Attachment K
Economic Report

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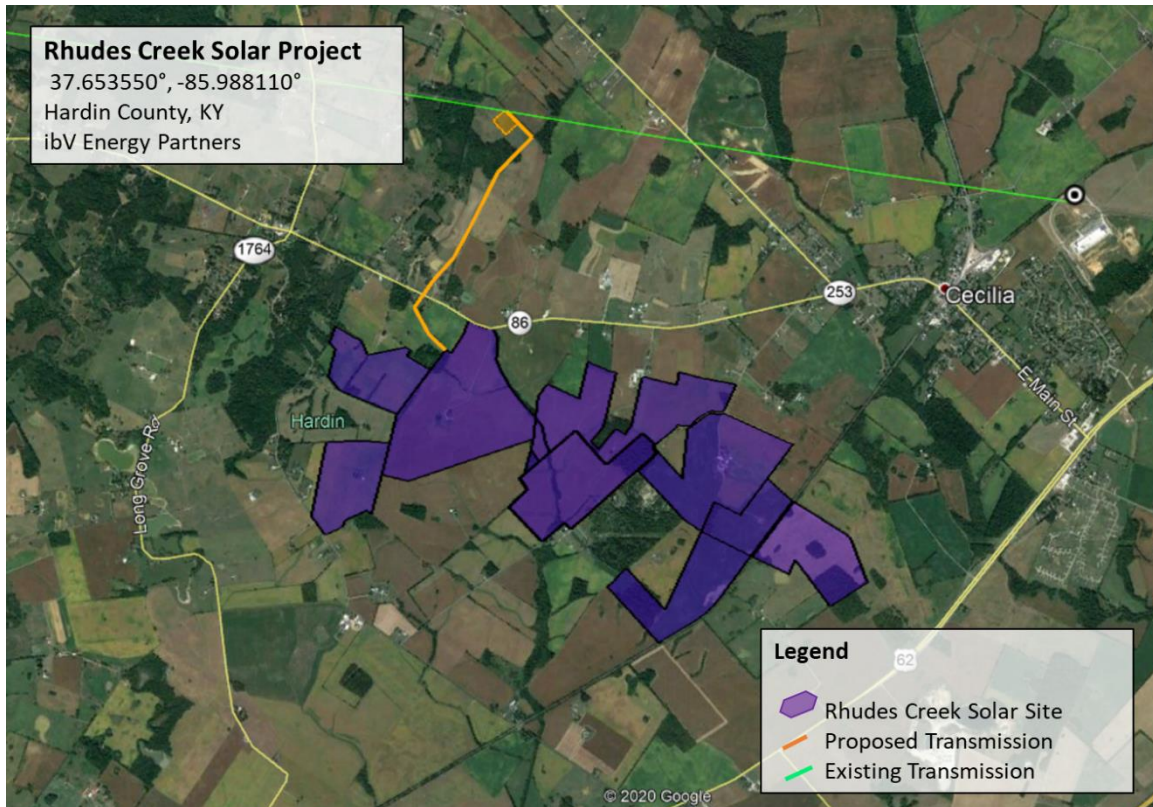
FROM: Paul Coomes

RE: Economic and fiscal impact of Rhudes Creek solar energy project

This note provides estimates of the new economic and fiscal activity expected from the proposed Rhudes Creek solar energy project, near Cecilia, in Hardin County, Kentucky. ibV Energy Partners is developing the 968-acre site, which will have an electricity generation capacity of 100 megawatts. Projects of this size typically require an investment of over $100 million. The company and the County government are negotiating a financial agreement in support of an industrial revenue bond in which the company will make annual payments in lieu of taxes (PILOT) to local government jurisdictions, in addition to other property and income-related taxes due.

