

# Out With The Old, In With Renew

## Utilizing Brownfields for Renewable Energy

**Elise Molleur**

Brownfield Redevelopment Specialist  
**NJIT TAB**



With Guest Speakers:



**Rebekah de la Mora**

Senior Policy Analyst, NC Clean  
Energy Technology Center



**Neil J. Alexander**

Partner, Cuddy & Feder LLP

In Partnership with

**NJIT**

**TAB** TECHNICAL  
ASSISTANCE TO  
BROWNFIELD  
COMMUNITIES

Made possible with funding from the EPA

# Agenda

## **What Are Brownfields?**

- Definition
- Types
- Common Brownfield Contaminants
- Brownfield Redevelopment Process

## **Renewables in Today's Economy**

- NC CETC
- Policy Maps

## **Renewable Energy on Redeveloped Brownfields**

- RE-Powering America's Land Initiatives
- General Steps For Redeveloping Brownfields with Renewable Energy
- Benefits of Renewable Energy on Brownfields

## **Repurposing Landfills and Brownfields for Solar Energy**

- Impacts and Benefits
- Value of Solar on Brownfields
- Case Studies

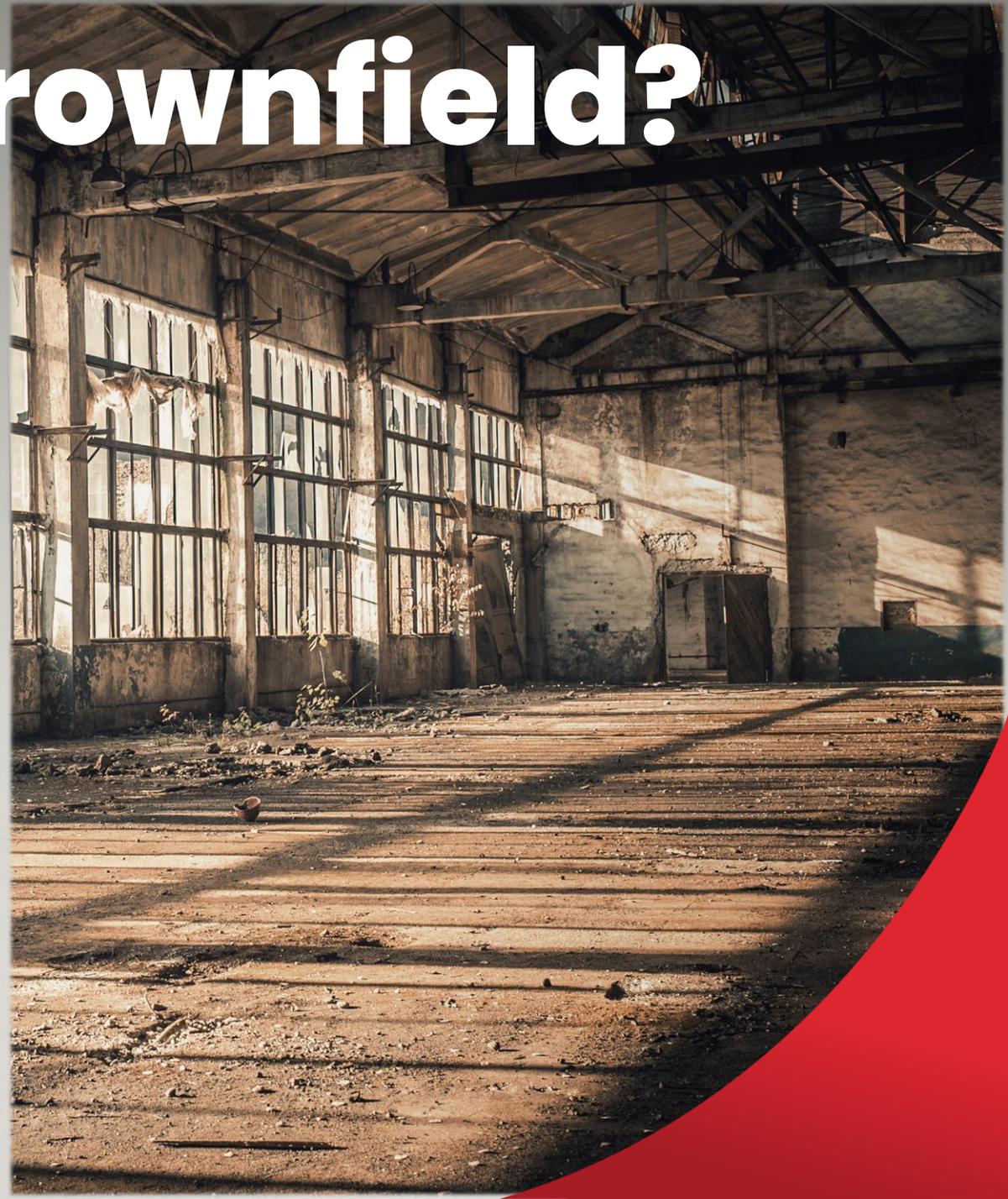
## **Successful Brownfield Redevelopment**

- Rewarding Redevelopments – A Success Story
- NJIT TAB Program

# What is a Brownfield?

“Real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.”

– USEPA

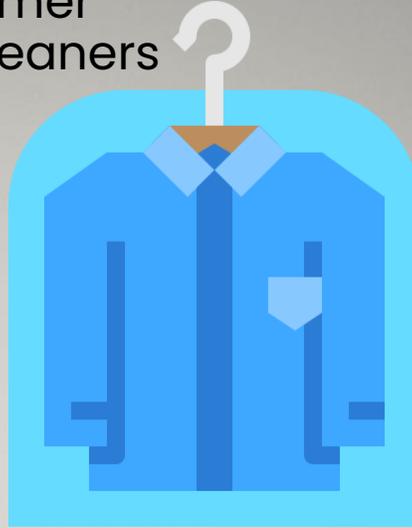


# Types of Brownfields



Abandoned Factories

Former Dry Cleaners



Old Gas Stations



Vacant Warehouses



Previous Landfills

Abandoned Houses  
(may contain asbestos  
and/or lead paint)



## Lead (Pb)

Some sources:

- Mining and processing
- Lead-based paints
- Leaded gasoline (TEL)
- Corroded plumbing



Some sources:

- Insulation, roofing
- Construction
- Old vehicle brakes
- Mining

## Asbestos

# Common Brownfield Contaminants

## Petroleum Products



Some sources:

- Spills
- Fuel tank leaks
- Heating systems



Some sources:

- Drycleaning solvents
- Petroleum products
- Leaking sewer pipes
- Stormwater runoff
- Pesticides
- Paint, paint thinners

