Penn State Solar Project

Penn State Sustainability Institute
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https://hub.aashe.org/browse/video/22031/A-Solar-PPA-Designed-for-Positive-Externalities

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Sustainability Institute

- Consultants and coaches to guide and bolster sustainability efforts at Penn State in:
  - Student and staff engagement
  - Curriculum development
  - Operations
  - Outreach and community-student projects
  - Research

COUNCIL OF sustainable leaders

green teams

sustainable communities collaborative

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- How did we get here?
- What is the status?
- What is coming next?

Penn State, Lightsource BP break ground on largest solar project in Pennsylvania

Project will provide 25% of University's statewide electricity over 25 years while maximizing the impacts of sustainable solar farming and providing a living laboratory for students

304 43

Penn State President Eric J. Barron signs a solar panel at the groundbreaking for a utility-scale solar project in Franklin County on Sept. 6, 2019. The project, a partnership between Penn State and Lightsource BP, will provide 25% of Penn State's purchased electricity over the next 25 years. **IMAGE: RYAN SMITH PRODUCTIONS**

September 06, 2019

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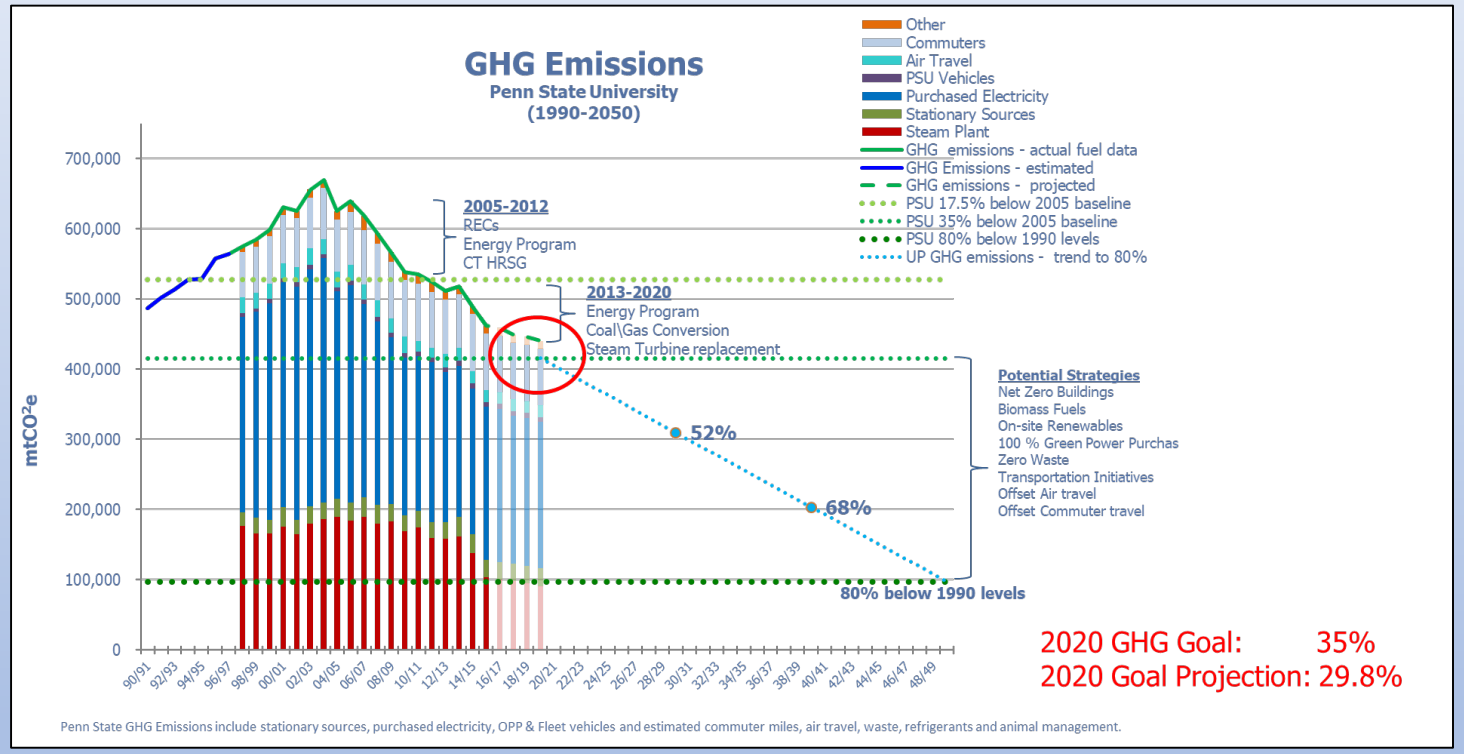
Background

- Penn State's GHG Emissions Reduction target
  - 35% reduction by 2020 (from 2005)
- Projected reduction in 2017
  - 29.8% reduction in 2020
- Gap of 33,000 $mtCO_2e$



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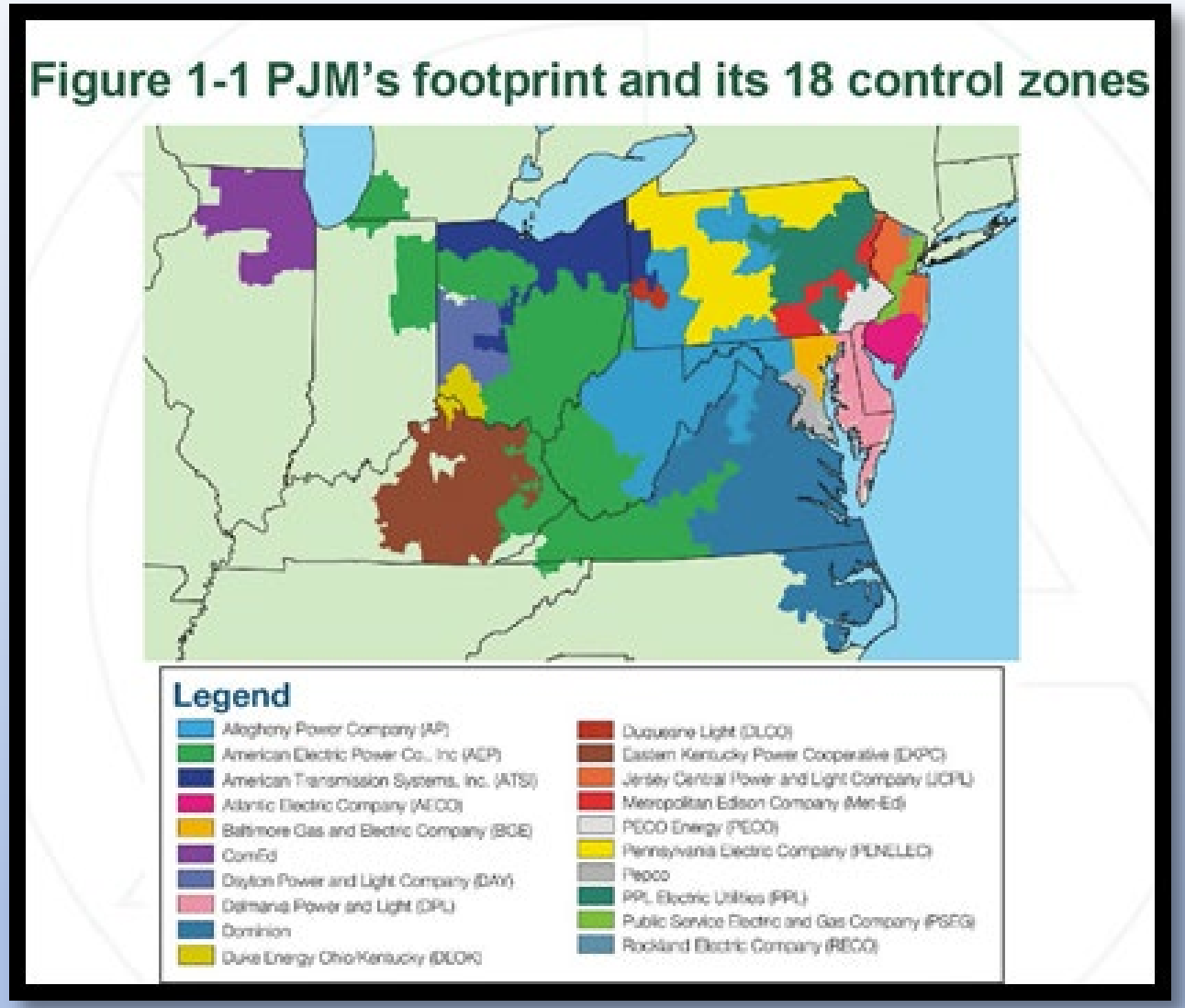
Background