There are two primary impacts expected from the project. First, there will be a one-time spike in construction and linked jobs as the site is built out over approximately one year. Using data from other similar projects and an economic model of the County, I estimate that there will be a total of 312 new jobs in the County in year one, with new payroll of $15.2 million. Second, there will be 35 years of new property tax and PILOT payments to state and local jurisdictions in Hardin County due to the increased value of real estate, machinery and tangible property installed at the site. New property taxes to jurisdictions are expected to be $2.35 million over the subsequent thirty-five years.

The site

The site is just west of Cecelia, and about seven miles west of Elizabethtown – the county seat of Hardin County. The land is currently in agricultural use. One can see in the map below the farmland, with Highway 86 on the north side of the site.

Construction phase

I anticipate that the company will invest over $100 million in the solar project. The investment involves land acquisition, site preparation, solar panel and electrical equipment installation, plus landscaping and security fencing. ibV Energy Partners will hire construction companies for this project. Using data from other studies, I estimate that construction will directly require about 240 job-years, and on-site labor costs will amount to $12 million, or $50,000 per construction job[1]. The average annual pay for all jobs in Hardin County in 2019 was $47,200[2].

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[1] A University of California-Berkeley study looked at six large PV projects in California, and summarized the economics. The author finds a ratio of 2.4 FTE construction jobs per MW. Applied to the Rhudes Creek 100 MW you get 240 direct construction job-years. He shows the permanent operations jobs per MW, and applied to Rhudes Creek you get about 3 FTEs. See page 28 of *Economic and Environmental Benefits of Building Solar in California*, by Peter Philips, November 10, 2014, https://laborcenter.berkeley.edu/pdf/2014/building-solar-ca14.pdf

[2] Source: US Bureau of Economic Analysis, average annual wages and salaries in county.

It is not possible to know precisely the ultimate number of construction-related jobs, since many subcontractors will be involved, each with their own decisions to make about staffing. The subcontractors, for example, may choose to use fewer highly skilled workers or more less-skilled workers, depending on local labor market conditions. I estimate the average annual pay will be $50,000 per construction job.

Occupations include construction managers, earth grader operators, panel installers, electricians, and fencers. I searched the federal database on hundreds of occupations to learn how much these workers are likely to earn on the project. There is no listing in the Kentucky data for "Solar Photovoltaic Installer", but the national average annual wage is $46,850[3]. Good inferences about other relevant occupations can be gleaned from the next table. The construction managers are likely to earn over $80,000, heavy equipment operators around $50,000, installers around $45,000, electricians around $53,000, and fencers $30,000. These data suggest that the $50,000 average pay assumed for construction jobs is reasonable.

Kentucky Wages for Related Occupations, 2019			
Occupation (SOC code)	Employment	Hourly mean wage	Annual mean wage
Construction Managers(119021)	1,770	$40.18	$83,570
Operating Engineers and Other Construction Equipment Operators(472073)	4,670	$24.72	$51,410
Electricians(472111)	9,880	$25.69	$53,440
Fence Erectors(474031)	250	$14.47	$30,090
Industrial Engineers(172112)	5,590	$38.69	$80,480
Materials Engineers(172131)	260	$38.36	$79,790
Mechanical Engineers(172141)	4,180	$39.57	$82,300
Heating, Air Conditioning, and Refrigeration Mechanics and Installers(499021)	4,290	$20.57	$42,780
Electrical Power-Line Installers and Repairers(499051)	2,680	$29.95	$62,300
Telecommunications Line Installers and Repairers(499052)	1,090	$22.95	$47,740

Source: US Bureau of Labor Statistics, Occupational Employment Survey, https://data.bls.gov/oes/#/home

Spin-off impacts in Hardin County

The construction phase will have some spin-off effects in Hardin County. I model this using a custom IMPLAN model of the County[4]. The relevant sector for the construction phase is number 52, "Construction of new power and communication structures", and

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[3] See www.bls.gov/ooh/construction-and-extraction/solar-photovoltaic-installers.htm#tab-1 , with details in the lookup database https://data.bls.gov/oes/#/home , Standard Occupational Code #472231 as of May 2019.