## Volatile Organic Compounds (VOCs)



**Engage the  
Community**

**Build  
Partnerships**

**Funding  
Sources**

**Fertilizer**

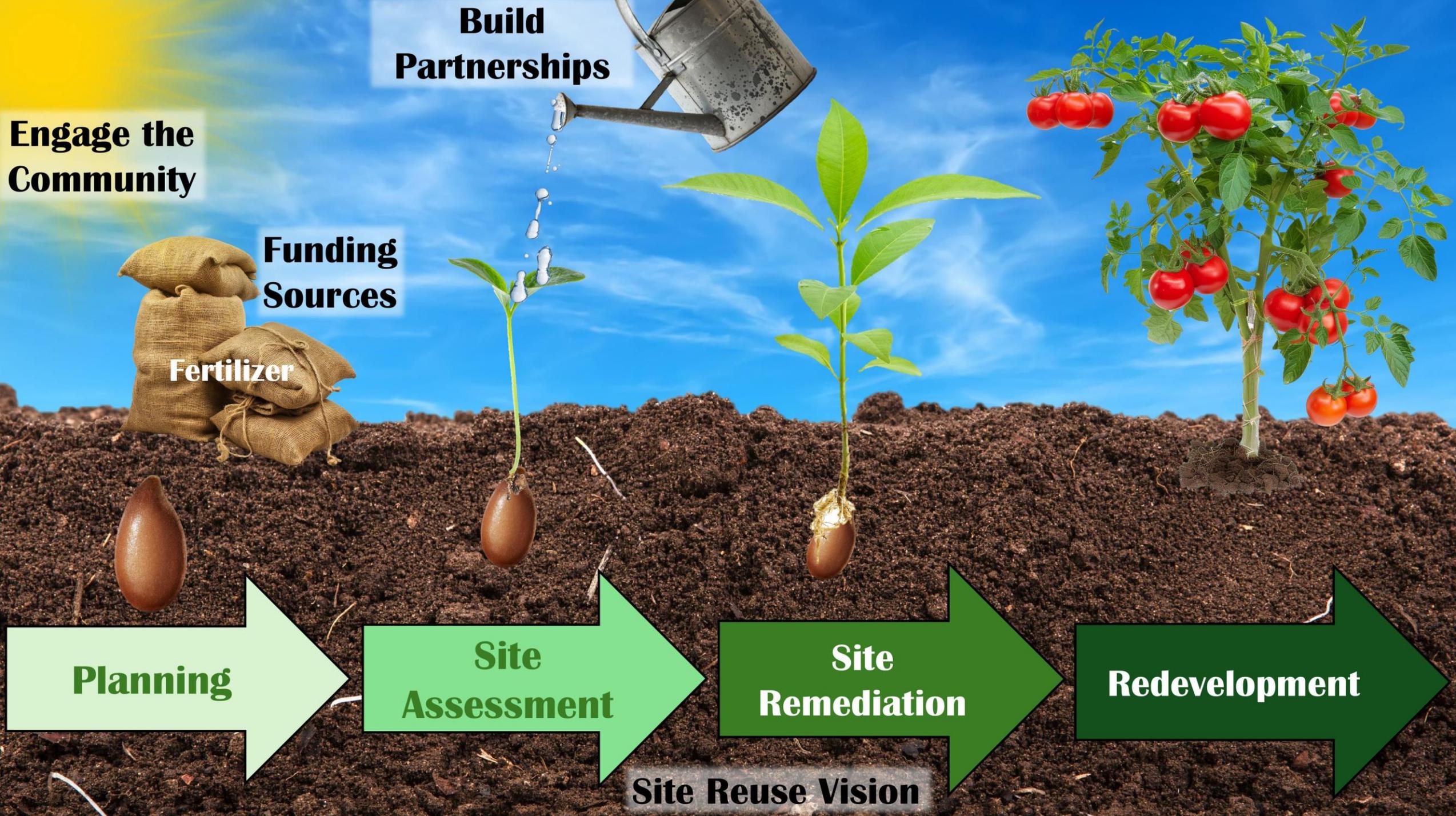
**Planning**

**Site  
Assessment**

**Site  
Remediation**

**Redevelopment**

**Site Reuse Vision**





# NC CLEAN ENERGY TECHNOLOGY CENTER

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## Renewables in Today's Economy



# North Carolina Clean Energy Technology Center

## Our Mission

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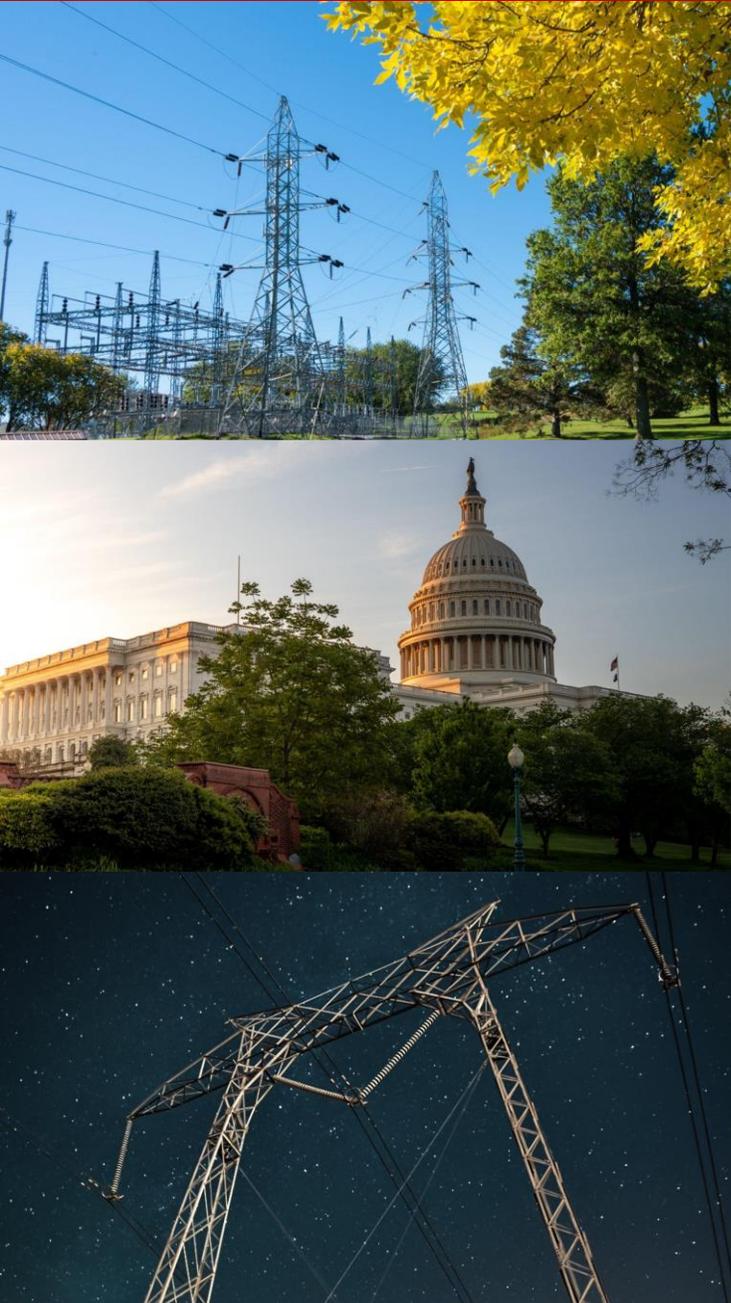
The N.C. Clean Energy Technology Center, at N.C. State University advances a sustainable energy economy by educating, demonstrating and providing support for clean energy technologies, practices, and policies.

For over 35 years, the Center has worked closely with partners in government, industry, academia and the non-profit community.

# Our Work

- Energy Policy
- Clean Energy Training
- Clean Transportation
- Clean Power & Industrial Efficiency





# Energy Policy & Markets

The Center conducts objective research and analysis and provides education and technical assistance on energy policy issues nationwide. Our Policy Team tracks developments and examines the impacts on clean energy technologies. Projects include:

- Database of State Incentives for Renewables & Efficiency (DSIRE)
- DSIRE Insight
- The 50 States Reports
- Customized research & analysis

# Clean Energy Training

The Center offers several opportunities for professional development and the highest level of continuing education in renewable energy technologies:

- Renewable Energy Technologies Diploma Series (RETDS)
- Certificate in Renewable Energy Management (CREM)
- FSPV: Fundamentals of Solar Photovoltaic Design & Installation
- ASPV: Advanced Solar Photovoltaic Design & Installation
- Solar Storage
- O&M: Operations & Maintenance of PV Systems
- Solar Policy & Finance Workshop





# Clean Transportation

The Center propels the development, awareness and use of alternative fuels and advanced transportation technologies through:

- Technical assistance, including trainings and fleet assessments
- Education and outreach initiatives, including workshops, meetings, conferences and marketing campaigns highlighting the benefits of using clean transportation technologies
- Hosts the annual **Sustainable Fleet Technology Conference & Expo**

# Clean Power & Industrial Efficiency

The Center staff works to reduce energy intensity by identifying energy efficiency improvements, as well as clean power solutions, such as combined heat and power (CHP), district energy and waste heat recovery applications. The team conducts:

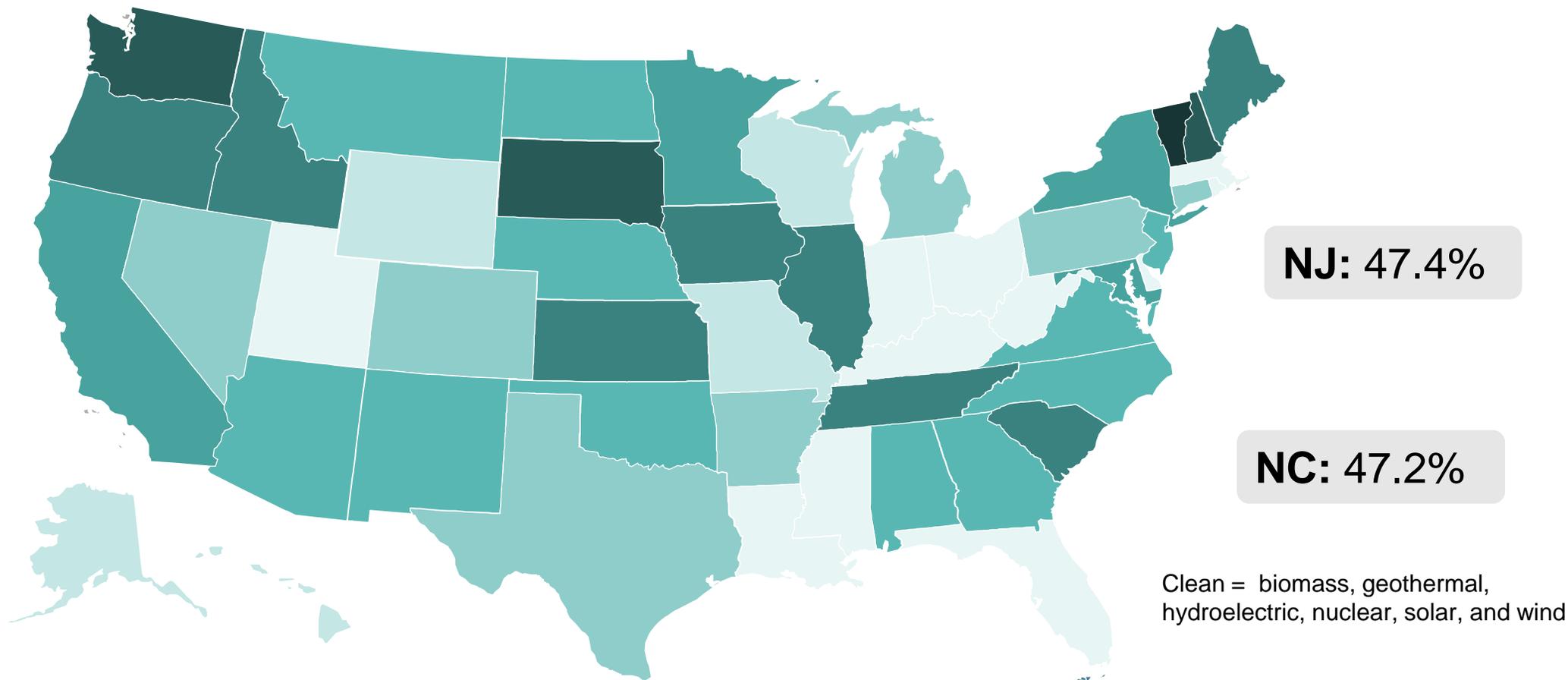
- Energy Assessments and Screenings
- Feasibility Analyses
- Consultative Energy Studies



