



# Repurposing Former Mine Lands for Solar Energy

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**STARFIRE SOLAR SITE** This reclaimed coal mine in eastern Kentucky is slated for a planned solar facility that will provide clean, renewable energy. © Dean Hill

# Agenda

- ▶ TNC Overview / Vision
- ▶ Scale of the Opportunity (Global & US)
- ▶ TNC Demonstration Project Spotlights (VA & KY)
- ▶ WVU Center for Sustainable Mine Lands
- ▶ Enabling Conditions

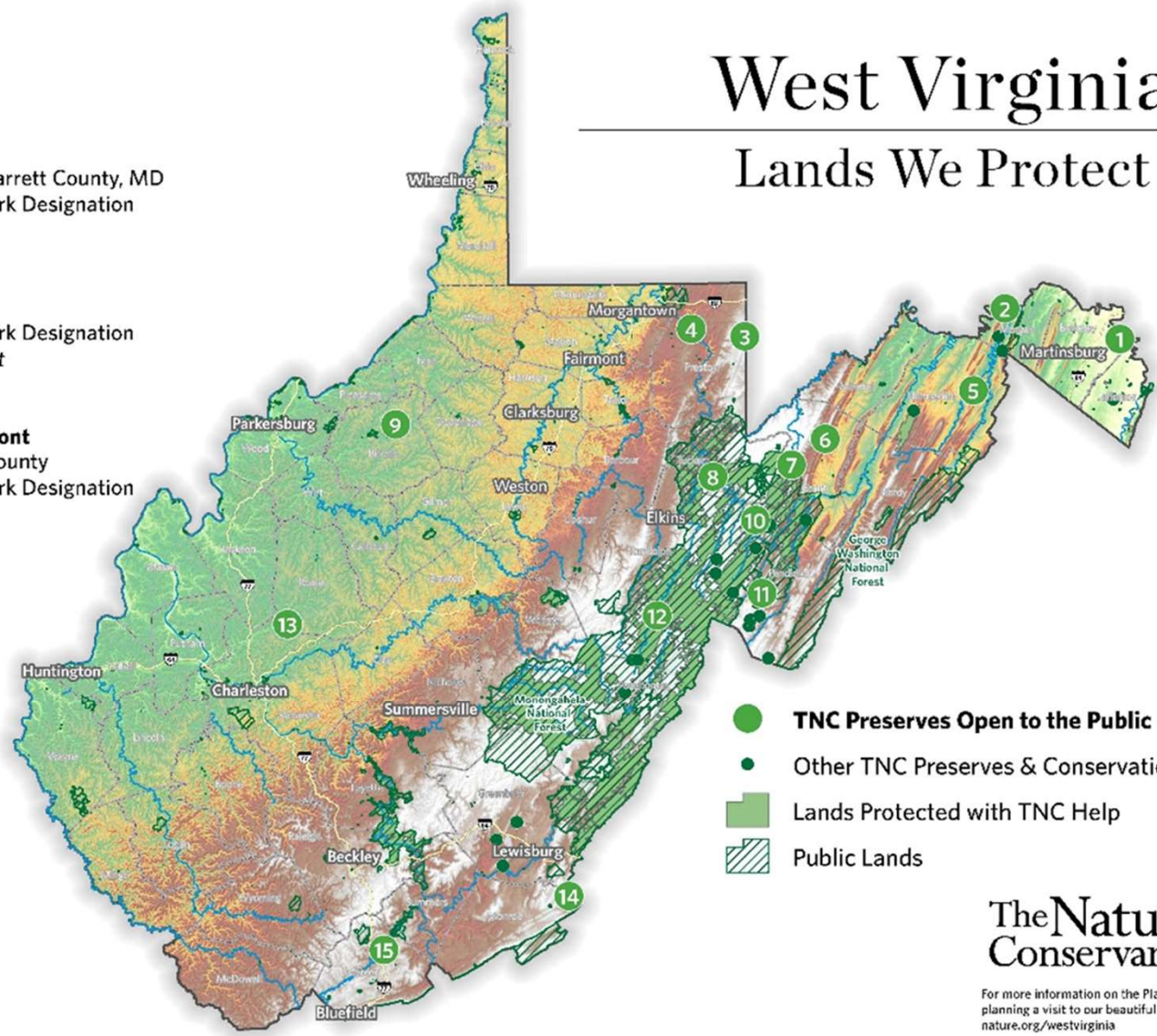








# West Virginia

## Lands We Protect

- 1 Yankauer**  
Berkeley County
- 2 Eidolon**  
Morgan County
- 3 Cranesville Swamp**  
Preston County, WV & Garrett County, MD  
National Natural Landmark Designation
- 4 Cheat Canyon**  
Preston County
- 5 Ice Mountain**  
Hampshire County  
National Natural Landmark Designation  
*Requires reservation to visit*
- 6 Greenland Gap**  
Grant County
- 7 Bear Rocks/Allegheny Front**  
Tucker County & Grant County  
National Natural Landmark Designation
- 8 Brooklyn Heights**  
Tucker County
- 9 Murphy**  
Ritchie County
- 10 Mount Porte Crayon**  
Pendleton County
- 11 Pike Knob**  
Pendleton County
- 12 Upper Shavers Fork**  
Randolph County  
*Requires advanced notice*
- 13 Hungry Beech**  
Roane County
- 14 Slaty Mountain**  
Monroe County
- 15 Brush Creek**  
Mercer County