- Possible Strategies to reach the reduction goal:
  - Increase Energy Savings Projects (ESP) funding by $45M
    - Though has the best long-term outlook, not feasible by 2020
  - Purchase Renewable Electricity Generation
    - Solar – has a high value due to generating electricity during peak price times
    - Wind – generates during low price times
    - Appeared doable by 2020
    - Internal analysis suggested Offsite Solar Project viable, but lots of questions remained
- A Request for Information was issued in November 2017 that gave us confidence to generate a Request for Proposals released in June 2018

Purchase Specs

- Purchase Size
  - 60 million kWh per year
- Location
  - Broader 11 state PJM region
  - Preference for PA
- Schedule
  - In-service by June 2020
- Renewable Energy Certificates
  - Bundled w/ the Project
- Contract Structure
  - Power Purchase Agreement
  - Term 20 to 30 years



Request for Proposals (RFP)

- Convened an inclusive Steering Committee
- Role
  - Determine project priorities
  - Weight the priorities
  - Generate RFP questions
  - Read and score proposals
  - Interview potential partners
  - Select project

PSU Steering Committee Members

Office of Physical Plant - Shelley Mckeague, Mike Prinkey, Rob Cooper

Purchasing - Ben Hoffman, Greg Zabrosky

Corporate Controller's Office - Sue Wiedemer

Risk Management Office - Richel Perretti

Office of General Council - Jennifer Eck

Strategic Communications - Susan Bedsworth

Sustainability Institute - Peter Buckland, Jeremy Bean

Applied Research Laboratory - Meghan Hoskins

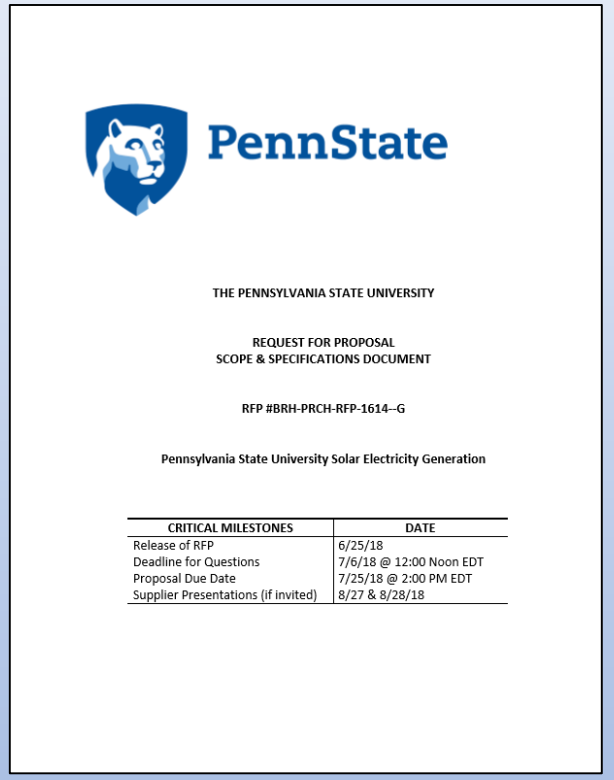
EMS Energy Institute - Jeffrey Brownson, Seth Blumsack

OPP Student Interns - Nita Williams, Nick Budzynski

PRX Energy – Gregg Shively

Request for Proposal Evaluation Criteria

- Cost
  - Price of electricity
- Location
  - PA is a preference
- Size
  - Meet 60,000 MWh/year, prefer a single project
- Counterparty
  - Role of bidding entity and its financial strength
- **Penn State Benefits**
  - Accessibility (physically and virtually) for academics and research
- **Host Community Benefits**
  - Project benefits to the community where it resides
- **Ecosystem Benefits**
  - Utilization of the land and any improvements
- **And 3 core principles:** Competitive Pricing, Manageable Risks, and **Solar Ecology**



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THE PENNSYLVANIA STATE UNIVERSITY