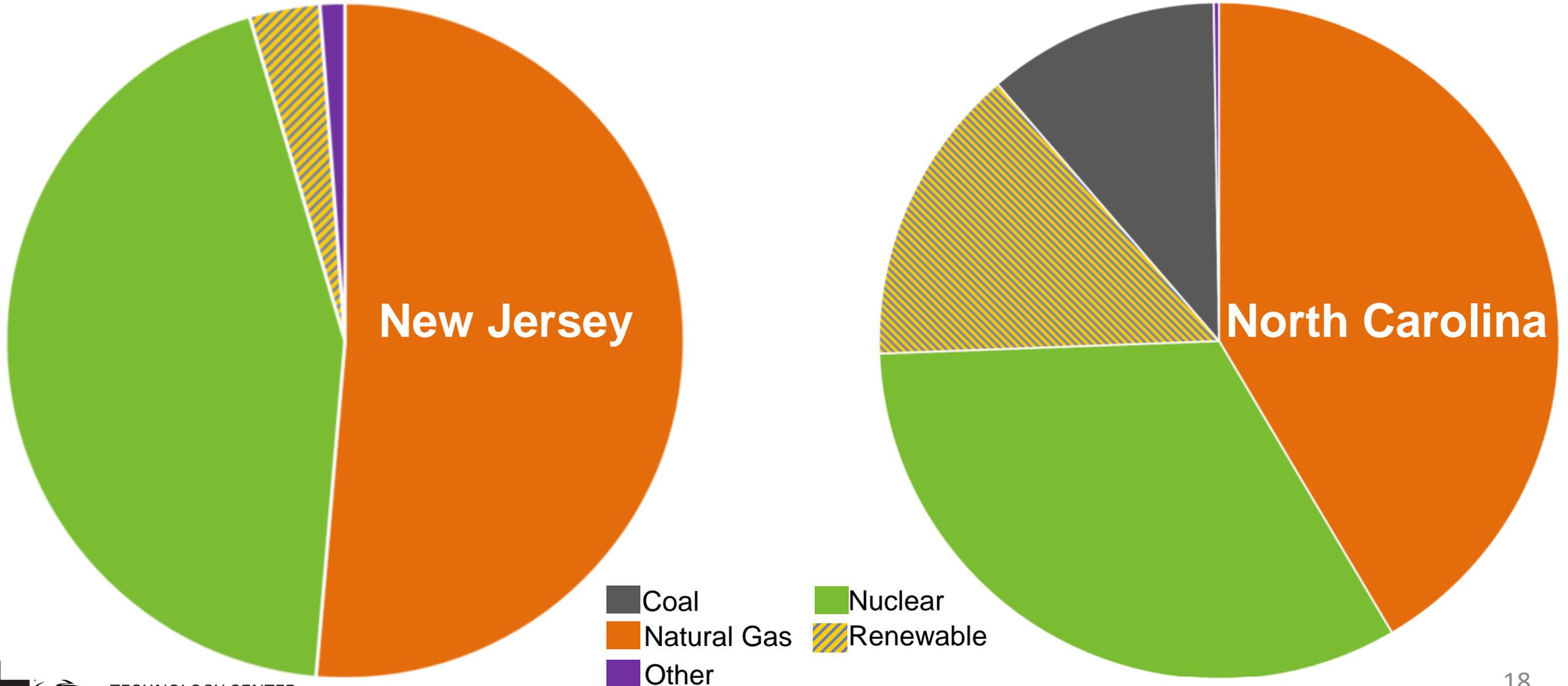
# Policy Maps



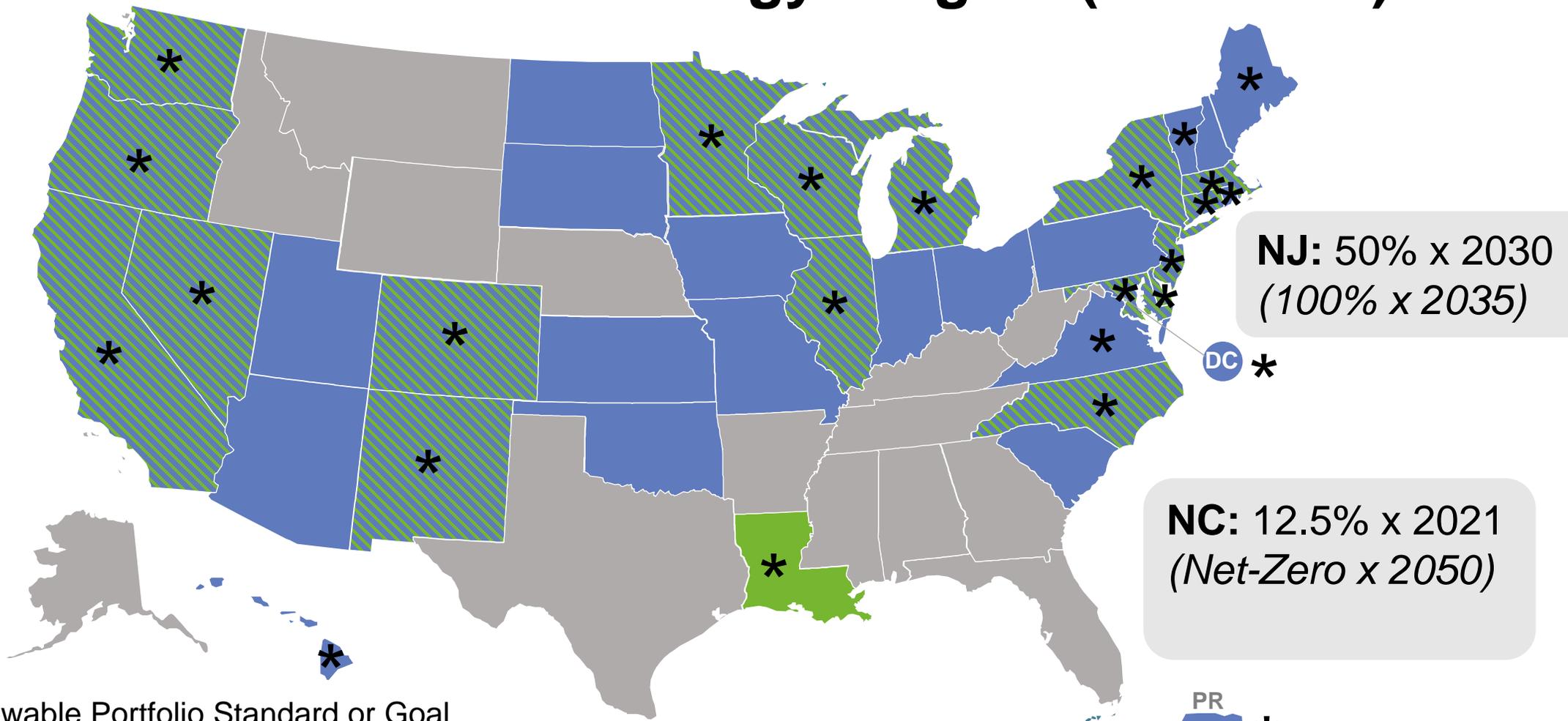
# Percentage of Clean Electricity Generated by State (2023)



# State Generation Mix (2023)



# Clean and Renewable Energy Targets (Nov 2024)



■ Renewable Portfolio Standard or Goal

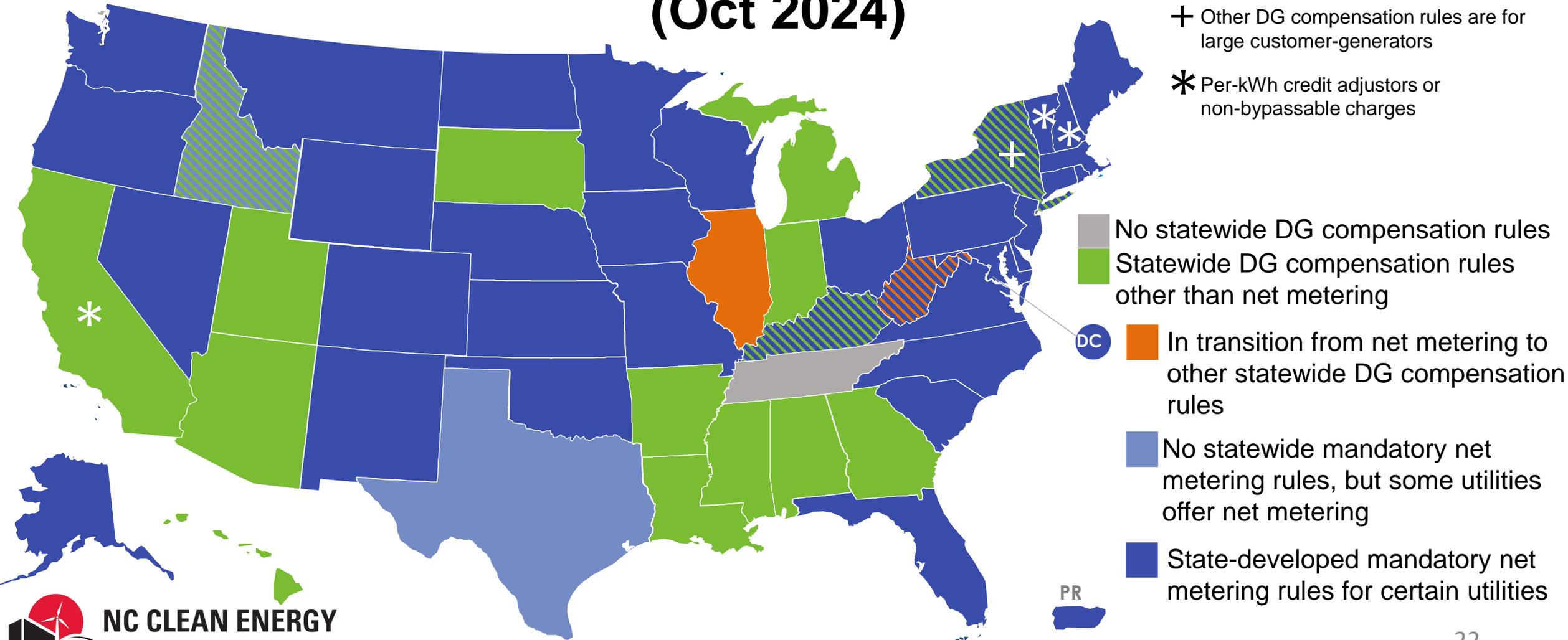
■ Clean Energy or Net-Zero GHG Standard or Goal

\* 100% Clean Energy or Net-Zero GHG Target or Goal





# Net Metering and Distributed Generation Compensation (Oct 2024)







# NC CLEAN ENERGY

## TECHNOLOGY CENTER

**Contact us for more information**

[rmdelamo@ncsu.edu](mailto:rmdelamo@ncsu.edu) | [dsire-admin@ncsu.edu](mailto:dsire-admin@ncsu.edu)

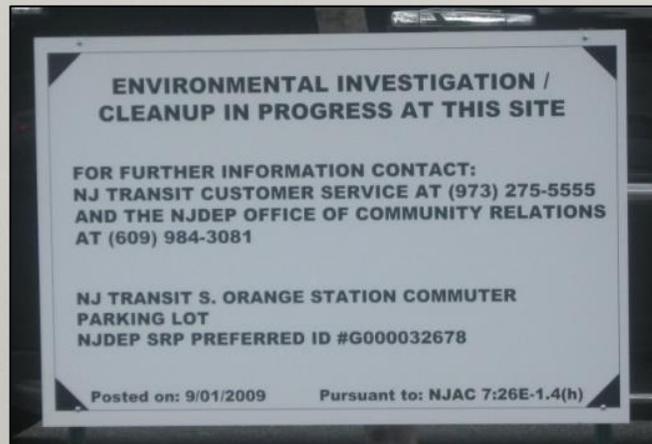


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# Renewable Energy on Brownfields