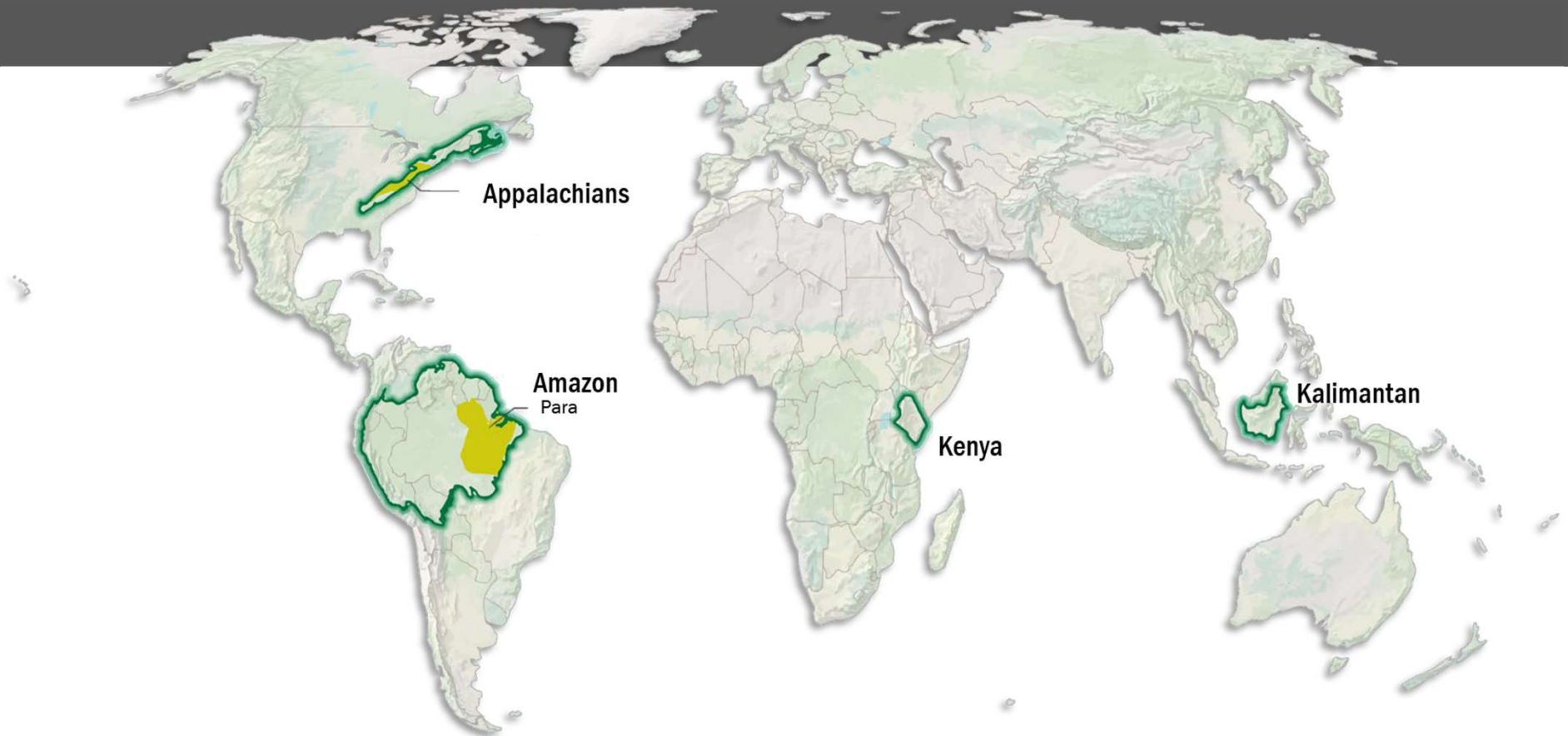


-  **TNC Preserves Open to the Public**
-  Other TNC Preserves & Conservation Easements
-  Lands Protected with TNC Help
-  Public Lands

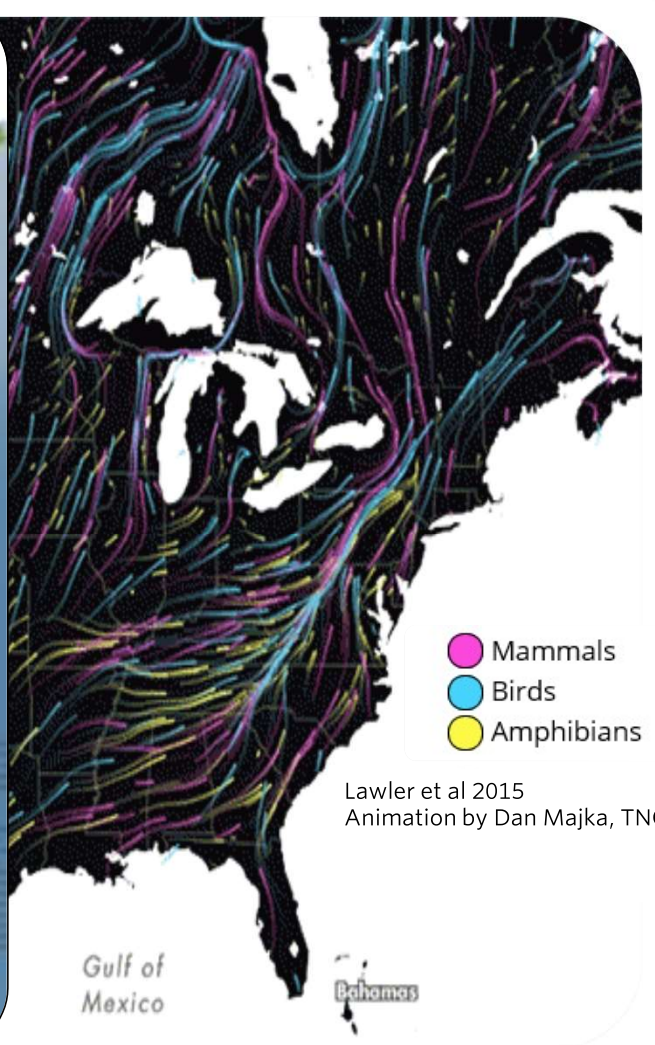
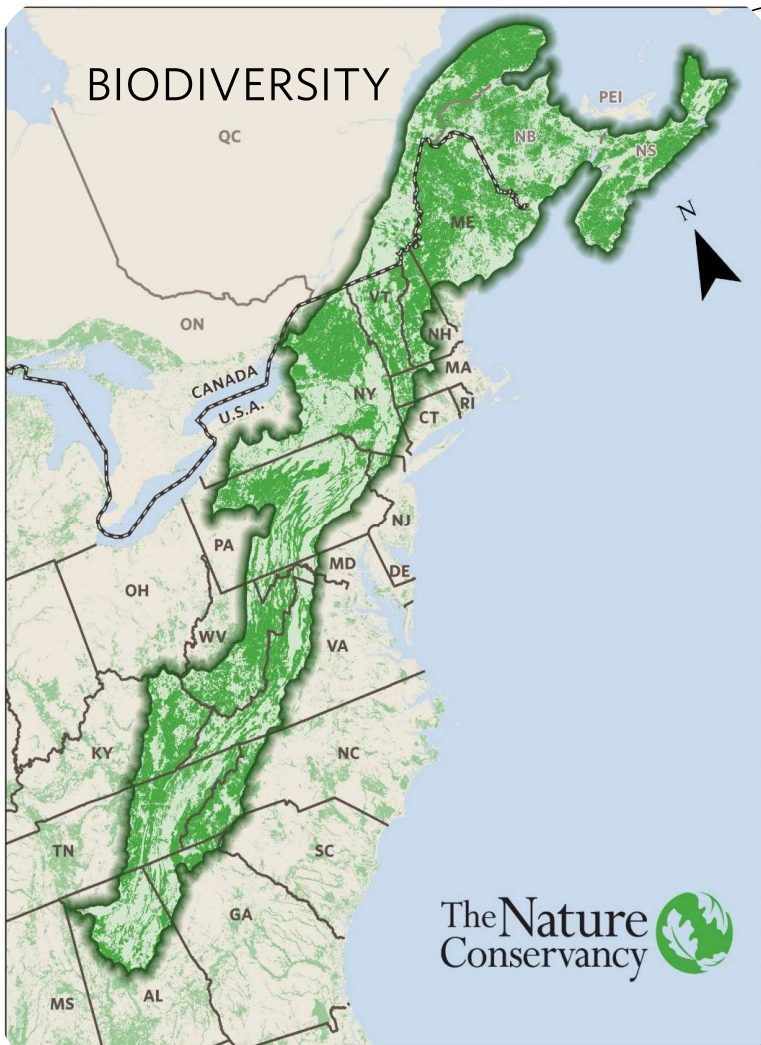
**The Nature Conservancy** 

For more information on the Places We Protect, including planning a visit to our beautiful preserves, please visit [nature.org/westvirginia](http://nature.org/westvirginia)