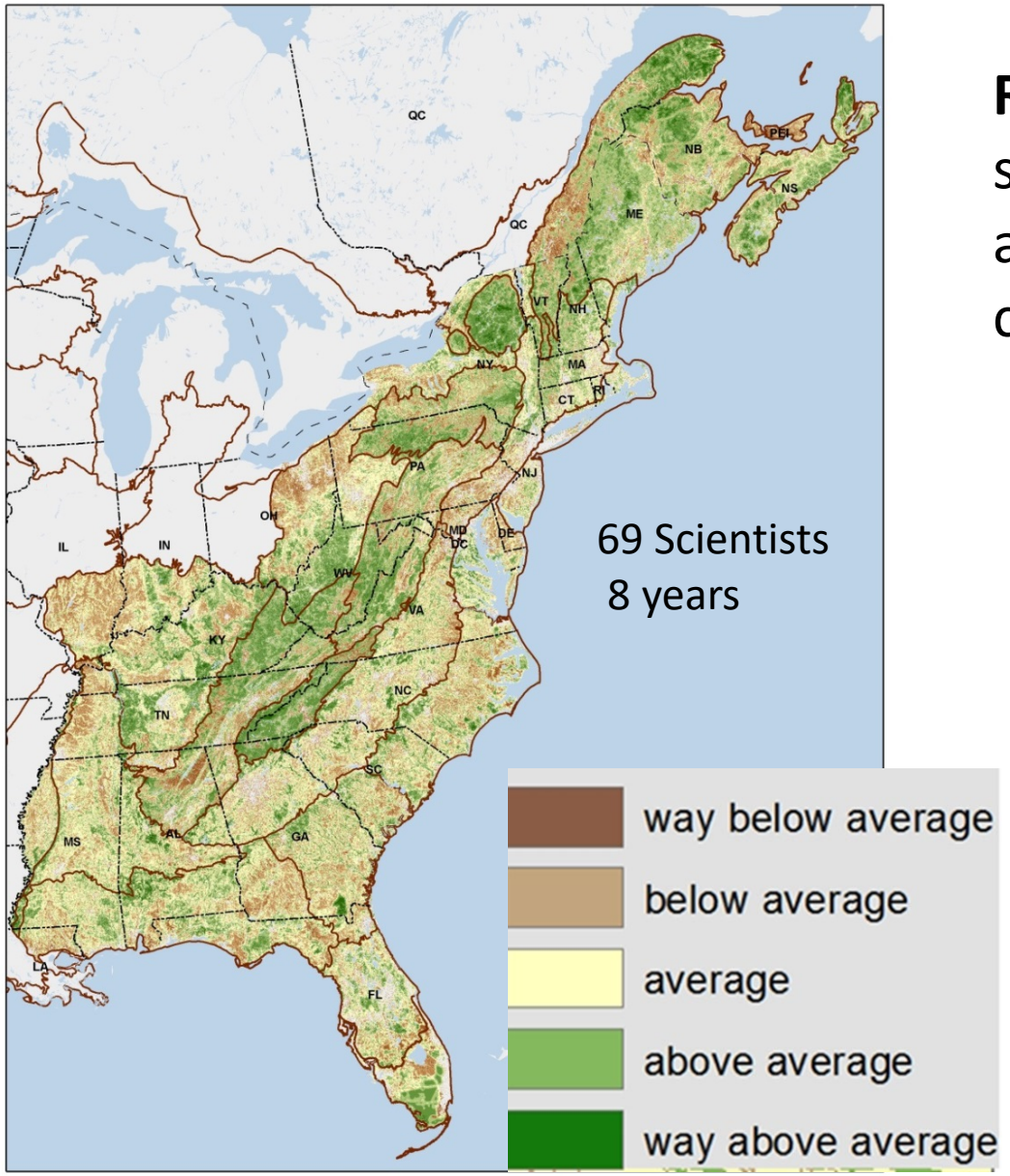
REQUEST FOR PROPOSAL
SCOPE & SPECIFICATIONS DOCUMENT

RFP #BRH-PRCH-RFP-1614--G

Pennsylvania State University Solar Electricity Generation

CRITICAL MILESTONES	DATE
Release of RFP	6/25/18
Deadline for Questions	7/6/18 @ 12:00 Noon EDT
Proposal Due Date	7/25/18 @ 2:00 PM EDT
Supplier Presentations (if invited)	8/27 & 8/28/18

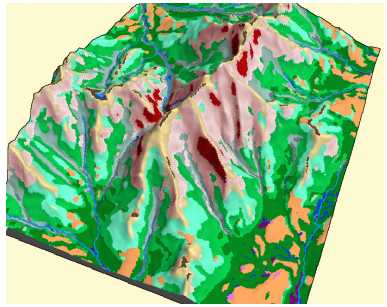
Climate Resilience



Resilient sites = sites that continue to support biological diversity, productivity and ecological function even as they change in response to climate change.

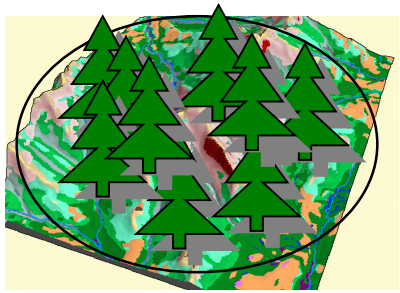
Many Microclimates

Create climate options



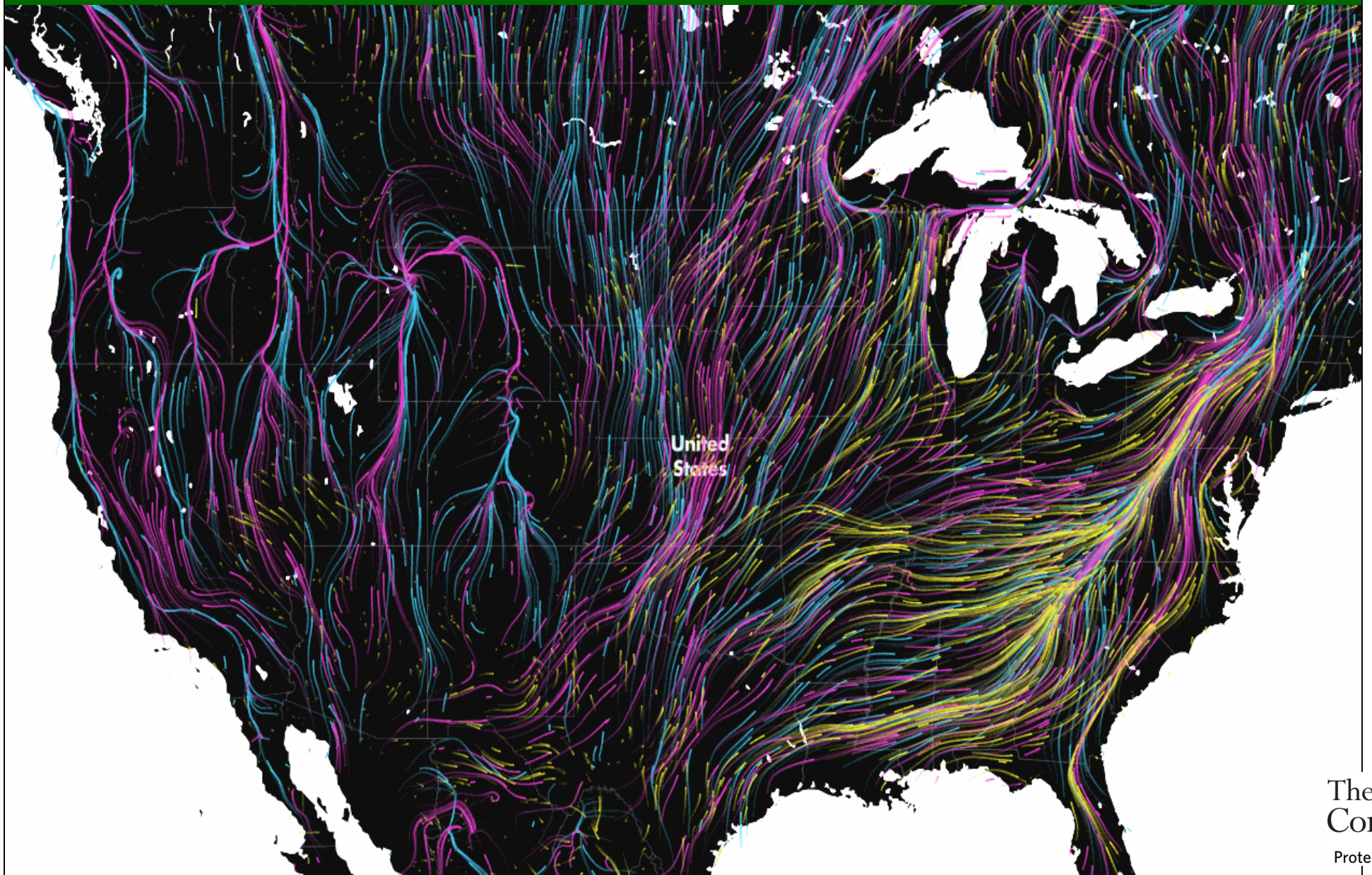
Locally Connected

Allows species to move



The Nature Conservancy
Protecting nature. Preserving life.