[4] For documentation of IMPLAN modeling, see www.implan.com/history/ . The model provides estimates of the linkages among over 500 industries in Hardin County.

this can be used to model the initial investment. The <u>direct effect</u> in the County is 240 jobs over one year, with a payroll of $12 million.

The model has detailed information about the inter-industry linkages in each regional economy, as well as the expected household spending on retail goods and services due to the enhanced employee compensation. When there is new industrial activity in a region, the model can predict how much of the supply chain can be met by local businesses and how much the new payroll will result in additional sales by local businesses. Adding these two effects to the direct effect yields the <u>total effect</u> of a development, and dividing the total effect by the direct effect yields a multiplier. Using the Hardin County multipliers for the relevant construction sector, and the direct construction budget, I project there will be a <u>total</u> of 312 new jobs in the County, and new payroll of $15.2 million.

There will also be some modest spin-off impacts from ongoing operations. I expect operations to support only about three permanent jobs. Unfortunately, for the operations phase, the relevant IMPLAN sector, number 42, "Electric Power Generation – Solar", is empty of data and results for Hardin County. This is because there is no history of solar electricity generation and therefore no basic economic data to construct industry relationships. A reasonable recourse is to tap the literature on solar project impacts, find comparable places, and use other studies to estimate the likely operational impacts on local economies in Kentucky. A California PV study, cited above, of six large solar farms found a ratio of 31.3 MW electricity capacity per permanent operations job. Applied to the Rhudes Creek project, this results in an estimate of only three permanent operational jobs at the site. Another example, the Shugart solar farm in Maryland was studied extensively, and analysts projected that annual operations will support a total of only four jobs in the County (including modest spinoff activity)[5]. Thus, ongoing annual economic impacts are expected to be very small relative to the one-time impacts of construction.

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[5] See pages 13-14 of the July 31, 2019 study of the Shugart, Maryland project: https://mde.maryland.gov/programs/Water/WetlandsandWaterways/Documents/Solar/Shugart-Solar-Socio-Economic-Justification-Report-FINAL.pdf

Local tax revenues, IRB, PILOT agreement

Hardin County and the Commonwealth of Kentucky levy property taxes on real estate and tangible property, with the state also taxing manufacturing machinery. The table below provides the latest tax rates that are applied County-wide. They total about one percent of the assessed value of property. There are six other municipal taxing jurisdictions in Hardin County, but the Rhudes Creek project is outside their city boundaries and thus would not be subject to those property taxes. Hardin County does not levy a county-wide occupational license fee (payroll) or a net profits tax.

The County and the company are negotiating an Industrial Revenue Bond (IRB) and a Payment in Lieu of Taxes (PILOT) agreement, whereby the company makes annual payments to the County jurisdictions. The company and

Hardin County Property Tax Rates, 2020		
in cents per $100 valuation		
Jurisdiction	Real Estate	Tangible Personal
Extension Services	1.7380	2.5787
Fiscal Court - General	12.4000	13.1000
Health Department	2.2000	2.2000
Soil Conservation	16.4880	17.8787
County Public Schools	65.2000	65.2000
Total, County-wide	98.0260	100.9574

Source: Kentucky Department of Revenue
https://revenue.ky.gov/News/Publications/Pages/Pro

its consultants made projections of the increased land value and the annual value of machinery and tangible property, under standard depreciation schedules, over the subsequent thirty years. Current property tax rates were applied, and annual tax estimates were calculated. The company estimates that local and state governments will $2.35 million over the next thirty-five years. These payments, averaging around $67,000 per year, can be compared to the few thousand dollars per year currently paid by landowners of the site (almost all of which is assessed at its agricultural use value). It should be pointed out that solar projects like this require almost no public services from local government; and because they require so few people to operate do not add students and expenses to the Hardin public school system.