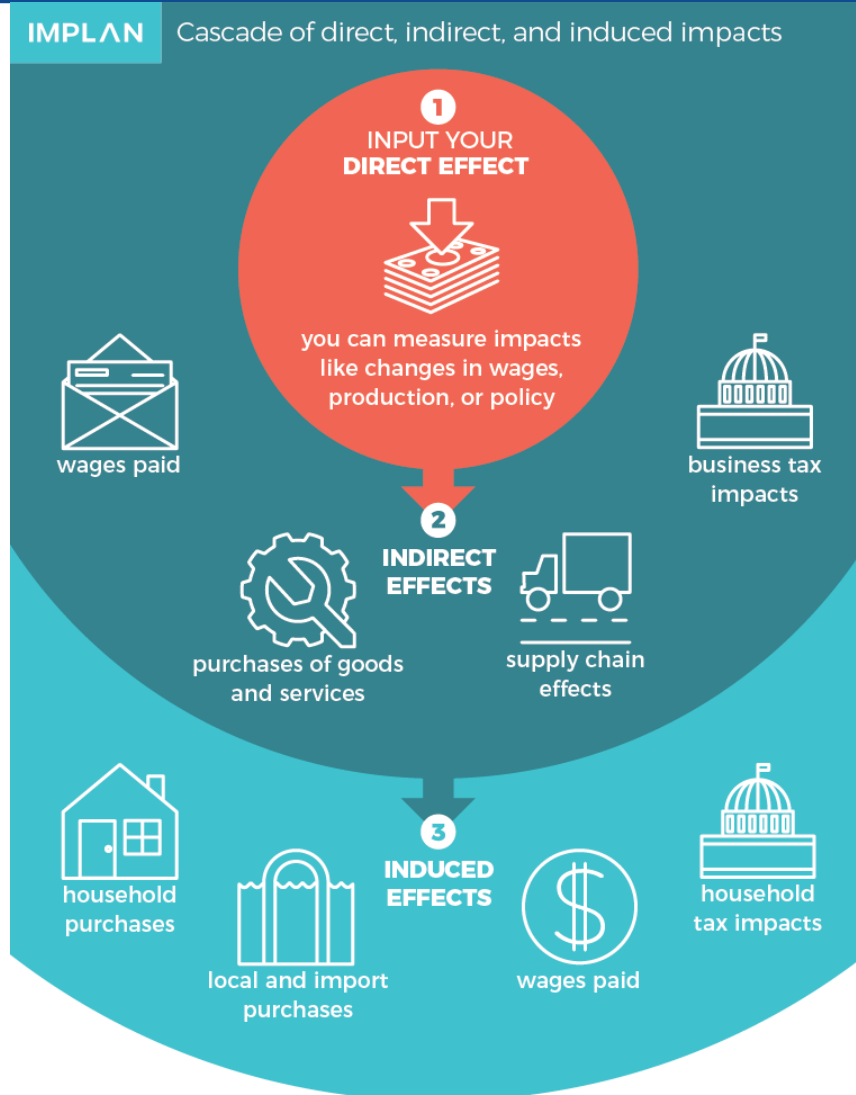


- Serves all of Kansas and Oklahoma, parts of 12 other states.
- From 2011-2021, Wind's contribution increased from 5.6% to 34.6%.
 - Coal decreased from 62.7% to 35.7%
 - Natural gas decreased from 24.4% to 19.9%

Regional Economy

- Washington and Republic Counties have a combined population of 10,204, with 4,151 total private nonfarm employees.
- Largest industries by number of employees in 2020:
 - Government: 1,257
 - Retail trade: 563
 - Manufacturing: 409
 - Nonfarm proprietors: 1,472
 - Farm employment: 1,436

Economic Impact Analysis



- For this study we use the IMPLAN model.
- Estimates flow of money throughout an economy.
 - Initial spending is called direct impact
 - Indirect impacts include business to business spending, such as per diem spending on lodging
 - Induced impacts include increased spending by households due to the direct and indirect impacts

Sources of Economic Impact

Type of Activity	Construction Phase	Operations Phase
Construction activities-labor and materials	x	
Employee per diem living expenses	x	
Tax implications	x	x
Operating expenses		x
Payments to landowners		x
Changes in government spending		x

- Focus on two geographies: the state of Kansas and Washington and Republic counties.
- Impacts divided into the construction and operations phase.
- Construction will take approx. 1 year. Operations will last 30 year lifetime of the project.