Continental Connectivity



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Protecting nature. Preserving life.

TNC PA's Renewable Energy Theory

More Desirable

Less Desirable

Formerly Mined Land

Connected/ Resilient Ridgetop

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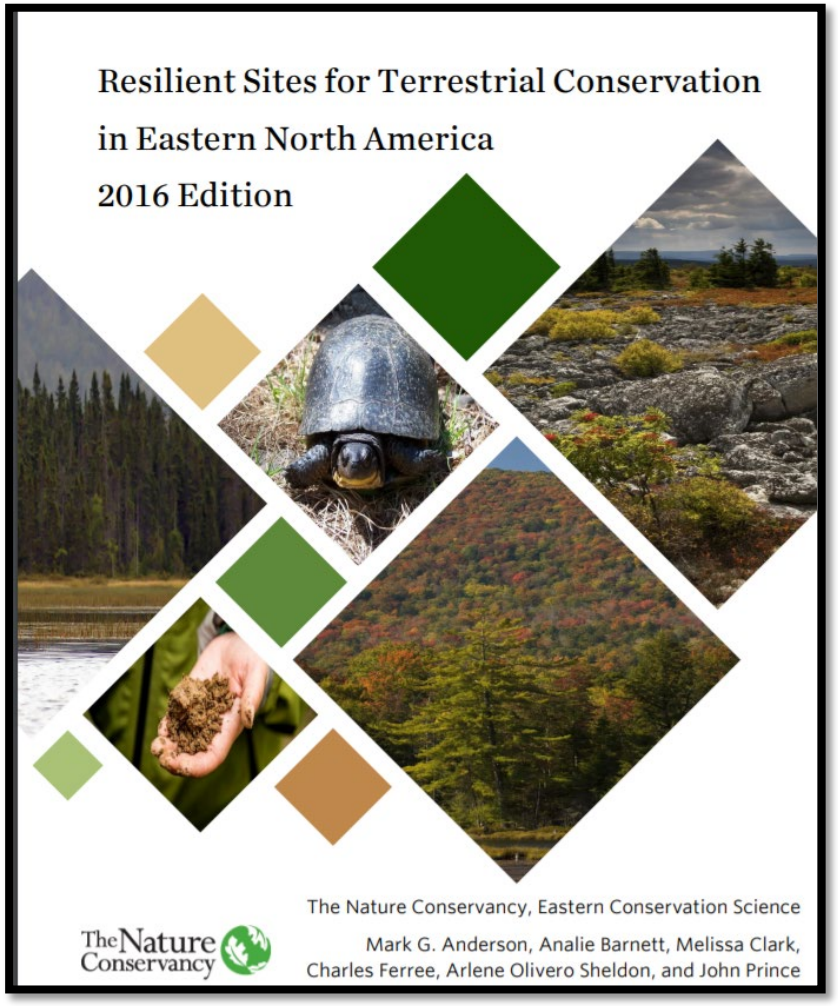
Protecting nature. Preserving life.



www.conservationgateway.org
http://maps.tnc.org/resilientland/

The Nature Conservancy
Protecting nature. Preserving life.

Ecosystem Services

Questions asked in the RFP:

- *Is or has the proposed host property been considered* ***degraded land?***
  - If no, will **the impacts to soil, surface water/ground water, and wildlife be minimized or mitigated during construction**?
  - If yes, describe the changes planned (or completed) for the site and interconnection to prepare for the solar installation.

- *What additional ecosystem services can be benefitted from the use of the Project's land beyond hosting the solar Project?*

Penn State Benefits as an R1

- Collaboration with Penn State faculty and staff on potential research opportunities that could include "solar ecology, biodiversity, water cycling, nutrient capture,…technology development/testing to support increased system performance, decreased system costs and risk management (microclimate management, solar resource assessment and forecasting), etc.
- Undergraduate, graduate, or post-doctoral opportunities during development and/or operation of the Project.

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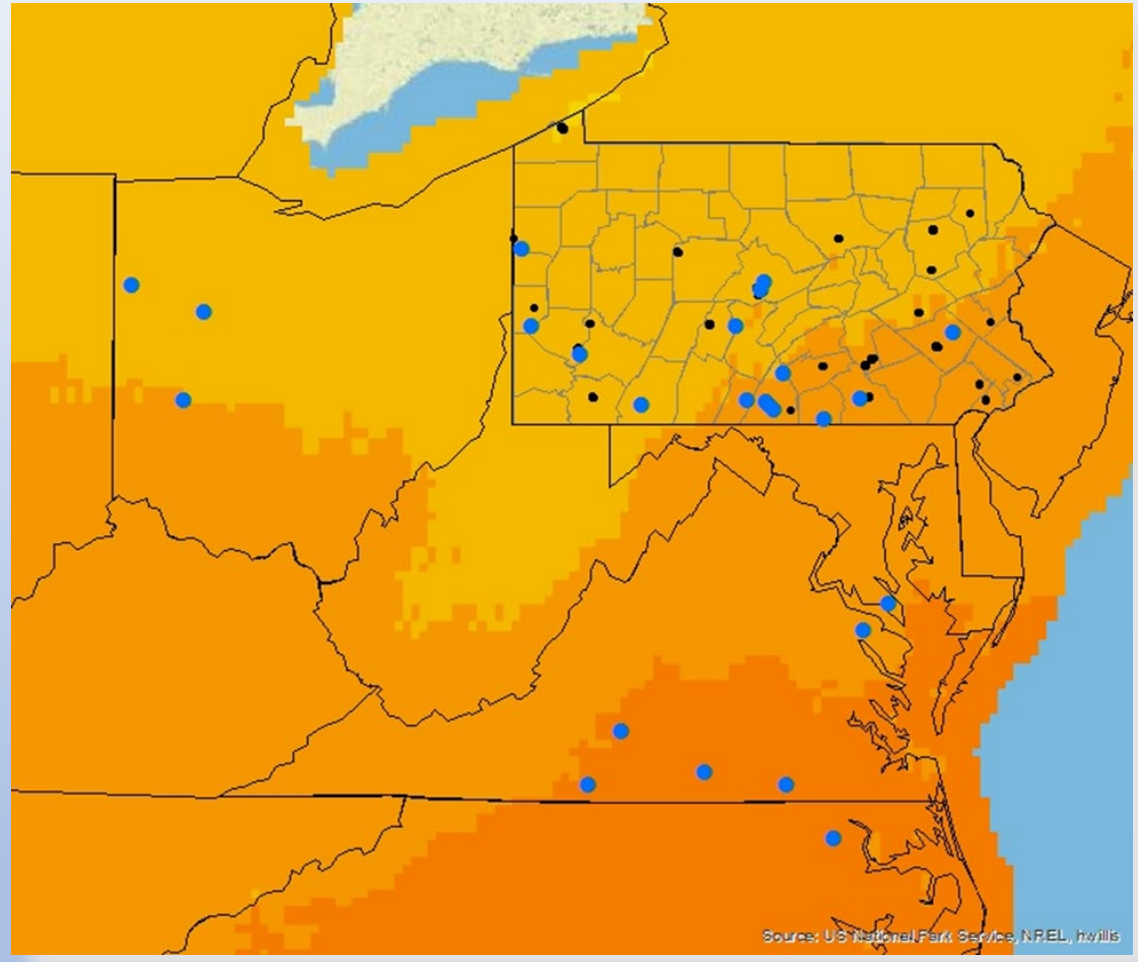
Community Benefits