# Global Focal Places



# Appalachians and WV:



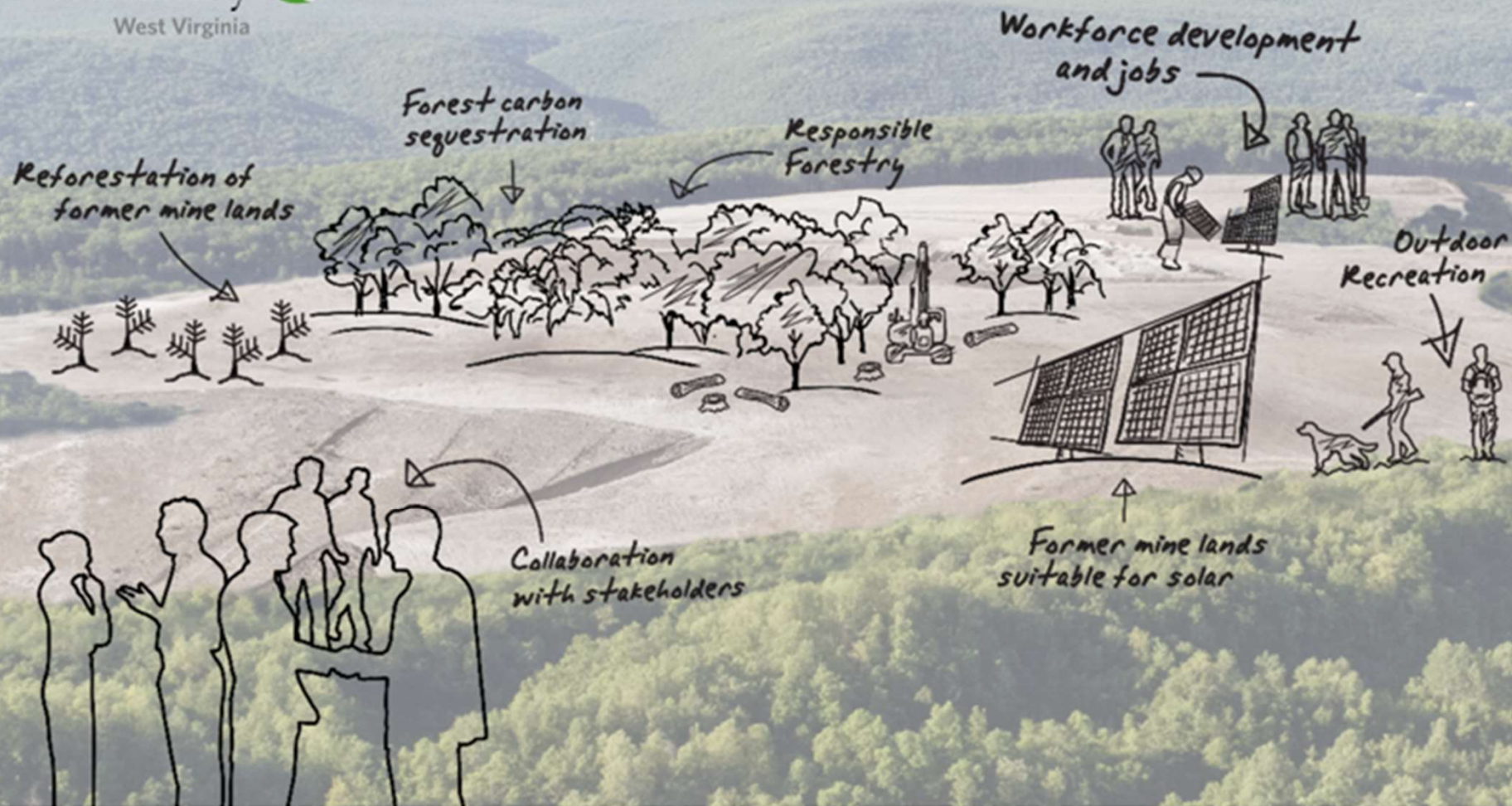
Lawler et al 2015  
Animation by Dan Majka, TNC

# Supporting Communities with Diversified Economic Opportunities

## “Nature & Economy” Programmatic Foci in the Central Appalachians:

1. Outdoor recreation and tourism
2. Forest and mine land restoration/reuse
3. Forest carbon markets
4. Conservation compatible clean energy deployment





The Nature Conservancy

# Global Clean Energy Vision

Accelerate a clean, green, and equitable energy future

- 1** **Unlock new markets** for repurposing mine lands and brownfields
- 2** **Center communities** and build partnerships for the energy transition
- 3** **Scale the impact** through siting, policy, and market solutions