Economic Impact Construction Phase

Key Assumptions for Construction Phase

Expense	Estimate	Notes
Employment		
Employees (#)	450	
Outside Kansas	90	
Kansas	360	
Republic and Washington Counties	15	Estimate based on unemployment and other factors.
Surrounding Counties North Central KS	55	Estimate based on unemployment and other factors.
Wages and Compensation		
Annual wages inc. overtime (\$ per employee)	88,660	
Annual benefits (\$ per employee)	28,041	
Annual compensation (wages plus benefits) per emp. (\$)	116,701	
Per Diem		
Number receiving per diem	380	
Amount per week (\$ per employee)	690	
Total annual per diem (\$)	13,634,400	
Amount per diem spent in Republic and Washington (\$)	4,311,880	
Materials		
Sand and gravel (\$)	11,211,229	
Amount from Kansas	10,090,106	Estimated 10% of sand and gravel from Nebraska.
Amount from Republic and Washington	5,045,053	Remainder from surrounding counties.
Fuel (\$)	2,119,038	Spending at fuel wholesalers and retailers. The IMPLAN model adjusts for the location of the original fuel source.

- Given estimates provided by NextEra and research into the local economy and wind farm construction, we assume:
 - About 450 employees will be needed for construction.
 - Wages and benefits will average \$116,701 per employee.
 - \$4.3 million in per diem will be spent in the two-county region.
 - Almost half the sand and gravel required will come from the two county region.

Employment & Property Income--State

Table X.3. Impact of Construction Activities: Statewide

Impact	Employment	Employee Compensation (\$)	Property Income (\$)
1 - Direct	450.0	52,515,300	0
2 - Indirect	63.7	4,543,109	2,874,954
3 - Induced	211.8	10,189,986	9,751,274
Total	725.5	67,248,395	12,626,229

- Total employment: 726
- Employee Compensation: \$67 million
- Property Income \$12.6 million

Per Diem Spending--State

**Table X.5. Impact of Per Diem Employee Spending:
Statewide**

Impact	Employment	Employee Compensation (\$)	Property Income (\$)
1 - Direct	140.6	3,976,226	2,906,598
2 - Indirect	24.8	1,365,710	778,496
3 - Induced	22.6	1,088,960	913,848
Total	188.0	6,430,895	4,598,942

Note; direct employment occurs primarily in lodging, food service, and gasoline and convenience store industries.

- Per diem spending makes up a large part of the impact of construction:
 - Statewide impact of per diem includes \$6.4 million in employee compensation and \$4.5 million in property income
 - Total employment created by per diem spending statewide: 188
 - Note that employment is in job-years (i.e. one job for one year)

Per Diem Spending--Counties

Table X.6. Impact of Per Diem Employee Spending:
Republic and Washington Counties

Impact	Employment	Employee Compensation (\$)	Property Income (\$)
1 - Direct	51.6	956,667	844,028
2 - Indirect	3.6	115,795	55,479
3 - Induced	2.2	65,770	91,785
Total	57.4	1,138,232	991,292

- Per diem spending makes up a large part of the impact of construction:
 - Locally compensation will be \$1.1 million
 - Property income will be \$991 thousand
 - Total employment created within the region: 57.4
 - Note that employment is in job-years (i.e. one job for one year)

Tax Generation During Construction

Tax Type	Kansas (\$)	Republic and Washington Counties (\$)
Sales	1,566,163	37,926
Income	1,341,176	
Property	64,028	4,586
Other taxes and fees	142,669	
Total	3,114,036	42,512

Note: the table does not include IMPLAN's estimated changes in property taxes for business. It is unlikely that businesses will expand property for a one-year surge in business.

Note: most direct NextEra construction purchases are sale tax exempt.

Note: the table does not include NextEra's in lieu of tax payments or direct property tax payments, which are analyzed in a separate section.

- Taxes generated during construction statewide include:
 - \$3.1 million total
 - \$1.6 million in additional sales tax
 - \$1.3 million in income
 - \$64 thousand in property
 - \$143 thousand other taxes and fees
- Local taxes generated include:
 - \$42 thousand total
 - \$38 thousand addition sales tax
 - \$5 thousand in property tax



Economic Impact Operations Phase

Key Assumptions for Operations Phase

Expense	Estimate
Total employees (#)	16
Republic and Washington Counties (\$)	16
Annual labor compensation per emp. (wages plus benefits)	93,750
Annual total labor payments (\$)	1,500,000
Annual purchased materials (\$)	116,000
Annual payments to landowners	4,966,667
in Republic and Washington Counties	4,616,667
NextEra profits and other property income	confidential
Expected years of operation	30