**By converting brownfields into renewable energy assets, municipalities can achieve multiple goals:**

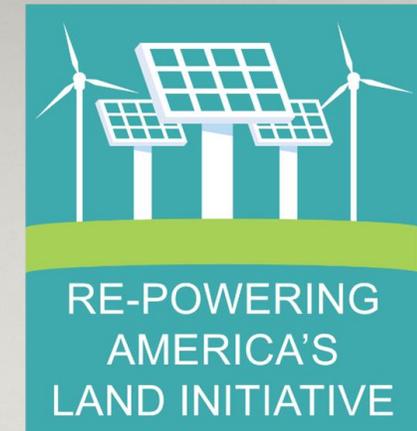
Reducing Environmental Hazards



Generating Local Economic Benefits



Contributing to Statewide and National Renewable Energy Targets

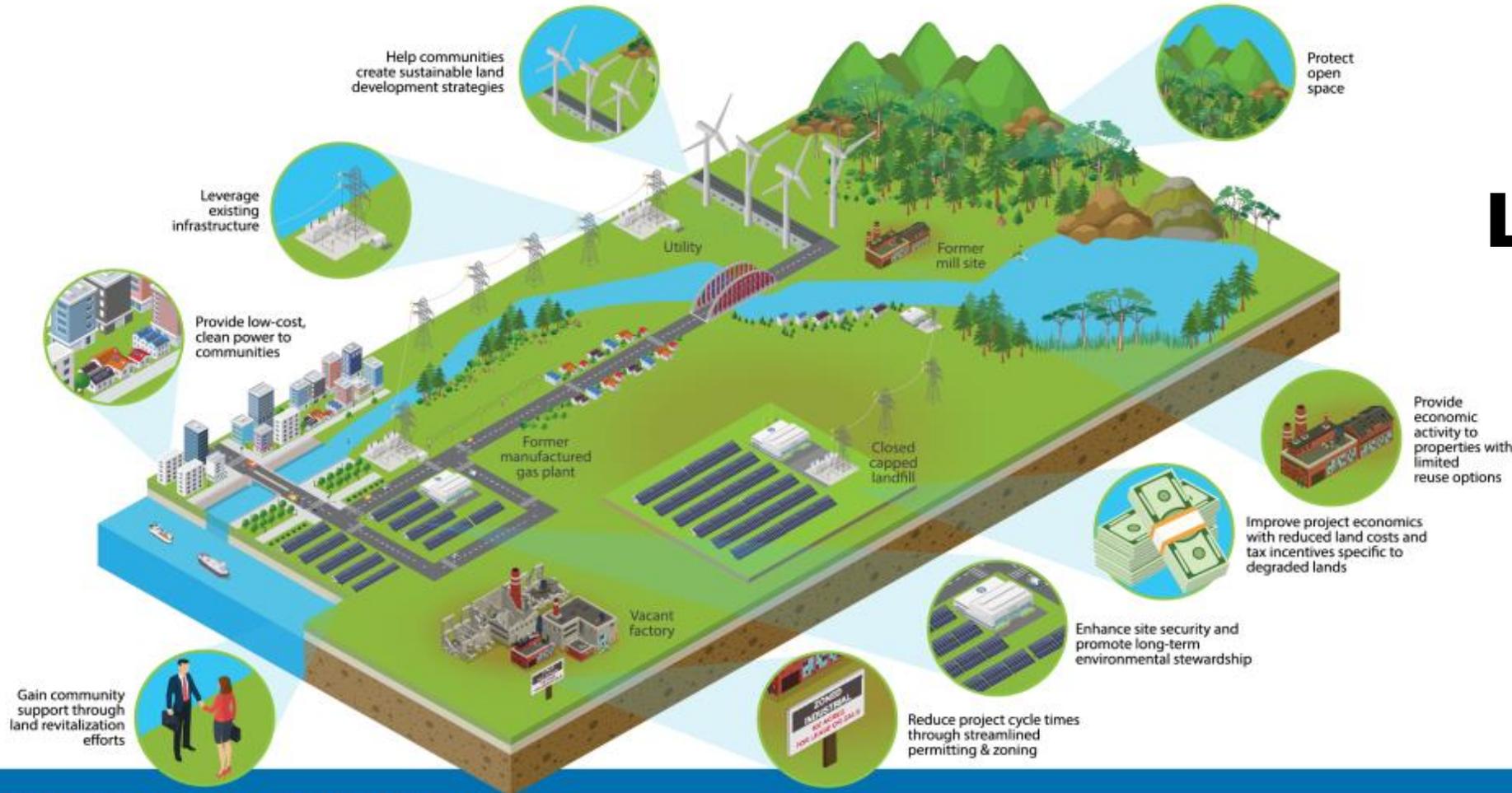


## RE-Powering America's Land

### Potential Advantages of Reusing Potentially Contaminated Land for Renewable Energy

# EPA's RE-Powering America's Land Initiative

Encourages renewable energy development on current and formerly contaminated lands when such development is aligned with the community's vision for the site



#### RE-POWERING AMERICA'S LAND INITIATIVE

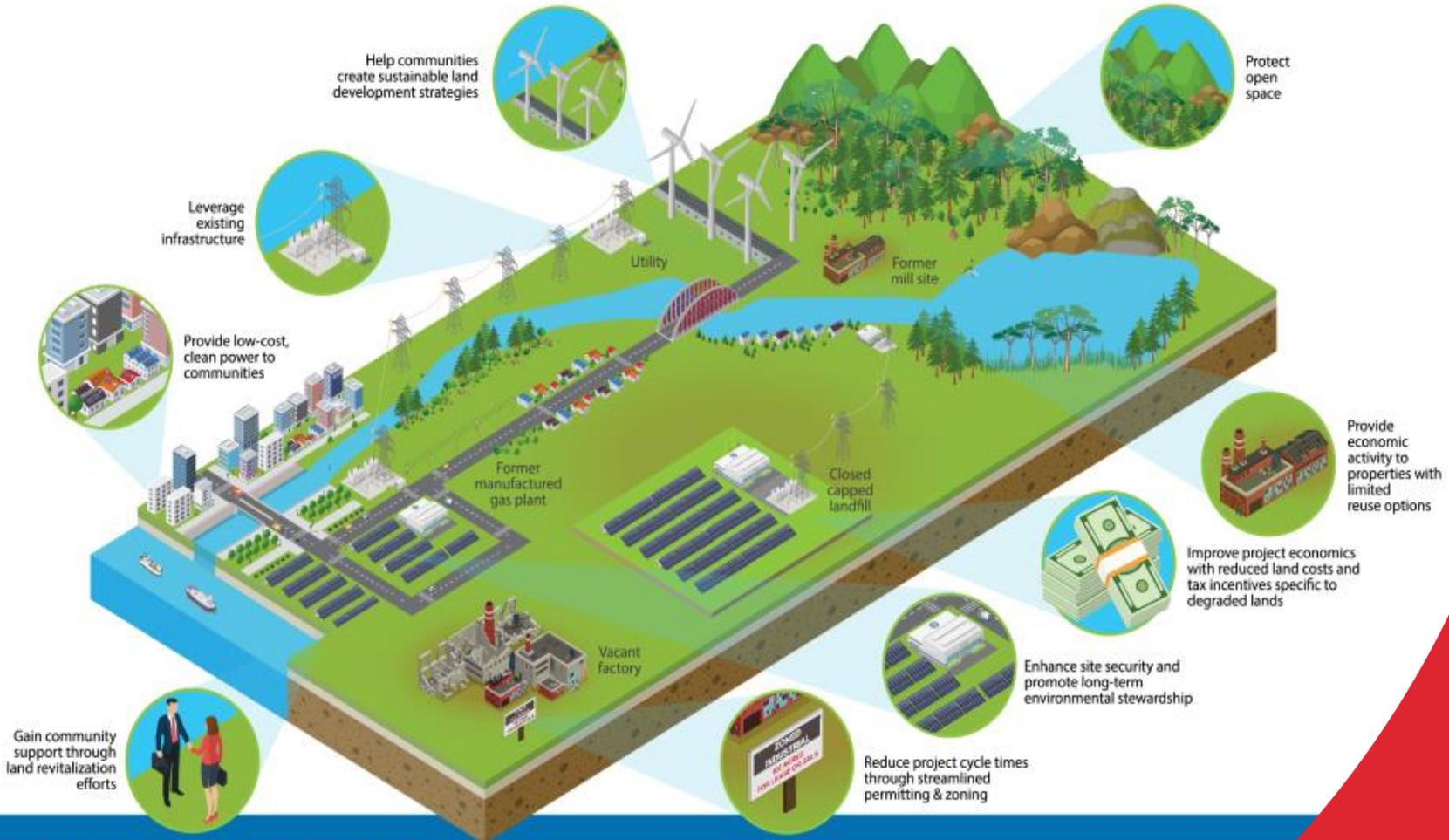
Through the RE-Powering America's Land initiative, the U.S. Environmental Protection Agency promotes the reuse of potentially contaminated lands and landfills for renewable energy through a combination of tailored redevelopment tools for communities and developers, as well as site-specific technical support. The initiative aims to revitalize degraded land by promoting renewable energy as a productive end use, when aligned with the community vision for the site.