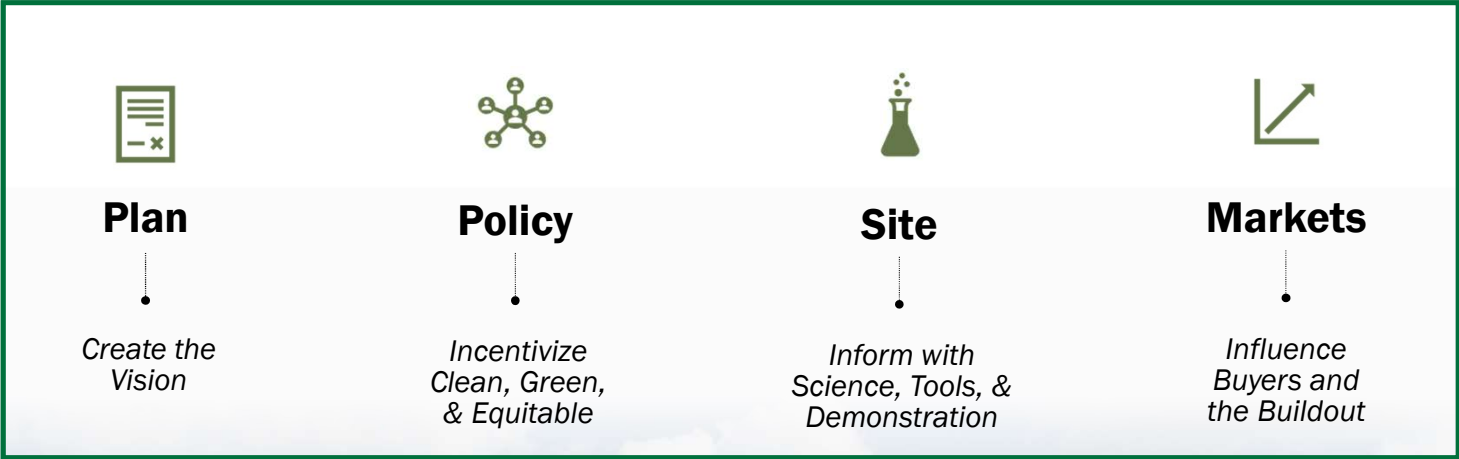
## Mining the Sun

Transforming mine lands and brownfields into clean energy hubs



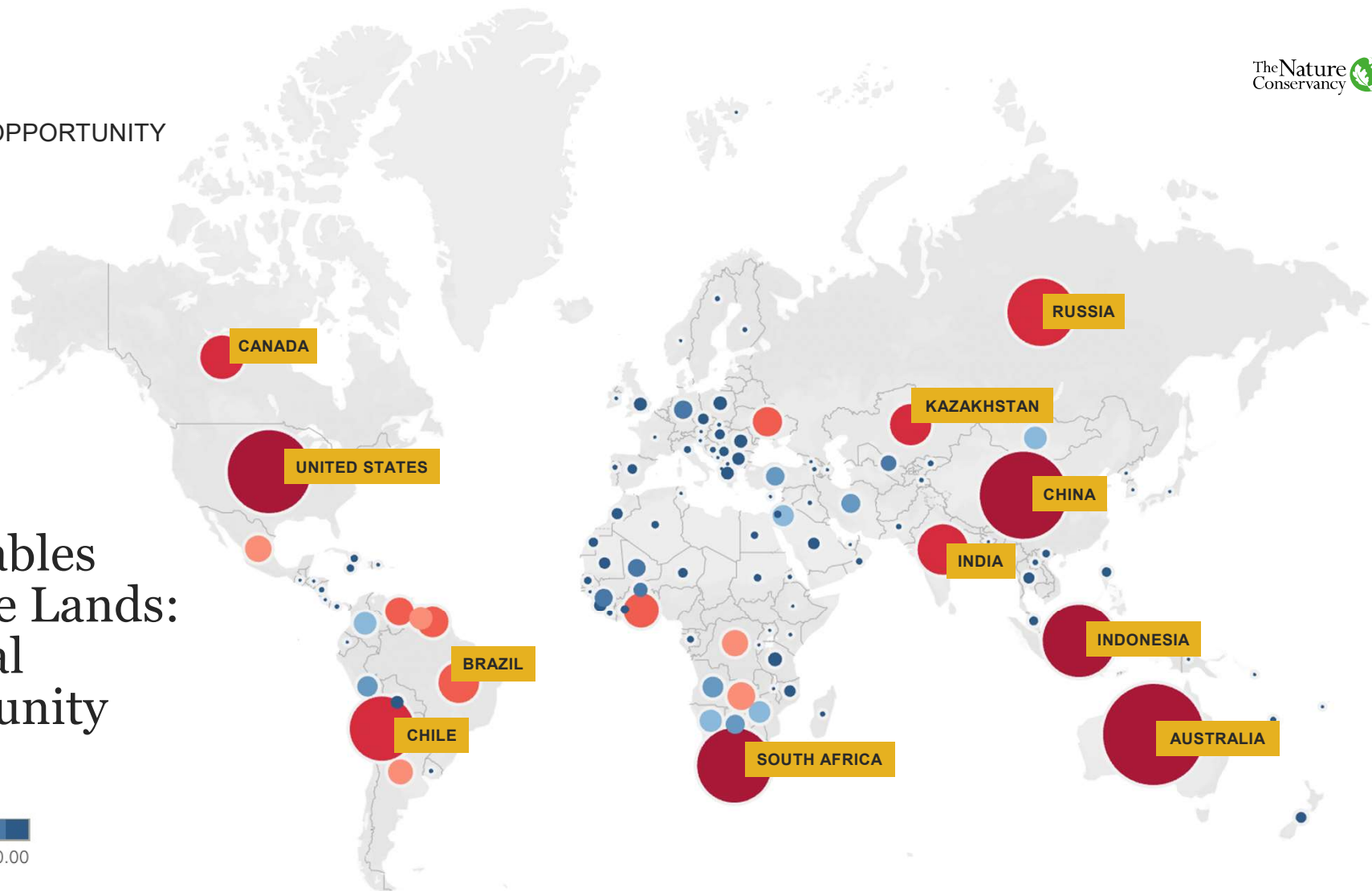


# TNC's Clean Energy Strategy: **What We Do**



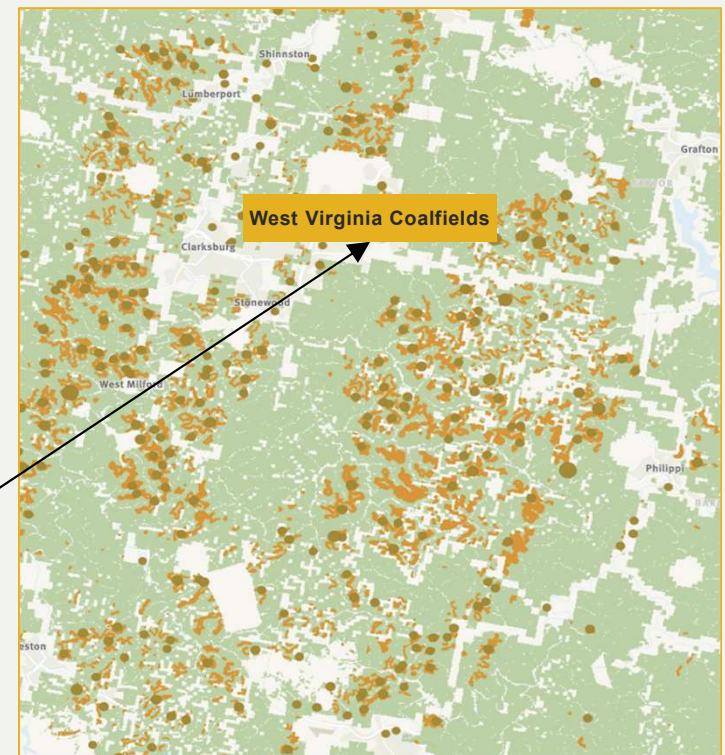
## THE GLOBAL OPPORTUNITY

# Renewables on Mine Lands: A Global Opportunity



# U.S. Potential for Renewables on Mine Lands and Brownfields

- **130,000** mine land and brownfield sites
- **20 million acres**—the size of South Carolina
- Only **530 renewables projects** developed to date
  - Total installed capacity of 2,500 MW (2.5 GW)
  - Average project size less than 5 MW
- **715 GW** of potential renewables on these lands, enough to power 120 million homes (NREL)



# U.S. Progress to Date

- ▶ **\$500 million DOE CEML Demo Program**
  - 98 applications, 29 states
  - \$27 billion private funds potentially
- ▶ **10% IRA “energy community” tax credits**
- ▶ **EPA RePowering Inventory**
  - 2020: 350 projects totaling 700 MW
  - 2024: 550 projects totaling 2.5 GW
- ▶ **At least 10 projects >100MW in pipeline**

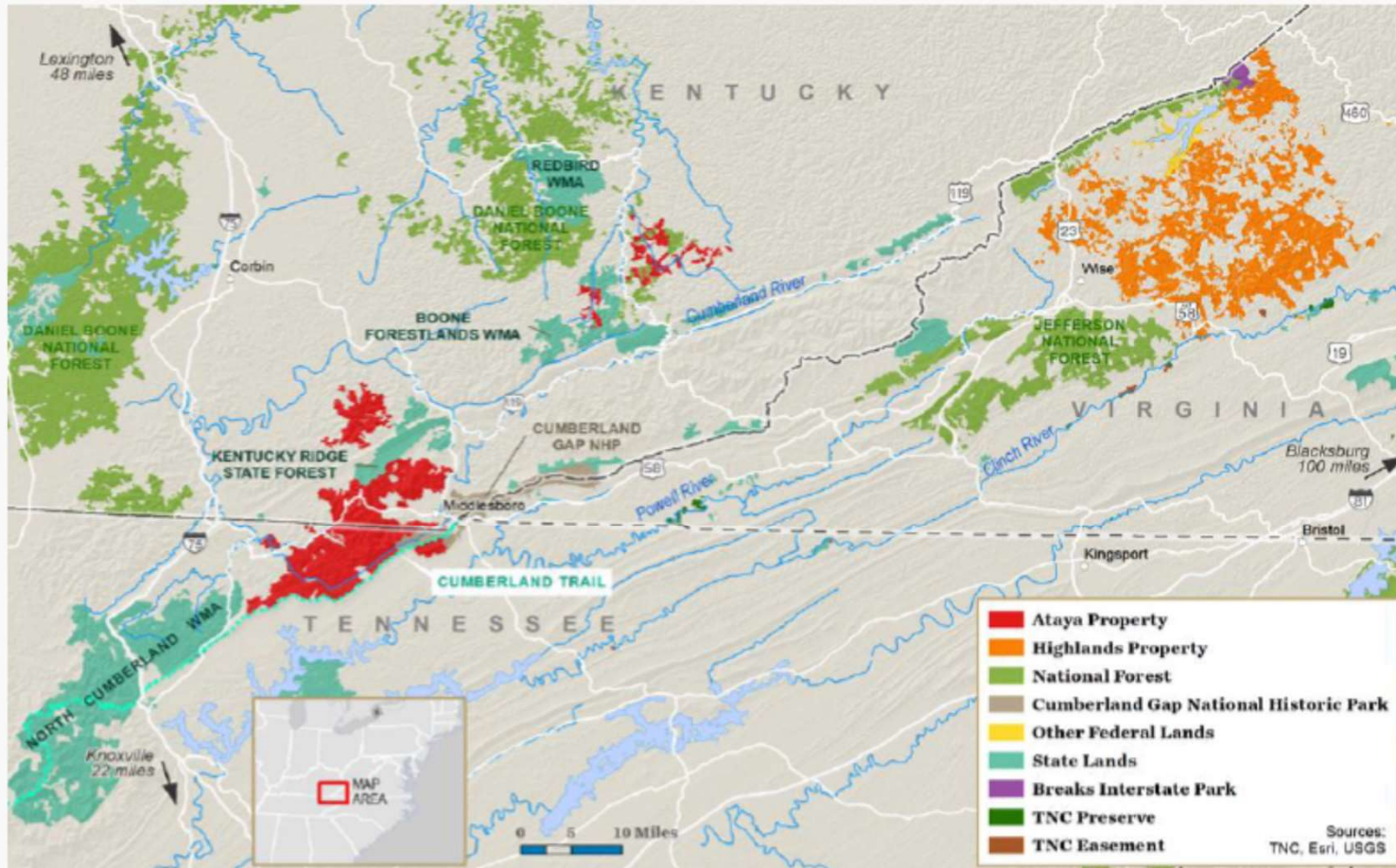




## **TNC Project Spotlights:**

- Cumberland Forest (VA)
- Starfire (KY)

