March 31, 2023

Dr. Brad Borum, Director
Indiana Utility Regulatory Commission
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Submitted via electronic mail

RE: Comments and Recommendations on AES Indiana's (formerly IPL) 2022 Integrated Resource Plan

Dr. Borum,

The Hoosier Environmental Council (HEC) is submitting the comments and recommendations below for AES's 2022 Integrated Resource Plan (IRP) to the Indiana Utility Regulatory Commission. HEC is the voice of the people for the environment in Indiana to tackle our environmental challenges and help make our state a healthier, better place to live and do business. We represent Hoosiers who advocate for addressing climate change and implementing clean and resilient energy to our electrical grid.

Overall, in review of AES Indiana's IRP, HEC has three main points:

1. Energy decision-making is vital for addressing climate change in Indiana. AES Indiana can make a profound impact on greenhouse gas emissions through energy efficiency, renewable energy, demand response, and battery storage deployment. Adopting such measures makes AES Indiana attractive for businesses aiming to meet their sustainability commitments[1] and investors aiming to lessen future financial risk.
2. HEC appreciates AES Indiana's commitment to adding 1300 MW of renewable energy by 2027, retiring coal units, and expanding battery storage. All play a role in increasing grid resilience in a time of electrification and a changing climate.
3. HEC asks AES Indiana to consider responsible development and management of solar, wind, and storage systems. The implementation of these systems should include secondary benefits to communities through community solar models, multi-land use practices, and redevelopment.

[1] Open Letter to AES Indiana. (2022). https://info.aee.net/hubfs/Indiana%20Green%20Tariffs%20Sign-on%20Letter-2.pdf

Indiana's climate data reveals increased average temperatures, rainfall, and extreme heat events (INCCIA[2]). These state-specific trends have impacts on Indiana's agriculture, health, and quality of life. Indiana has already warmed 1.1 degrees F over the last century, and it is on track to witness a 5 to 6 degree F increase by 2050 given current state and global greenhouse gas emissions. We expect the local impacts to effect how Hoosiers live and do business. In addition, the above impacts will be compounded by the expected broader U.S. and global climate changes and impacts. Global climate impacts include flooding, forest fires, food and water insecurity, and climate refugees. The electric power industry is Indiana's leading greenhouse gas emitter and if we want to avoid worst case climate scenarios, we must take advantage of our full arsenal of energy tools.

Community solar is a valuable tool for increasing MW of solar, developing communities, and increasing grid resiliency and reliability.

Community solar allows individual ratepayers to be a part of a solar purchasing program within their own community. This adds capacity to our electrical grid and acts as an additional resource during surges and outages. According to the EPA, it also eliminates "line loss" during energy transmission and distribution by traveling shorter distances[3]. Paired with AES Indiana's planned battery storage, distributed generation lowers energy costs during normal demand periods, continues running during outages, and adds capacity during increased demand periods[4]. In addition to increased resilience, community solar allows equal access for consumers who otherwise cannot install rooftop solar due to cost, home ownership status, or home position.

Indiana is a prime location for solar of any scale. Utility solar and community solar can support farmers, cohabitate with farmland, and power ecosystem services while strengthening community relationships. Additionally, rural redevelopment of retired landfills and abandoned coal mines limits any agricultural land loss and provides community benefits.

To meet or exceed AES Indiana's 1300 MW goal, development or acquisition of solar projects should be considered. Luckily, Indiana is a prime location for solar given its topography as most solar systems need flat land with less than 1% slope and 5 to 10 acres per MW [5]. Despite the current land use requirements for solar, it is proportionally negligible to cultivated agriculture

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[2] Indiana's Past & Future Climate: A Report from the Indiana Climate Change Impacts Assessment (INCCIA). Purdue Climate Change Research Center, Purdue University. ag.purdue.edu/indianaclimate/indiana-climate-report/

[3] https://www.epa.gov/energy/distributed-generation-electricity-and-its-environmental-impacts

[4] National Renewable Energy Laboratory (2017). Microgrid-Ready Solar PV – Planning for Resiliency. https://www.nrel.gov/docs/fy18osti/70122.pdf

[5] Land Use & Solar Development. SEIA, https://www.seia.org/initiatives/land-use-solar-development

land use[6]. Figure 1 from the Great Plains Institute illustrates the average percentage of county in cultivated agriculture versus existing or queued solar by region.

Table 1. Average percentage of county in cultivated agriculture versus solar by region

Region	Average % of County Land Use in Cultivated Agriculture	Average % of County Land Use in Existing and Queued Solar
Midwest	42.3%	0.23%
Gulf Coast	15.5%	0.36%
West	14.3%	0.21%
Rockies	13.7%	0.02%
Appalachia	9.80%	0.26%
Northeast	9.14%	0.20%
Southeast	8.96%	0.05%
Southwest	2.83%	0.05%

Figure 1[7]

We expect with technology upgrades and multi-land use practices the average power density for utility scale solar will continue to decrease[8]. For example, a German 4.1 MW solar farm increased power density by vertically positioning panels. While powering 1400 homes, farmers can continue grow hay between solar panels. Applying this innovative method to Indiana could provide additional stability and reduce the load on natural gas plants during peak demand [9]. Other multi-use models include flowers and rice in Japan and vegetables in Connecticut. According to Jordan Macknick from the National Renewable Energy Laboratory, researchers are testing tomato and potato plantings with existing utility-scale systems. [10]

While the agrisolar sector is emerging, pollinator friendly solar is a current multi-use practice implemented in Indiana. Pollinator friendly solar saves money in operation and maintenance

[6] The Great Plains Institute. https://betterenergy.org/blog/the-true-land-footprint-of-solar-energy/
[7] Refer to footnote 6
[8] Katz, C (2022) .More Energy on Less Land: The Drive to Shrink Solar's Footprint. Yale Environment 360. https://e360.yale.edu/features/small-solar-agriculture-technology
[9] Reker, S., Schneider, J., & Gerhards, C. (2022). Integration of vertical solar power plants into a future German energy system. *Smart Energy*, *7*, 100083.
[10] Refer to footnote 8

costs and strengthens developer and community relationships through stimulating rural economies. Figure 2 illustrates these direct cost savings over a 20-year period. [11] Additional savings which are difficult to quantify, include the benefits of increased ecosystem services benefiting the community. Lastly, figure 3 highlights an example of a solar system, farm, and native plants operating together.