This strategy creates new markets for potentially contaminated lands, while providing a sustainable land development strategy for renewable energy. RE-Powering aims to turn liabilities into assets for surrounding communities by fostering collaborative networks between the energy and remediation sectors. This fact sheet provides an overview of the potential advantages of this development approach.



## RE-Powering America's Land

### Potential Advantages of Reusing Potentially Contaminated Land for Renewable Energy



#### RE-POWERING AMERICA'S LAND INITIATIVE

Through the RE-Powering America's Land Initiative, the U.S. Environmental Protection Agency promotes the reuse of potentially contaminated lands and landfills for renewable energy through a combination of tailored redevelopment tools for communities and developers, as well as site-specific technical assistance. The initiative aims to revitalize degraded land by promoting renewable energy as a productive end use, when aligned with the community vision for the land.

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#### Advantages:

1. Leverage existing infrastructure
2. Reduce project cycle times through streamlined permitting and zoning
3. Improve project economics with reduced land costs and tax incentives
4. Gain community support through land revitalization efforts
5. Protect open space

# Renewable Energy on Brownfields



1. Pre-Screening
2. Site Conditions and Feasibility
3. Design and Development

## Brownfields Renewable Energy Siting Checklist

Brownfields Renewable Energy Siting Checklist

**Process Checklist**

### Brownfields Renewable Energy Siting

The following checklist provides a flexible guide for integrating renewable energy activities into the brownfields assessment, cleanup, and reuse process. Site-specific conditions may lead to implementing some key considerations during steps that differ from those specified below.

1. Site Conditions → 2. Integrate Design → 3. Implement Cleanup → 4. Operate & Maintain

**Step 1: Screen Site and Environmental Conditions**

**Is my site large enough for renewable energy?**

The [RE-Powering Mapper](#) is a useful resource to identify favorable site-specific conditions for renewable development. Several brownfield sites are smaller than two acres, below the typical size threshold of five acres for utility-scale renewable energy development. However, other options for small brownfield sites include small community-scale projects that serve nearby development or disadvantaged neighborhoods, or renewable energy that provides just for on-site electricity needs. The [RE-Powering Tracking Matrix](#) has examples of Brownfields sites used for small-scale projects where less than 300 kilowatts of solar were developed and projects typically required less than two acres.

**Are the local solar or other energy resources sufficient to support renewable energy development?**

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# EPA RE-Powering Benefits Matrix

**Job Creation**



**Cost Savings**

**Environmental Benefits**



**Community Benefits**

**Revenue Generation**



**Other Benefits**

# The Benefits of Renewable Energy on Brownfields

## Job Creation



68 Projects Report Job Creation  
(EPA RE-Powering Benefits Matrix)

“The project, over its 20-year life span, is expected to generate approximately 1,300 full time equivalent employee years...”

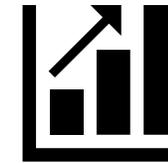
Regulus Solar Power Plant, Bakersfield, CA

[EPA Benefits Matrix Site List](#)

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# The Benefits of Renewable Energy on Brownfields

## Environmental Benefits



240 Projects Report  
Environmental Benefits  
(EPA RE-Powering Benefits Matrix)

“As of October 2020, the installation had produced enough electricity to equal planting over 67,000 trees, equivalent to over 290,000 gallons of gas and over 230,000 pounds of methane.”

Cheshire Landfill Solar, Cheshire, CT

“The solar farm also houses a butterfly feeding ground.”

Oakland Transfer Station, Oakland, ME

[EPA Benefits Matrix Site List](#)

*Renewable Energy  
Has Space to Grow*

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ASSISTANCE TO  
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COMMUNITIES

# The Benefits of Renewable Energy on Brownfields

## Revenue Generation



130 Projects Report  
Revenue Generation  
(EPA RE-Powering Benefits Matrix)

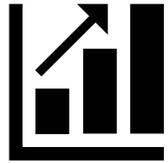


“This solar array... generates revenue for the city from PILOT and lease payments, as well as energy credits, which is expected to total nearly \$4 million over the next 20 years.”

Titcomb Solar Array, Amesbury, MA  
[EPA Benefits Matrix Site List](#)

# The Benefits of Renewable Energy on Brownfields

## Cost Savings



221 Projects Report  
Energy Costs Savings  
(EPA RE-Powering Benefits Matrix)

“The system reduces the \$250,000 annual electric bill for cleanup by 90%.”  
Clean Harbors, Bridgeport, NJ

“Over 100 Beverly residents have subscribed to the community solar system. Subscribers accrue energy credits that reduce their electric bill.”  
Beverly Landfill Solar, Beverly, MA

[EPA Benefits Matrix Site List](#)



# The Benefits of Renewable Energy on Brownfields

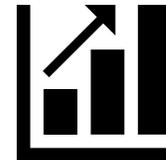
## Community Benefits



“This community solar model allows those who are not able to install solar to access solar energy. The town signed a power purchase agreement (PPA), which provides energy cost savings.”  
Milton Landfill Solar Garden, Milton, NH

“The project is part of a statewide initiative to demonstrate how low-income community solar can help reduce energy costs for highest-need customers (i.e., those who spend 4% of income or more on utility bills)...”  
Coyote Ridge Solar, Forts Collins, CO

[EPA Benefits Matrix Site List](#)



57 Projects Report  
Community Benefits  
(EPA RE-Powering Benefits Matrix)

Time Magazine

### Why Community Solar Is Key to the Clean Energy Transition

Over a third of Americans rent, and over half of homeowners can't use their rooftops for solar. Community solar power can help fill this...

1 month ago

Mass.gov

### DPU Issues Order on Low-Income Solar Access

The new order provides equitable access to solar energy and affordability to low-income and environmental justice populations.

Jun 4, 2024

Oregon Public Broadcasting - OPB

### Solar project offers low-income Portland residents relief from high energy bills

Carlos Interian lives with his family on the lower level of an apartment complex in the Cully neighborhood of Northeast Portland.

Sep 4, 2024

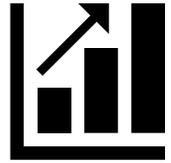
Inquirer.com

### Warehouses now powering homes through rooftop solar

About 20000 New Jersey residents subscribe to a state program that encourages rooftop solar on commercial buildings.

Jun 19, 2024

# The Benefits of Renewable Energy on Brownfields



174 Projects Report  
Other Benefits  
(EPA RE-Powering Benefits Matrix)

## Other Benefits

- ✓ Cost savings with green remediation
- ✓ Economic benefits to community from created jobs
- ✓ Tools for learning and data gathering
- ✓ Distributed generation



“The solar array generates clean power to offset the needs of the remediation systems.”  
Refuse Hideaway Landfill, Middleton, WI

[EPA Benefits Matrix Site List](#)



# Repurposing Landfills and Brownfields for Solar Energy

*Transforming Underutilized Land into Renewable  
Energy Resources*

# Benefits of Renewable Energy Projects

## Minimal Environmental Impact and Consumer Savings

- **No Water Use or Wastewater Generation**
- **Minimal Traffic:** Only limited monthly visits after construction
- **No Noise, Night Lighting, or School Children**
- **Minimal Visual Impact:** Security fencing as the only visible structure
- Environmental Benefits: Significant greenhouse gas reduction and emissions offset
- **Consumer Savings:** Community Solar programs in NY offer **10% energy cost savings** for enrolled consumers





# Repurposing Landfills for Renewable Energy

## Transforming Underutilized Land into Productive Assets

- **Minimal Additional Impact:**
  - Brownfields and landfills are already disturbed sites, ideal for renewable projects.
- **Solar on Landfills:**
  - Converts closed, unused landfills into productive, revenue-generating sites.
  - No interference with active or closed landfill cells.
- **Existing Infrastructure:**
  - Landfills generating energy from methane gas already have grid connections for solar arrays.
- **EPA Encouragement:**
  - Supported by the “RE-Powering America’s Lands” initiative for renewable energy on landfills and contaminated sites.