# Cumberland Forest- 253,000 acres

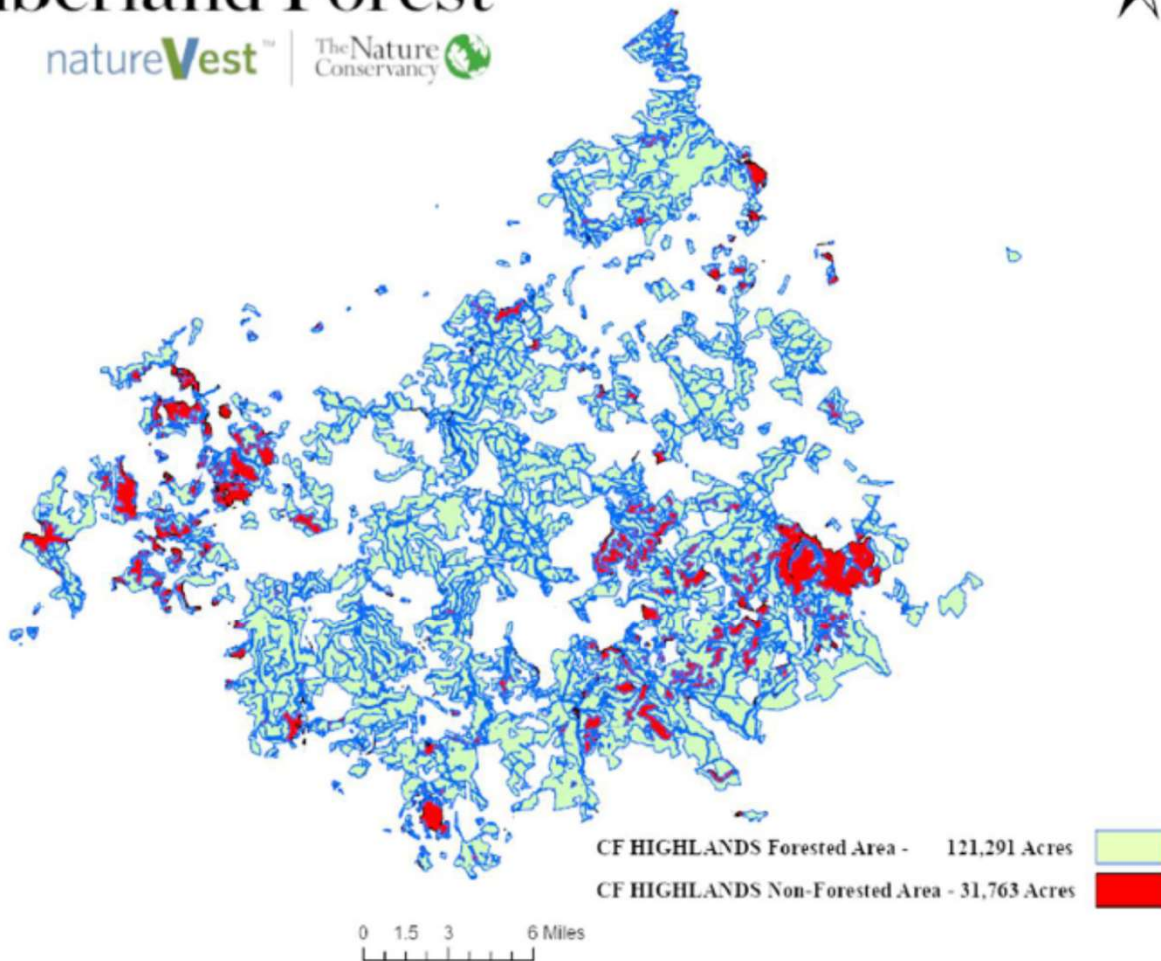


# Cumberland Forest

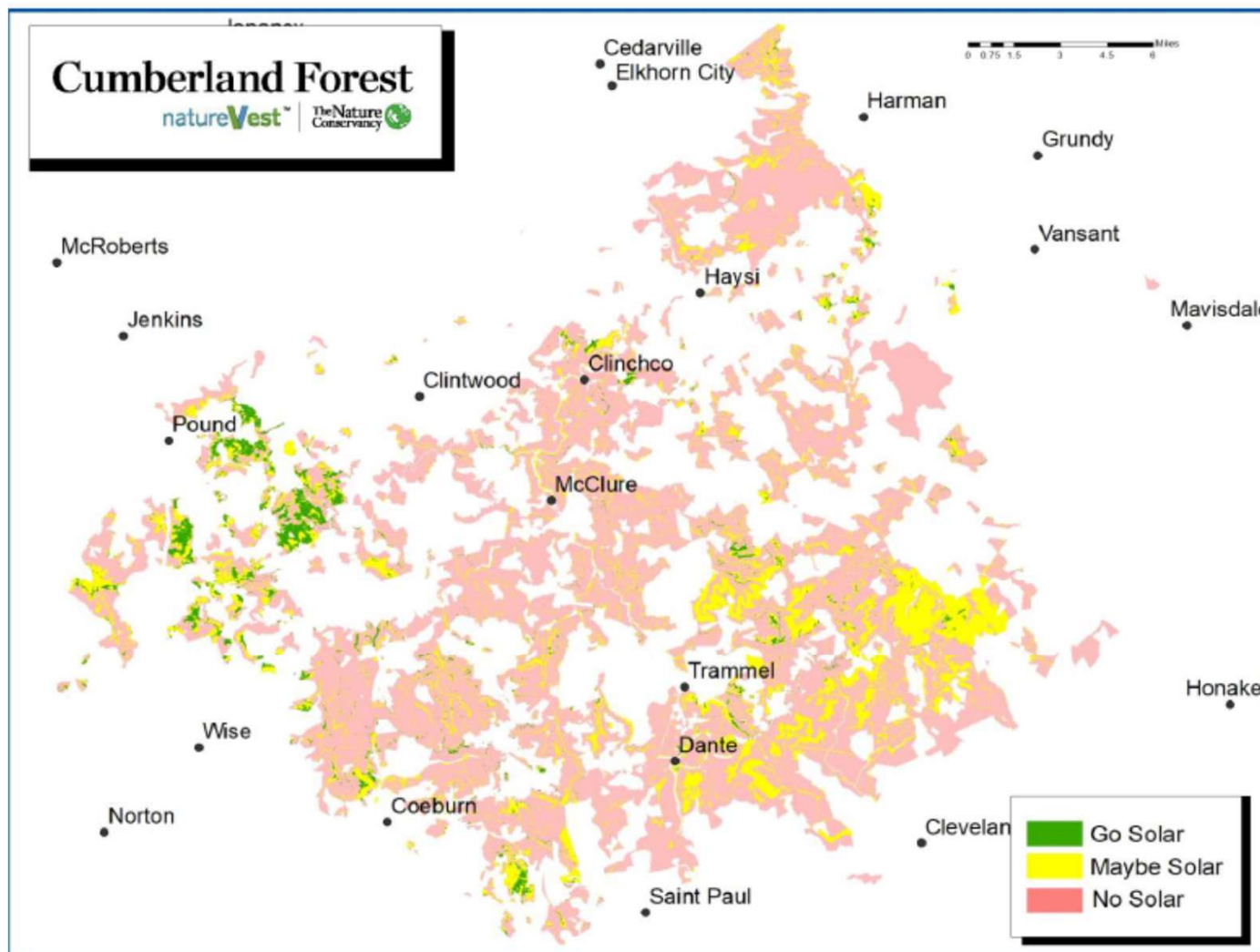
natureVest™ | The Nature Conservancy 



**Distinguishing Forest  
And Non-Forest Areas**



### Solar Suitability – Avoiding and Minimizing Impacts to Key Ecological Features and Other Management Priorities









Former Surface Mines



- 7 Sites, ~130 MW, ~1,000 acres
- 4 to 7-year pre-development period
- Site assessments and project design
- Mineral owner agreements
- County land use approvals
- Utility interconnection studies and agreements
- Power purchase agreements
- SCC Approval
- DEQ permit
- Community engagement and benefits
- 35 to 40-year operating period