- Given estimates provided by NextEra and research into the local economy and wind farm construction, we assume:
 - 16 new full-time employees in the region
 - Each employee receives \$93,750 in annual compensation.
 - \$5 million in annual payments to landowners

Annual Statewide Impact of Operations

**Table X.9. Annual Impact of Utility Operations:
Statewide**

Impact	Employment	Employee Compensation (\$)	Property Income (\$)
1 - Direct	16.0	1,500,000	confidential
2 - Indirect	0.4	30,393	31,645
3 - Induced	6.5	311,577	261,717
Total	22.9	1,841,970	293,363

- Total Employee Compensation
 - \$1.8 million
- Total Property Income
 - \$300,000
- 81% of this impact accrues to Washington & Republic Counties.

Annual Taxes Generated During Operations

Table X.13. Taxes Generated during Operations Phase for Kansas and for Republic and Washington counties

Tax Type	Kansas (\$)	Republic and Washington Counties (\$)
Sales	167,784	14,645
Income	78,402	
Property	139,090	119,238
Other taxes and fees	9,754	
Total	395,030	133,883

Note: the table does not include Next Era's in lieu of tax payments or its direct property tax payments, which are analyzed in a separate section. The table also excludes NextEra's corporate income taxes, which are unknown.

- Total statewide taxes generated during operations will be \$395 thousand:
 - Statewide sales tax: \$167 thousand
 - Statewide inc. tax: \$78 thousand
 - Statewide prop. tax: \$139 thousand
 - \$134 thousand in local taxes
- **\$134 thousand in local taxes**
 - \$14 thousand in sales
 - \$119 thousand in prop.

Property Tax and in Lieu of Tax Payments

Payment Year	Contribution or Tax (\$)	Washington (\$)	Republic (\$)
Tax exempt period: NextEra payment in lieu of taxes			
Initial contribution	1,082,602	149,400	933,202
Annual years 1-10	973,440	134,460	838,980
Total tax exempt years	10,817,002	1,494,000	9,323,002
Taxable period: NextEra property tax payments			
Average annual years 11-30	12,000,000	1,644,000	10,356,000
Total years 11-30	224,000,000	30,688,000	193,312,000
Total all years	234,817,002	32,182,000	202,635,002

- NextEra will make payments in Lieu of Tax for first ten years:
 - Annual cont. of ~\$1 million in two county area for first ten years
- Will then pay property tax for years 11-30.
 - Total \$193 million to Republic county and \$31 to Washington county
 - Total all years: \$235 million to the two counties

Tax Feedbacks into Region

Time period	Employment	Employee Compensation (\$)	Property Income (\$)
Construction year	11.7	484,642	131,752
Years 1-10	10.5	435,774	118,467
Years 11-30	129.3	5,371,971	1,460,396

- New tax revenue will make up a significant amount of the local government budget in the region.
- We forecast the impacts of increased government spending due to the project.
- Construction year:
 - 11.7 new job/years
 - Employee compensation: \$485 thousand
 - Property income: \$132 thousand
- Operations years:
 - 140 new job/years
 - Employee compensation: \$5.8 million
 - Property income: \$1.6 million

Summary of Economic Impact

Table X.16 Summary of High Banks Economic Impacts

Impact Source	Kansas State Level Analysis			County Level Analysis		
	employ (#)	labor compensatio n (\$)	property income (\$)	employ (#)	labor compensatio n (\$)	property income (\$)
Construction phase, year 0						
Facility construction	725.5	67,248,395	12,626,229	58.6	2,346,901	1,385,823
Per diem expenditures	188.0	6,430,895	4,598,942	57.4	1,138,232	991,292
NextEra property payments to local govt.	11.7	484,642	131,752	11.7	484,642	131,752
Present value, year 0	925.2	74,163,932	17,356,923	128	3,969,775	2,508,867
Operations phase, annual years 1-10						
NextEra operations	22.9	1,841,970	293,363	19.3	1,602,353	138,100
Landowner payments	31.1	1,501,227	6,247,009	14.4	423,906	5,186,601
NextEra property payments to local govt.	10.5	435,774	118,467	10.5	435,774	118,467
Present value, years 1-10	523.2	30,650,840	54,009,149	358.5	19,969,293	44,148,968
Operations phase, annual years 11-30						
NextEra operations	22.9	1,841,970	293,363	19.3	1,602,353	138,100
Landowner payments	31.1	1,501,227	6,247,009	14.4	423,906	5,186,601
NextEra property payments to local govt.	129.3	5,371,971	1,460,396	129.3	5,371,971	1,460,396
Present value, years 11-30	1,682.9	80,015,156	73,456,151	1,496.5	67,924,167	62,294,909
Total present value	3,131.3	184,829,928	144,822,223	1,982.7	91,863,235	108,952,744