- Temporary and permanent jobs.
- Tax revenue estimates for the local municipality.
- Background on projects built in the same jurisdiction.
- Will **community concerns** be addressed prior to or during construction? If so, describe plans to engage the community.

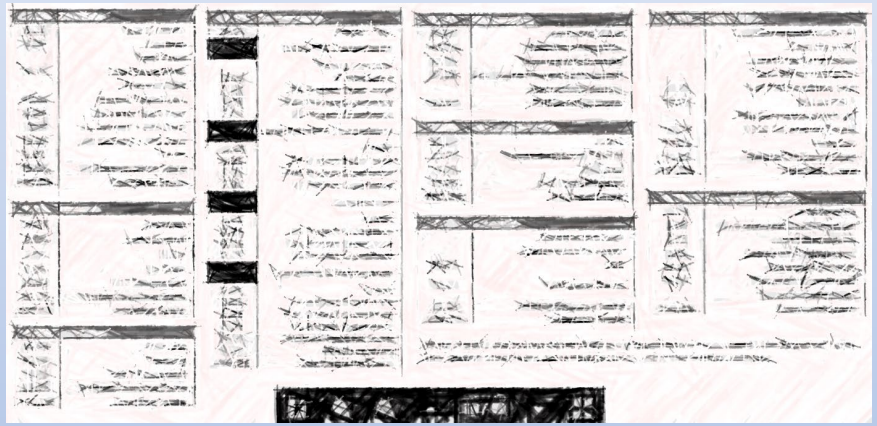
RFP Results

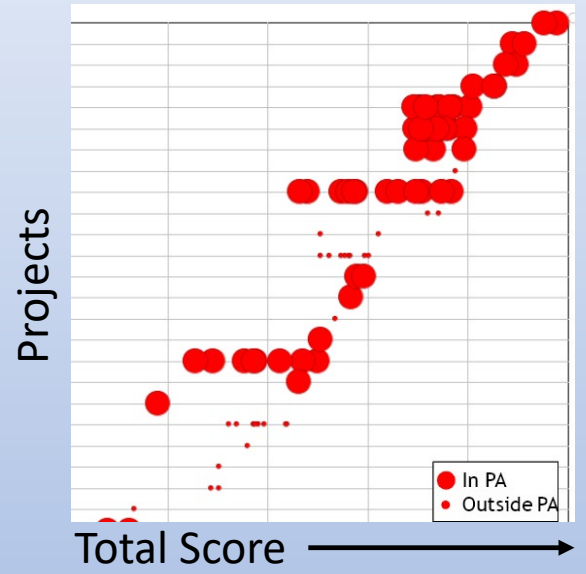
- 43 Invitations/15 responses
- Location
  - 25 distinct project sites
  - 5 sites in PA
- Multiple Options
  - Sizes
  - Term Lengths
  - In-Service Dates
  - Escalators



Scoring Process

- Evaluation Criteria → RFP Questions → Score Sheet
  - Cost
  - Location
  - Size
  - Counterparty
  - Penn State Benefits
  - Host Community Benefits
  - Ecosystem Benefits





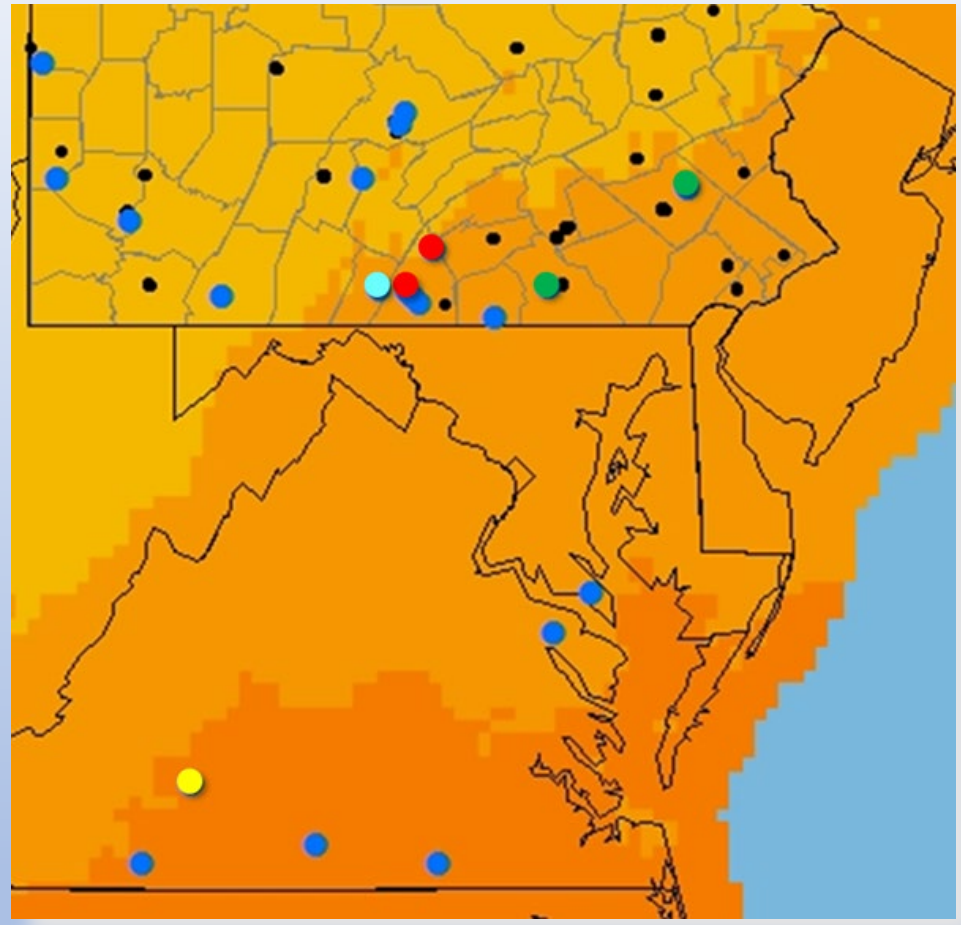
- Screening Team scored everything
- Full Committee reviewed results, selected four for interviews

PRX ENERGY
http://prxenergy.com/

PennState Applied Research Laboratory
http://www.atsv.psu.edu/

Top Four Projects

- Observations
  - Three Projects in PA, one in VA
  - Three projects provided break even economics or better
  - VA Project has good value, but optics not as good
- Best Project is in PA
  - Scored highest overall
  - Actually 3 smaller projects near Penn State Mont Alto
- Lightsource BP selected



Case Study:
Supporting Penn State's Sustainability Goal Achievement

In February 2019, Lightsource BP and Penn State announced the development of 70 megawatts of offsite solar energy, enabling Penn State to achieve its goal of a 35% GHG reduction by 2020 while saving the university millions of dollars on their electricity bills and providing long-term budget certainty.