## Power with Purpose: Collaboration between Rivian and TNC

Innovative partnership enables participation of smaller non-profit buyer, elevates community, conservation and climate benefits, and strengthens commitment to the region



▶ Anchor PPA offtaker  
Optimize impact + economics



### Starfire Mountain

▶ Project developer  
Focus on mining to renewables



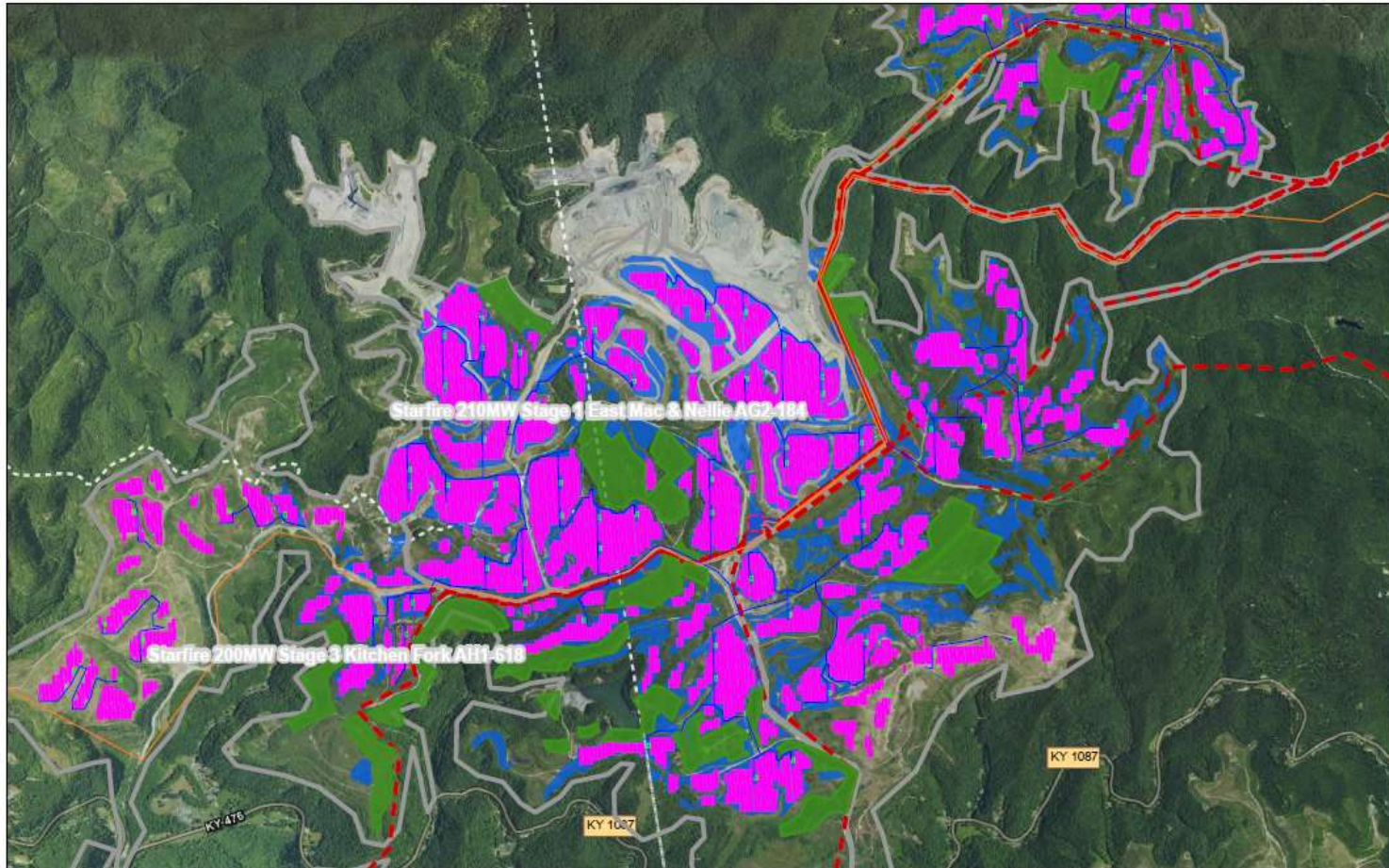
▶ Partial REC Offtaker  
3C screening and implementation

# Starfire Site Design Considerations



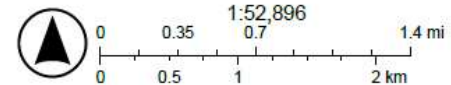
Photo: Green Forests Work

# Starfire Project Map with Proposed Tree Conservation Areas



2/29/2024

- Starfire Tree Conservation And Growing Areas - Starfire Tree Conservation Growing Areas
  - Starfire Buildable Area
  - Starfire Proposed Transmission (Gen-Tie)
  - Starfire Proposed Substations
  - Mine Land Solar Projects and Phases
  - Other
- USA NAIP Imagery: Natural Color



Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri, Esri, USDA



**Incorporate  
wildlife  
passageways**

# Wildlife-friendly fencing

**Traditional fence**



**Permeable fence**







50°F 10°C

01-28-2019 17:44:41



## Green Infrastructure Approach

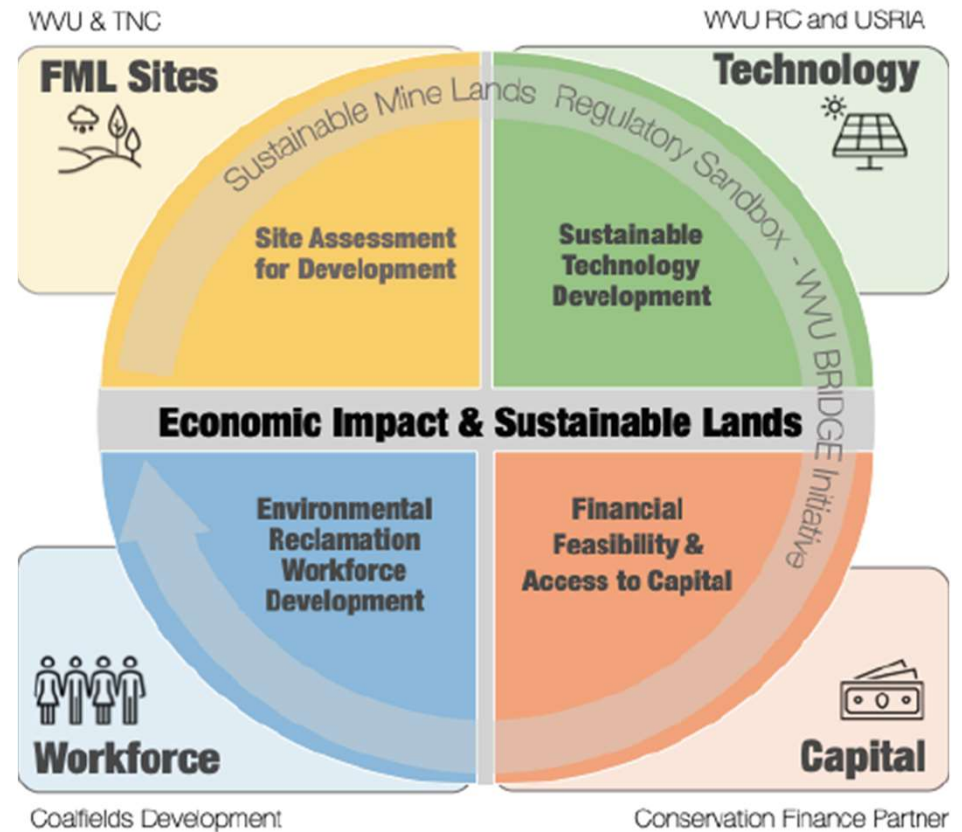
- **Utilize vegetation vs. gravel/concrete/impermeable surface**
- **Incorporate ~50 acres of pollinator plantings and monitor success of these plantings.**
- **Minimize disturbance of established vegetation**
- **Utilize native grasses/forbs**

# WVU Center for Sustainable Mine Lands

- CSML operates as a center under the WVU Institute for Sustainability and Energy Research (WISER)
- Located on the campus of West Virginia University
- Goal is to become a national leader in mine land reclamation by developing a comprehensive system for conversion of these sites to their highest and best uses.



## Center for Sustainable Mine Lands



# Mineland Selection Tool

- Data for the Southern 22 Counties has been incorporated
- To date, approximately 4,485 sites have been identified
- 31 Different screening criteria have been incorporated and can be used for selection
- .



**General Development Potential**

**Site category**  
No category selected

**Select county/counties for sites**  
No category selected

**Site size**  
0 acres - 2855 acres

**Site shape**  
(No preference)

**Parcels intersecting site (max)**  
less than 637

**Different parcel owners**  
0 - 345

**Majority private landowners**  
(No preference)

**Intersects floodplain**  
(No preference)

**Intersects active railroad**  
(No preference)

**Distance to nearest substation**  
0.00 mi - 12.60 mi

**Distance to nearest paved road**  
0.00 mi - 4.47 mi

Currently selected sites						
Site Unique ID	Acres	Narrow site shape	Number parcels	Number parcel owners	Majority private owners	Intersects floodp
1	11	0	4	4	1	
2	91	1	10	1	1	
3	9	1	5	5	1	
4	486	0	11	8	1	

Number of Features

## 4,485

with your current settings

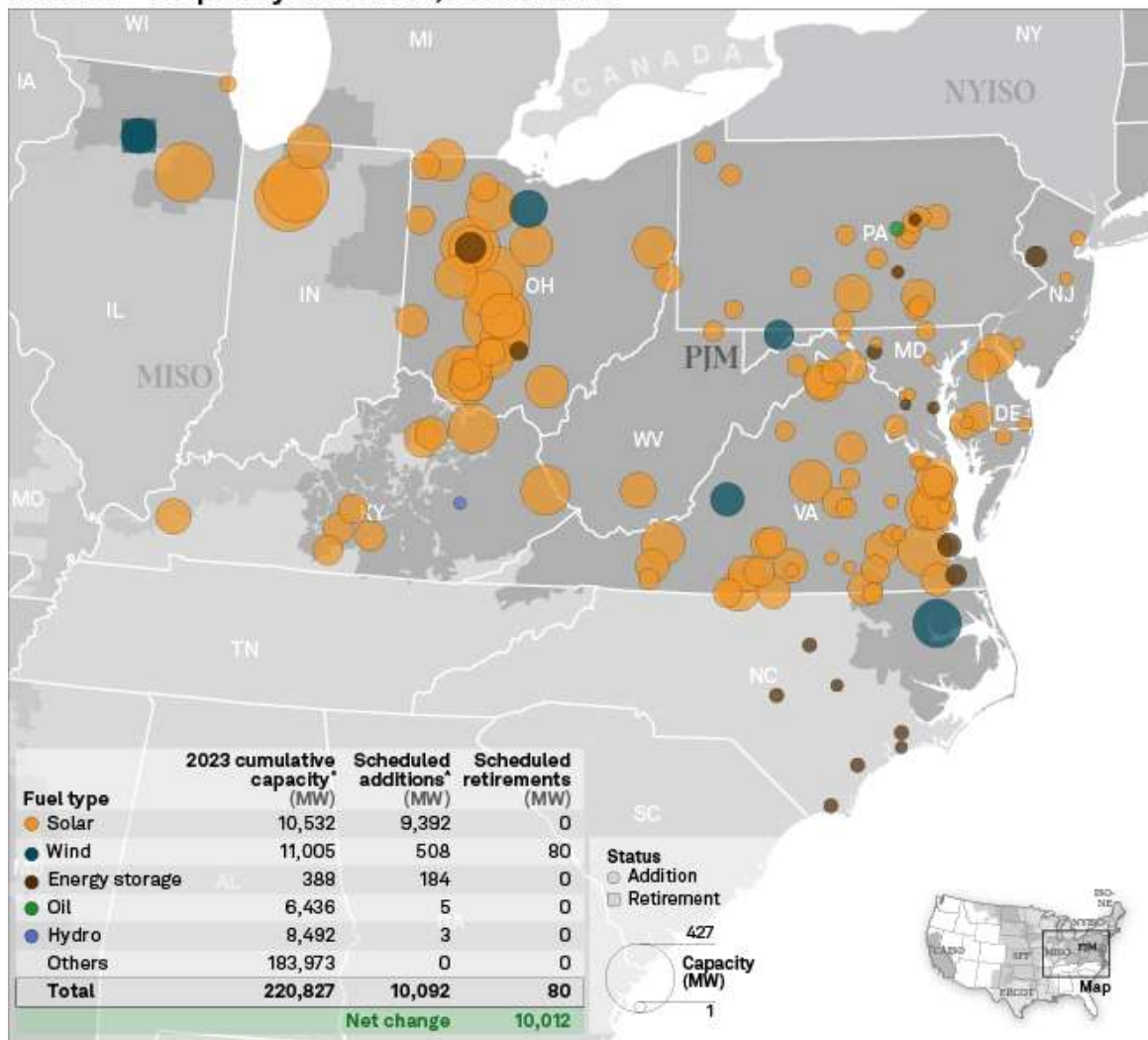
[Link to criteria explanation for General dashboard](#)

# Site Selection Efforts

- The tool has been used to identify sites for Master Plan Development
- CSML, The Nature Conservancy, and Coalfield Development Corp are partnering with CEC to develop plans for 10 sites across southern WV