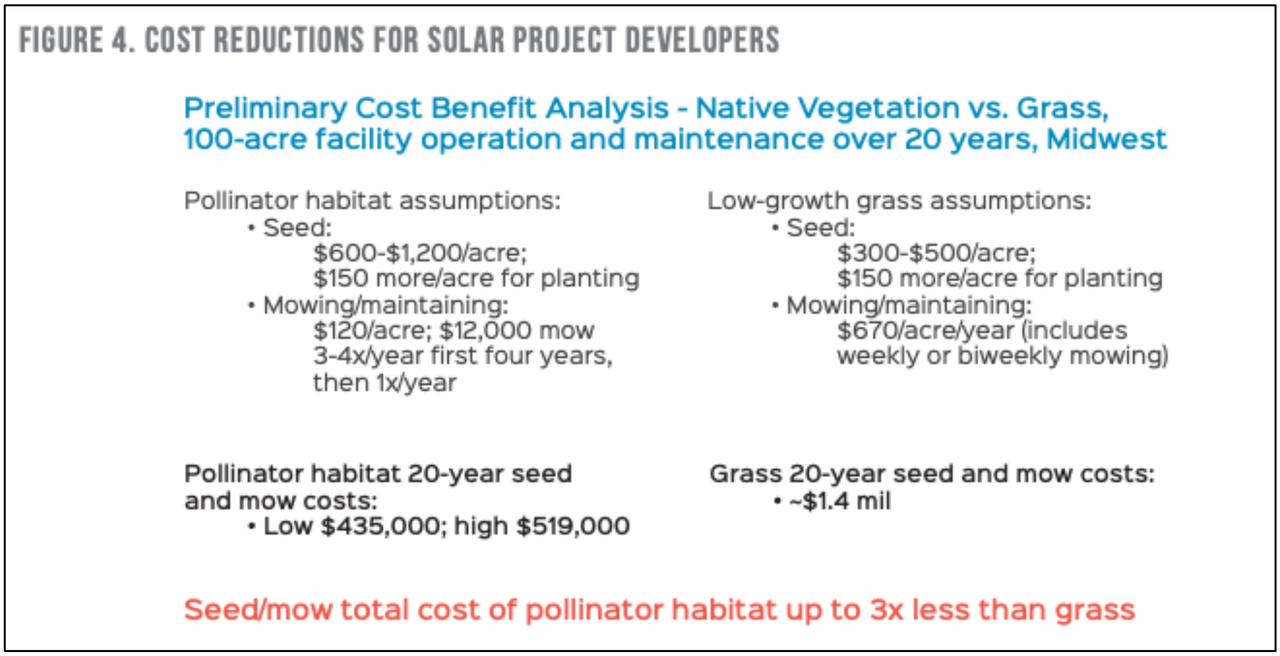

Figure 2: Cost Reduction for Solar Project Developers [12]

[11] Smith, C (2020). Amplifying Clean Energy with Conservation. https://www.cfra.org/sites/default/files/publications/amplifying-clean-energy-with-conservation-part-i-pollinator-friendly-solar.pdf

[12] Refer to footnote 10

Figure 3: Example of a community solar model with pollinator friendly grasses and flowers benefiting farmer in Minnesota [13]

In addition to multi-land use in rural settings, multi-land use and redevelopment in urban settings has similar community benefits while capitalizing off distributed generation's advantages.

The EPA[14] outlines the benefits of redeveloping land for renewable energy:

- *Leveraging existing Infrastructure*
- *Streamlined permitting and zoning*
- *Reduced land costs and tax incentives*
- *Sustainable land development strategy*
- *Gain community support*
- *Protect open space*

[13] SEIA. (2020). How Community Solar Supports American Farmers. https://www.seia.org/sites/default/files/2020-02/SEIA-Report-Community-Solar-Support-American-Farms-2020.pdf
[14] EPA (2023). https://www.epa.gov/re-powering/what-re-powering

On potentially contaminated land, renewable redevelopment provides the added service of cleanup to the burdened community further increasing community support.

The largest cost savings comes from leveraging existing infrastructure when utilizing community rooftops, implementing urban infill, and redeveloping brownfields. Existing transmission lines, substations, roads, water access, rail access, and buildings lower development costs on large and small scale renewable energy systems. For example, road construction typically costs $2-$3 million per mile in rural areas and $4-5 million in urban areas[15].

Recommendations
Given the technology available, current renewable landscape, and community engagement, we recommend the following:

1. AES Indiana should adopt a community solar model in addition to increasing renewable energy to power queued battery storage and replace energy provided by Petersburg coal units.
2. AES Indiana should develop or acquire renewable developments that provide multiple benefits to the community and our ecosystem including pollinator friendly solar and argisolar and agriwind practices.
3. AES Indiana would benefit from practices that gain community support and business investment through redevelopment of brownfields.

Respectfully submitted,

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[15] American Road and Transportation Builders Association. http://www.artba.org/about/faqs-transportation--general-public/faqs/#20