Project capacity
70 megawatts (DC) / 53 megawatts (AC)

Electricity production
102,000 megawatt-hours per year, 25% of the university's statewide annual electricity demand

Owner and operator
Lightsource BP

Power purchaser
Penn State, who will also receive in-state Solar Renewable Energy Credits (SRECs) from the project

Total project investment
$75 Million by Lightsource BP

Total size
150,000 solar panels installed across three locations, encompassing 500 acres

Contract
25-year power purchase agreement (PPA)

Location
Franklin County, Pennsylvania, north of Penn State Mont Alto

Expected Completion
Summer 2020

70MW
CAPACITY

$75M
LIGHTSOURCE BP FUNDED

25%
PENN STATE'S ANNUAL POWER DEMAND

57,000MT
ABATED GREENHOUSE GAS EMISSIONS

2020
COMPLETION DATE

250
LOCAL JOBS

Benefits Beyond the Low Cost of Solar Electricity

We collaborate with universities and local communities, during solar planning and development al the way through the 30+ year lifetime of our solar farms. We foster solar energy education, local economies and ecosystems, to truly become a home-grown asset that communities can be proud of.

Revenue for Local Landowners
Provides landowners and their families with a new source of reliable income for 25-30 years

Job Creation & Economic Development
Grows local solar markets, creating scores of jobs in construction, operations, maintenance and asset management

A Healthier Environment
Lowers greenhouse gas emissions, helping universities meet their sustainability goals

Clean, Local Energy
Diversifies energy portfolios and increases security with locally generated power

Enhanced Biodiversity & Agriculture
Solar farming can boost crop yields, provide pollen, and be co-located with agriculture such as small livestock grazing, hay farming, and bee keeping

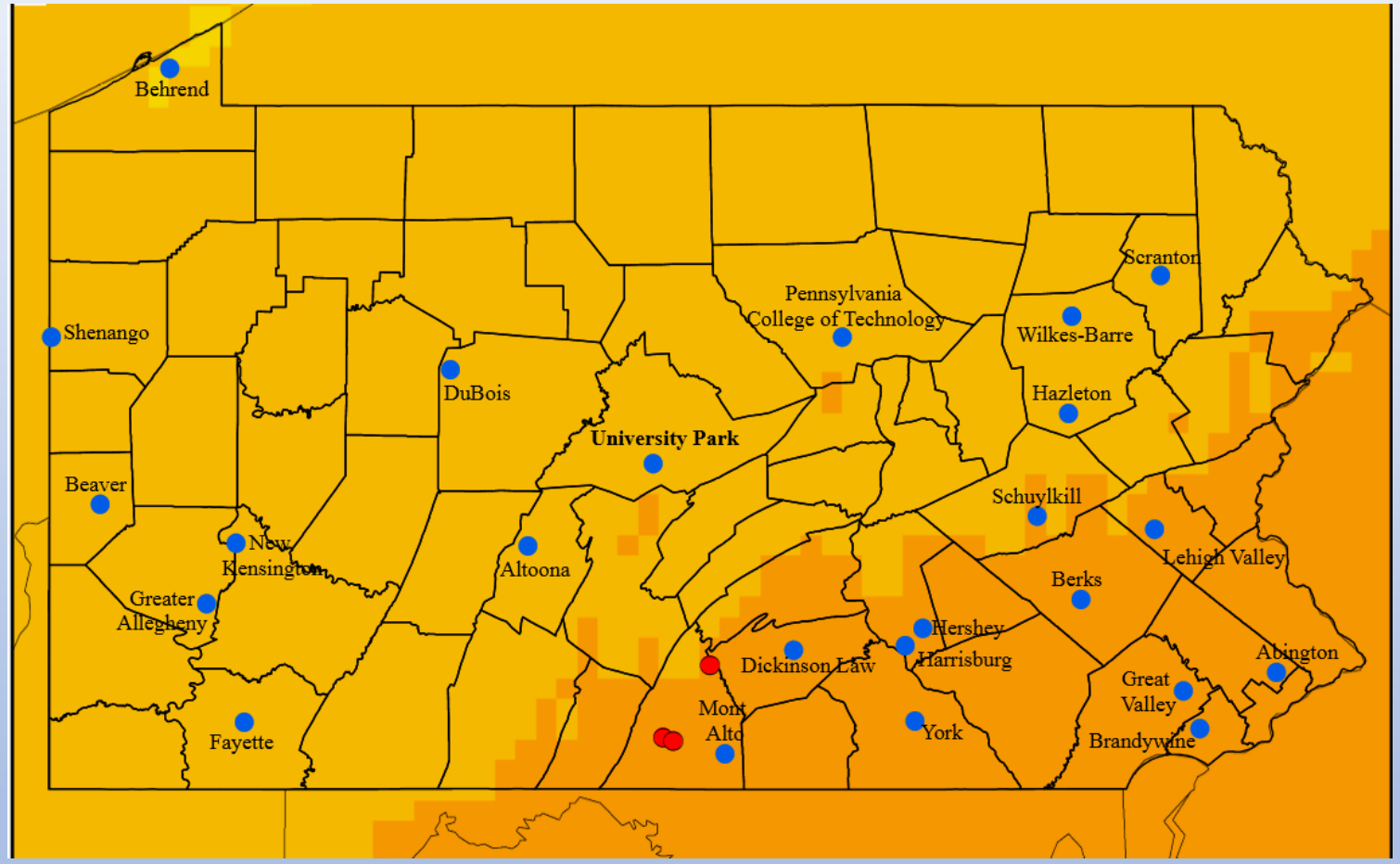
Student Involvement – A Living Laboratory
Students develop real-world experience in designing utility solar projects that help conserve the environment, along with Lightsource BP internships

Intended Project Benefits

- Lowers electric generation costs
- Provides long term budget certainty
- Lowers GHG emissions
- Positive Public Relations
- Curriculum and Educational Value
- Research Potential
- Internship Opportunities
- Reflects Student Attitudes

- Supports Governor Wolf's recent Executive Order committing the state to GHG reduction goals of 26% by 2025 and 80% by 2050
- Creation of 50 to 100 PA jobs over 6 months
- Lease payments to landowners
- Tax income for host community
- Ecosystem Benefits