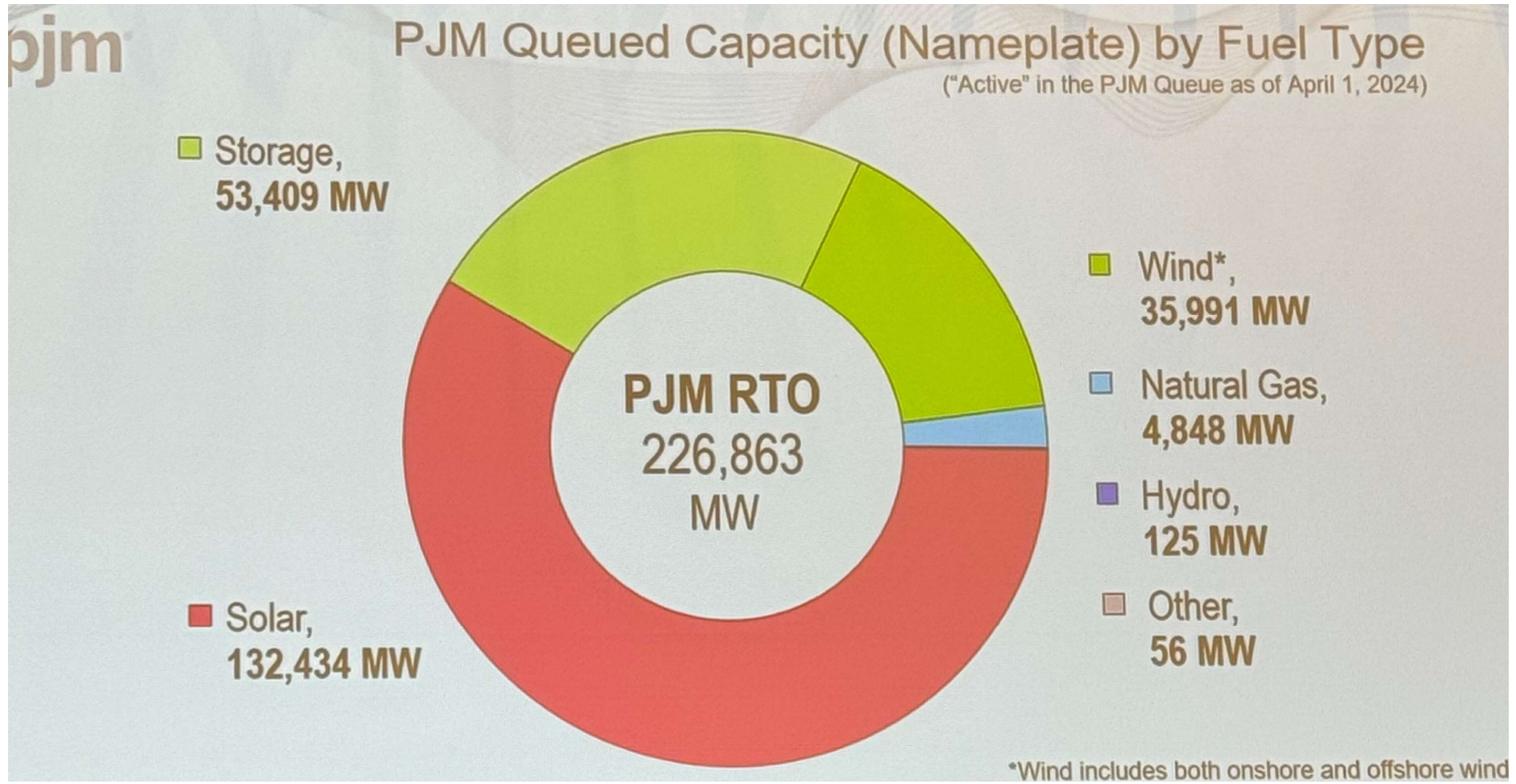
## PJM 2024 capacity additions, retirements

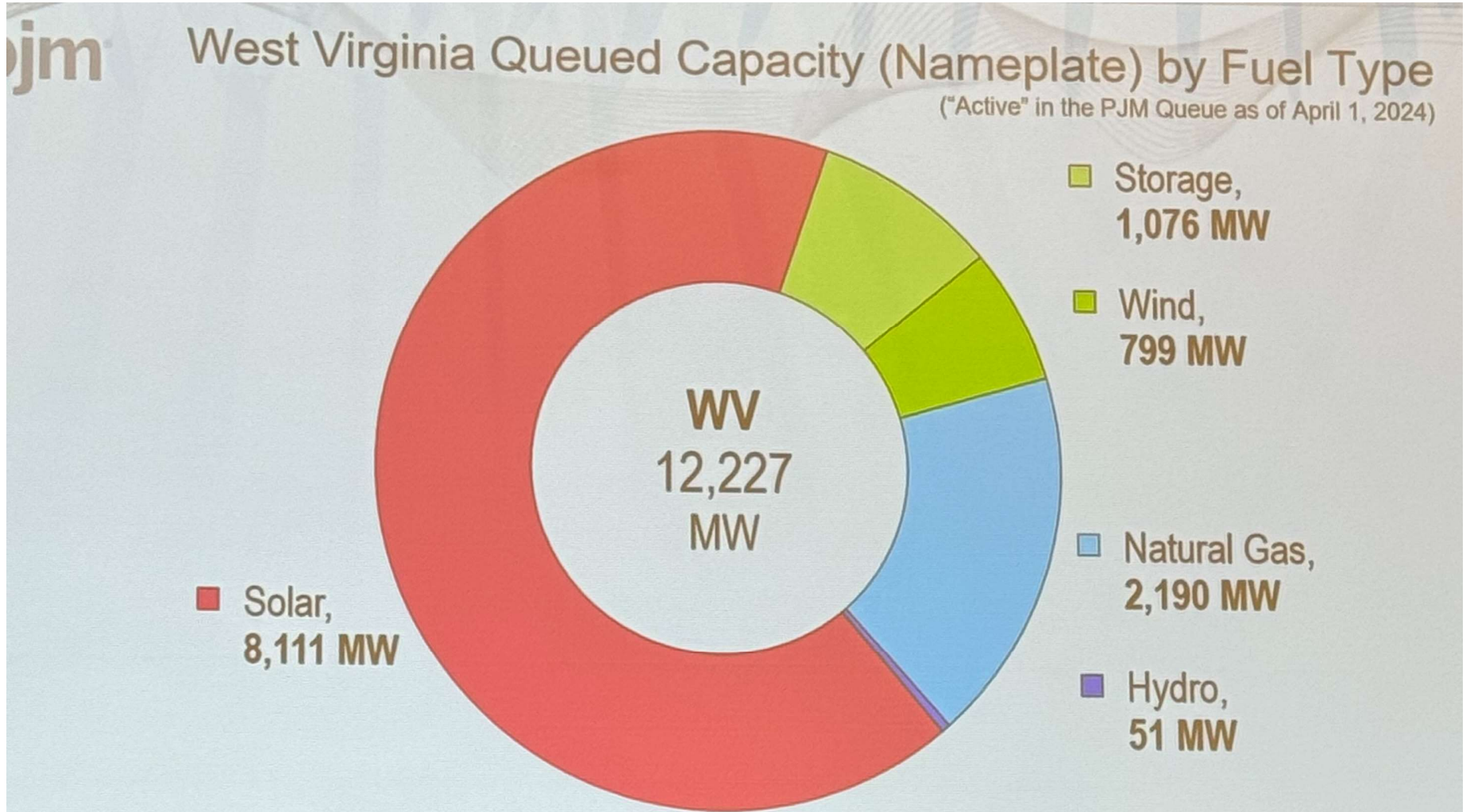


Data compiled March 7, 2024.

\* Cumulative capacity only includes operating and out of service capacity.

^ Scheduled additions exclude capacity in announced status as well as select plants in early development stage with 200 MW and above capacity where the latest information is not available.









We are a community of 400+ energy customer companies and partners **committed to achieving a 90% carbon-free U.S. electricity system by 2030.**



# Thank you

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