# Value of Solar on Brownfields and Landfills

- Converts idle, capped landfills into **productive, revenue-generating assets**.
- Enhances reuse value of **brownfields and hazardous waste sites**.
- Supports NYS Climate Action goals by **reducing fossil fuel dependence**.





# Key Findings from NYS DEC Analysis (2016-2018)

- Reviewed 32 solar projects (<25 acres) across diverse sites.
- **Outcome:** All projects received negative SEQRA declarations—no significant adverse environmental impacts.

# Environmental and Economic Benefits

**\$ Environmental:** No air emissions, no water use, and improved air quality.

- 🌿 Economic:**
- Job creation during construction.
  - Long-term property tax revenues.
  - Shaded parking via solar canopies.



# SEQRA Type II Exemptions

- **Installation on 25 acres or less** at sites like:
  - Closed landfills and brownfields with COCs.
  - Parking lots/garages and wastewater facilities.
  - Industrially zoned but underutilized sites.
- **Infrastructure Ready:** Existing utility lines simplify grid connection.

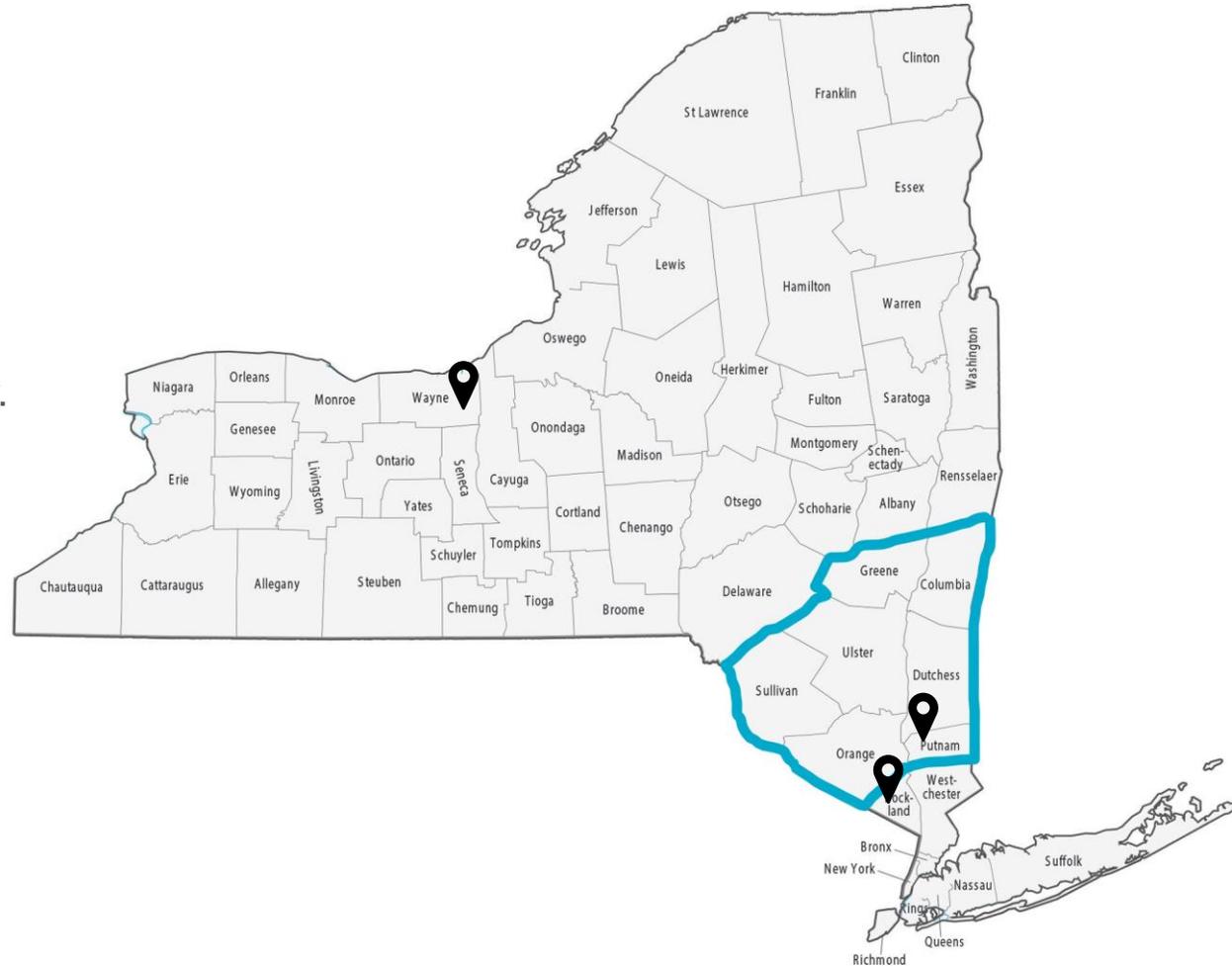
# Case Study: Brookhaven Solar Project

- **8.6 MW Solar Project** on a capped landfill (35 acres).
- Over **16,000 solar panels** with fixed-tilt ballasted installation.
- Feeds into PSEG-LI's grid, generating renewable energy for the region.



# Other Successful Projects

- **Clarkstown, Rockland County:** 2.3 MW solar facility.
- **Williamson, Wayne County:** 1.5 MW solar array.
- **Patterson, Putnam County:** Multiple landfill solar projects.



# Support from USEPA & Beyond

- USEPA's **RE-Powering America's Lands** program encourages:
  - Renewable energy on capped landfills and brownfields.
  - Leveraging federal incentives like the Inflation Reduction Act.



## Zoning and Development of NY Brownfield/Landfill Solar Projects

### PatterSun

**Technology:** Solar

**Location:** Patterson, NY

**Site:** long-term Municipal Landfill

**Project Size:** 1 MW

**Status:** In Operation

**Unique Features:** Sells power via Remote Net Metering to Trinity Pawling High School under a long-term agreement.



## Zoning and Development of NY Brownfield/Landfill Solar Projects

### PatterSun 1.3

**Technology:** Solar  
**Location:** Patterson, NY  
**Site:** 25 acre Municipal Landfill  
**Project Size:** 1.3 MW  
**Status:** In Operation



## Zoning and Development of NY Brownfield/Landfill Solar Projects

### Sunlight Beacon

**Technology:** Solar

**Location:** Beacon, New York

**Site:** 16.6 acre Former  
Municipal Landfill

**Project Size:** 2 MW

**Status:** In Operation, Power  
sold to City of Beacon





# Contacts

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# Rewarding Redevelopments – Success Stories

## Pine Avenue Landfill – Niagara, NY



(1995)