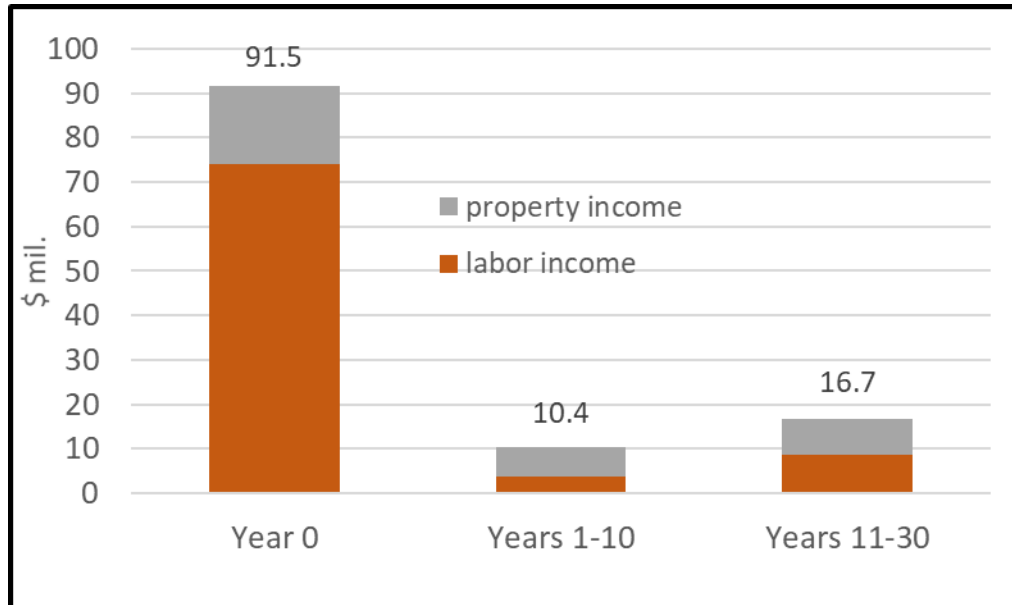
Note that the present value for employment numbers is the number of **employment years**, discounted to take account of the time period in which the employment occurs.

Note: the present value calculations use a 4.0% discount rate.

- Using present value calculations (4% discount rate) to adjust and then add up the previous findings.
- Total state level impact: **~\$185 million** employment income, **~\$145 million** property income.
- Total impact on two county area: **~\$92 million** employment income, **~\$109 million** in property income.

Annual Economic Impacts by Phase

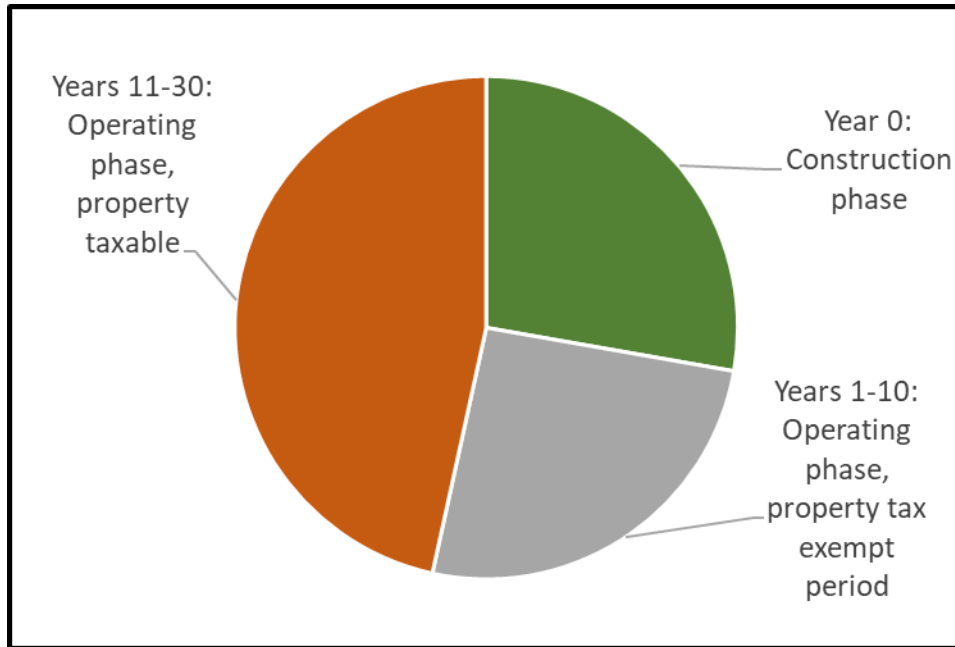
Annual Economic Impacts of the High Banks Project on Kansas
(in 2022 \$ million)