➢ **Create demand for responsibly developed projects**



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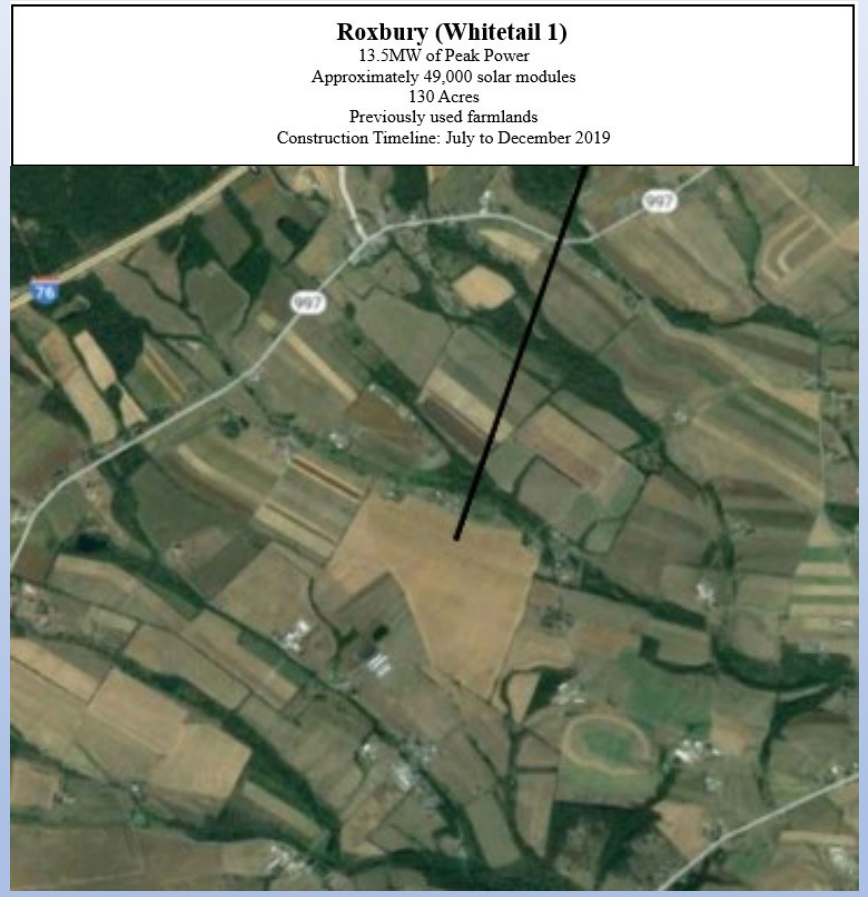
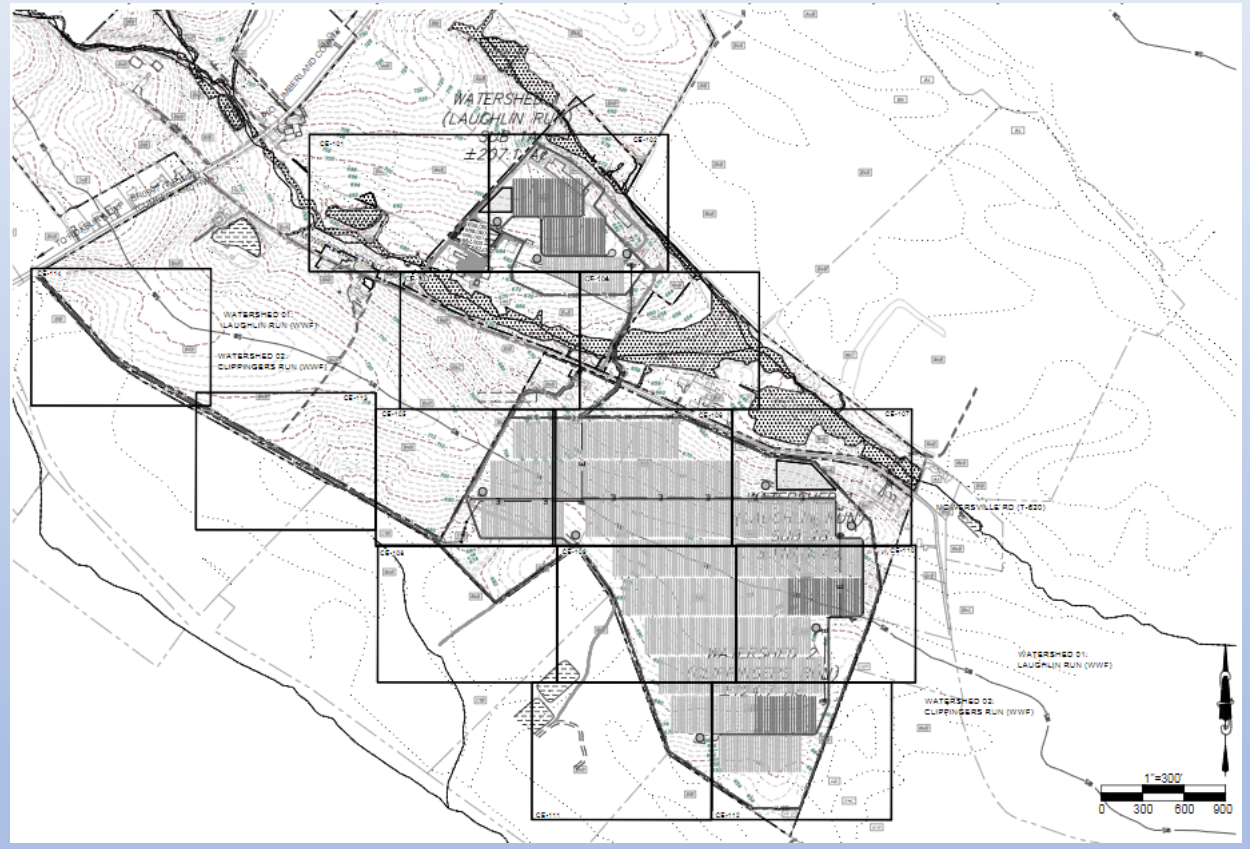
Whitetail 1



- Most visible site from the road
- Under construction now
- Available frontage for tour busses
- Working on a planting plan for pollinator biodiversity
- Camera will be on-site for time-lapse video
- Pyranometer will be co-located with weather instrumentation

Whitetail 1 Erosion/Sedimentation Control



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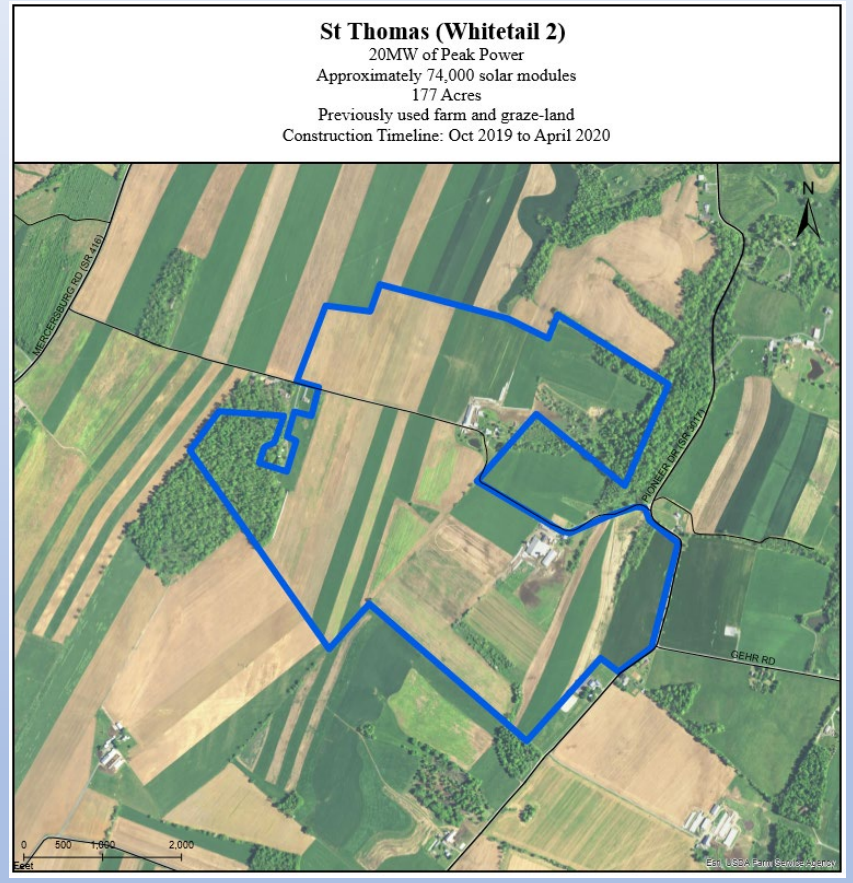
Whitetail 2



- Reviewed design sets, should be starting construction in October
- Landowner is interested in sheep grazing
  - Connected a Professor in Ag to the landowner to discuss research potential

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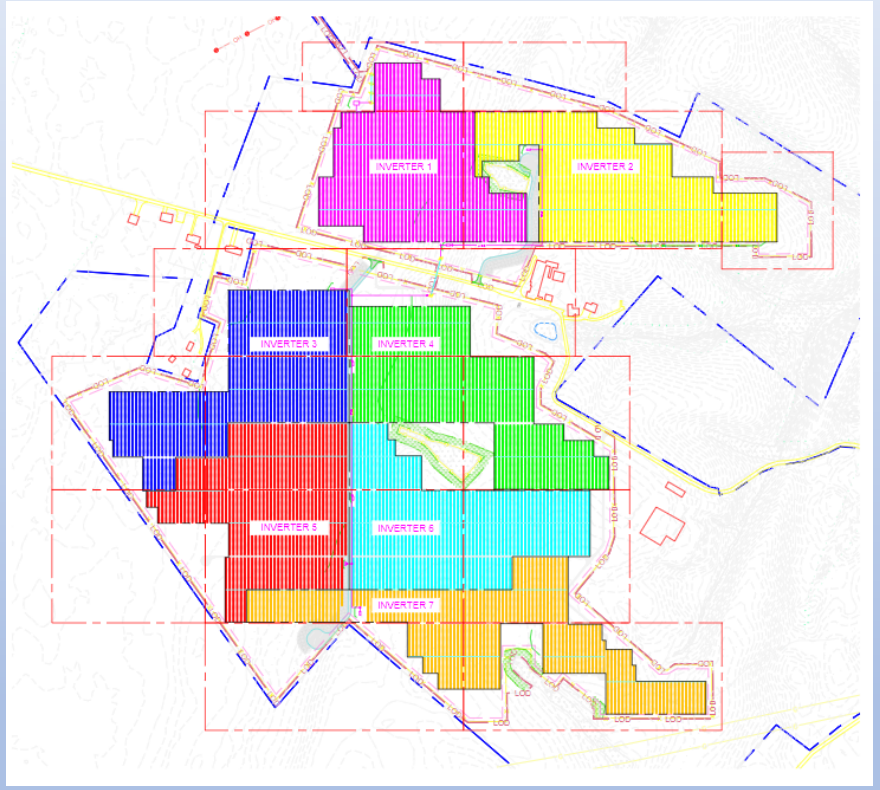
Whitetail 2 Technical Layout



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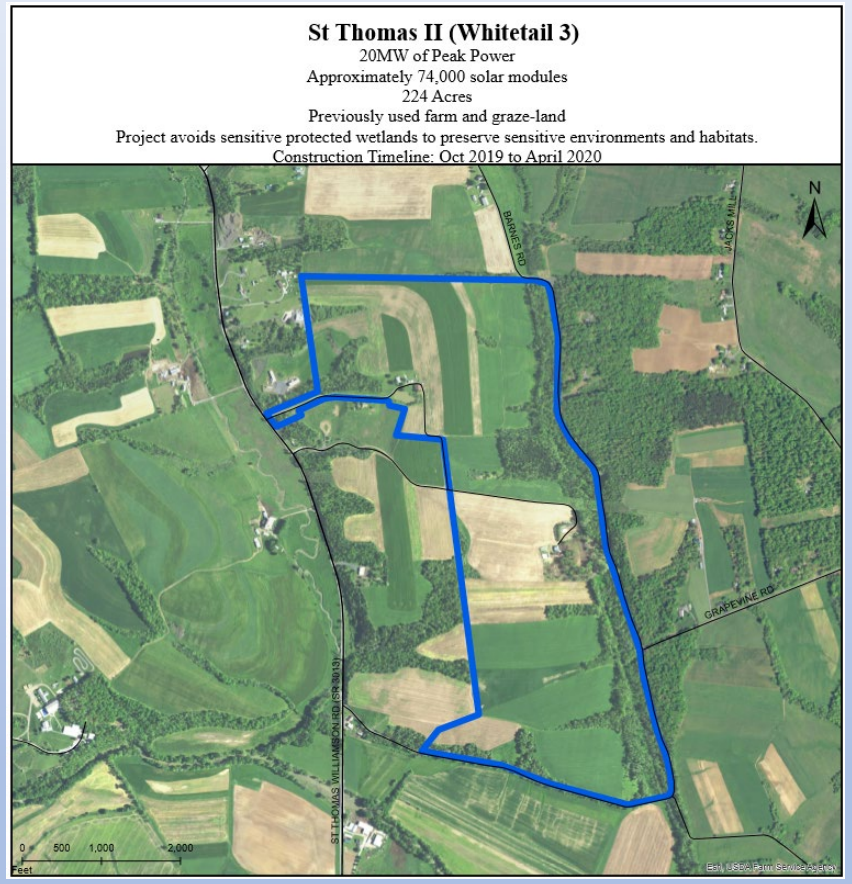
Whitetail 3



- LSBP almost through site planning/review
- Setbacks are necessary and challenging
  - Potential for cricket frogs in wetland
  - Prickly pear is on site
  - Attempting to minimize tree removal and grading
- Possible site for honeybee habitat
  - Already on site!
- Battery will be made technically feasible on this site

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Whitetail 3 Construction Layout

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Opportunities for Penn State involvement

- Data – LSBP will provide a web interface to the data for research, teaching, public consumption
- Research/education
  - Online form for collecting ideas for site usage: https://psu.infoready4.com/#competitionDetail/1790250
  - LSBP willing to share documents once they complete permits
- Internships (LSBP and Rosendin) – internships are available, both directly through the partners, but also internally (funding on its way)
- Learning factory project in the works for Spring '20

Thank you!

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