- Annual economic impact will vary by phase, shown left:
 - \$91.5 million in total impact from construction in year 0
 - \$10.4 million in years 1-10 (property tax exempt period)
 - \$16.7 million in years 11-30

Total Economic Impact by Phase

Contribution to Total High Banks Present Value by Project Phase



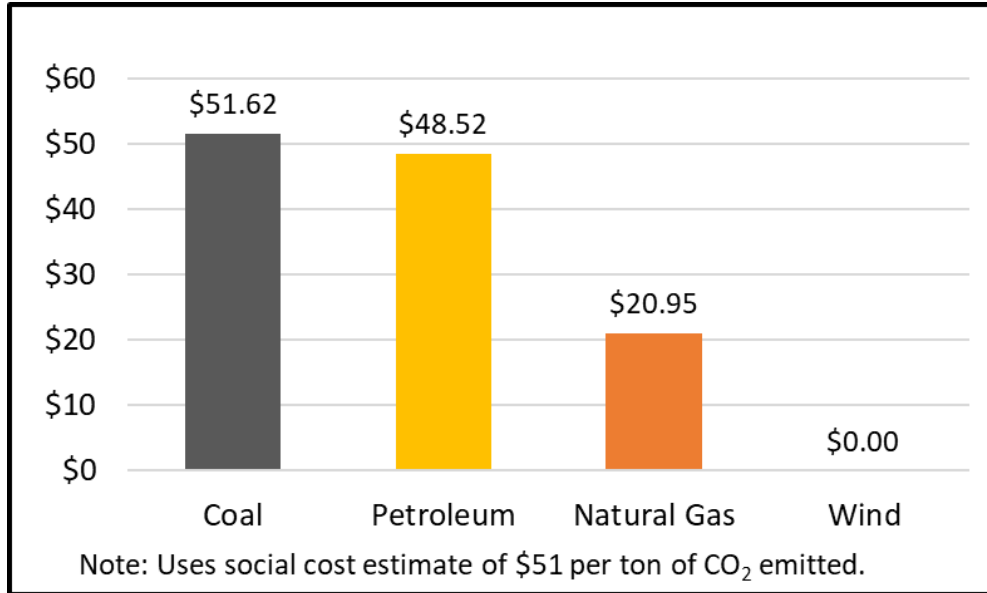
- The largest share, (47%) of total present value comes from years 11-30, where High Banks will be not be property tax exempt.
- Followed by year 0 construction: 28%
- Years 1-10: 26%.



Economic Impact Benefit of Decarbonization

Costs of Carbon Emission

Social Cost of Carbon Emissions per MWh by Generation Source



Source: U.S. Energy Information Administration. <https://www.eia.gov/tools/faqs/faq.php?id=74&t=11> and calculations of authors.

Note that social costs are calculated using a value of \$51/ton.

- EIA estimates and calculations using Biden administration estimate of carbon cost (\$51 per metric ton emitted).
- Coal costs \$51.62 per megawatt hour produced.
 - Natural Gas: \$20.95 per MWh
 - Petroleum: \$48.52 per MWh

Cost of Carbon Emissions

- Based on SPP generation trends, we assume all electricity generation replaced by the project will be from coal.
- High Banks will produce 2,801,000 MWh * \$51.62/MWh (coal emissions valued at \$51/ton) = **\$144,600,000** per year.
- Over 30 years, adjusting for present value, this is **\$2.5 billion**.
- Using higher estimate of carbon cost (\$185/ton from a recent article in *Nature*): **\$524,500,000** per year.
- Trump administration figure of \$5/ton: **\$14,175,000** per year.

Total Benefit of High Banks Wind Project

- Using present value calculations (4% discount rate) to adjust and then add up the previous findings.
- Total state level impact: ~**\$185 million** employment income, ~**\$145 million** property income.
 - **Total benefit over time: \$330 million for the state**
- Total impact on two county area: ~**\$92 million** employment income, ~**\$109 million** in property income.
 - **\$201 million** or 60% of that benefit will accrue to Washington and Republic Counties.
- Total Benefit to Society: **\$2.5 Billion**

Thank You!

Thank You
Mahalo
Kiitos
Tack
Toda
Grazie
Thanks
Obrigado
Takk
Danke
Gracias
Merci