### History:

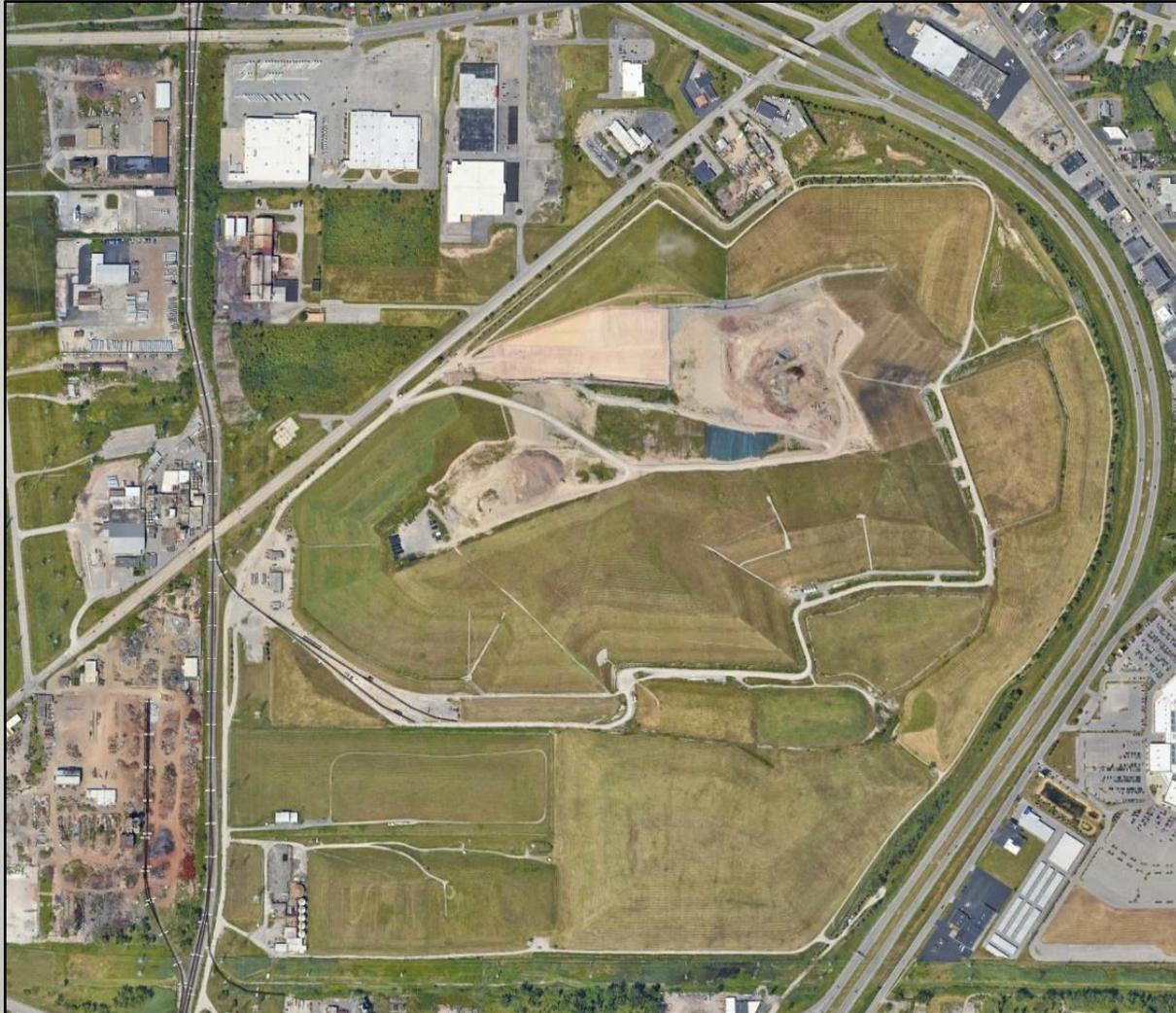
- Late 1800s – dumping of industrial waste
- 1970s – solid waste management facility
- Part of a 385-acre complex



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# Rewarding Redevelopments – Success Stories

## Pine Avenue Landfill – Niagara, NY



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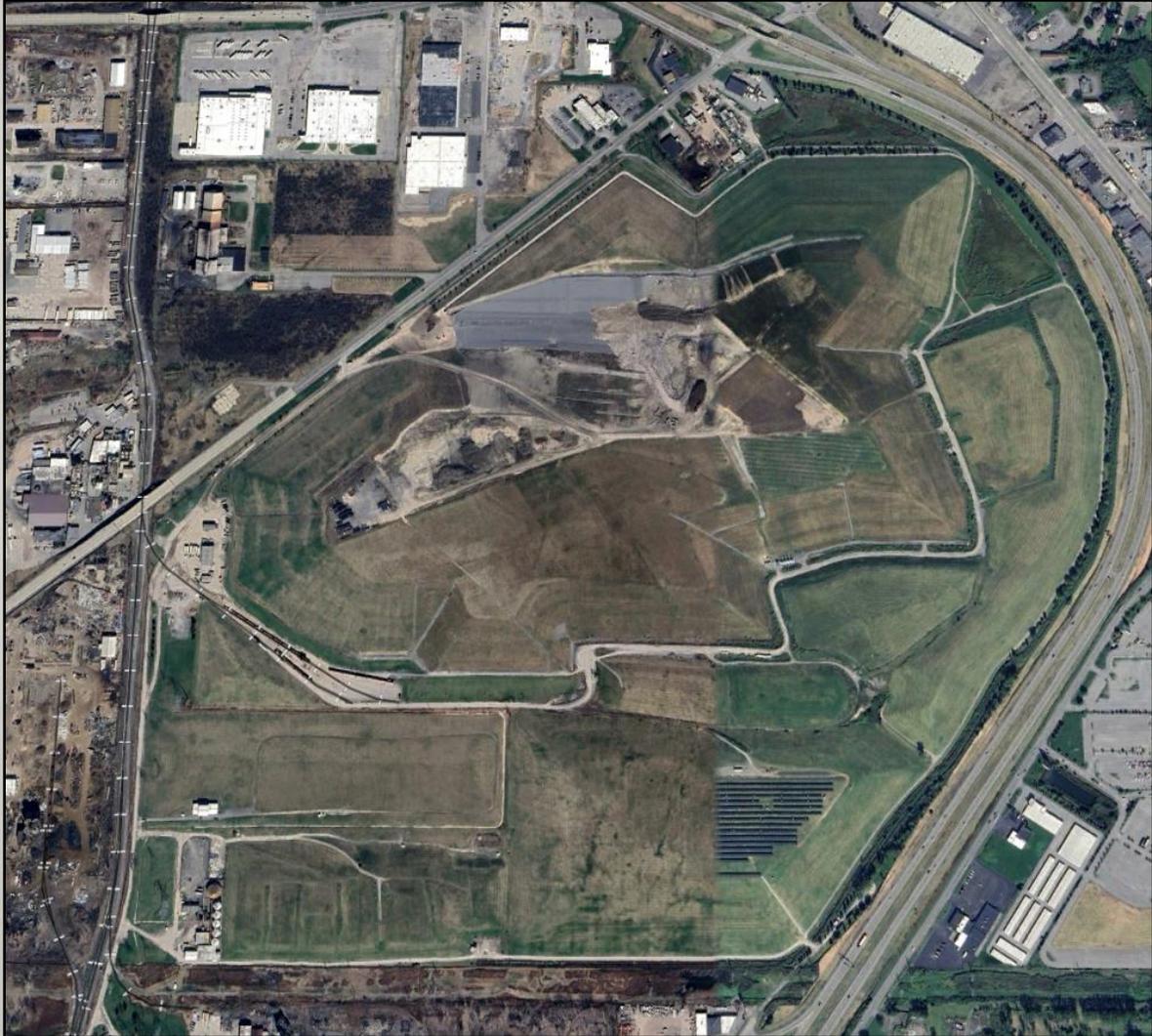
(August 2022)

### The Initiation:

- 2022 – AC Power begins discussions with Republic Services
- Permitting and environmental challenges
- Phase I Environmental Site Assessment
- Coordination with the town
- NYSDEC post-closure use modification application
- Engineering challenges

# Rewarding Redevelopments – Success Stories

## Pine Avenue Landfill – Niagara, NY



### The Benefits:

- Local and federal clean energy incentives
- Jobs during development
- Discounted energy for residents (including low-to-moderate income)
- Offsetting carbon dioxide
- Meeting statewide renewable targets
- PILOT agreement
- End-of-life recycling plan

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(September 2024)

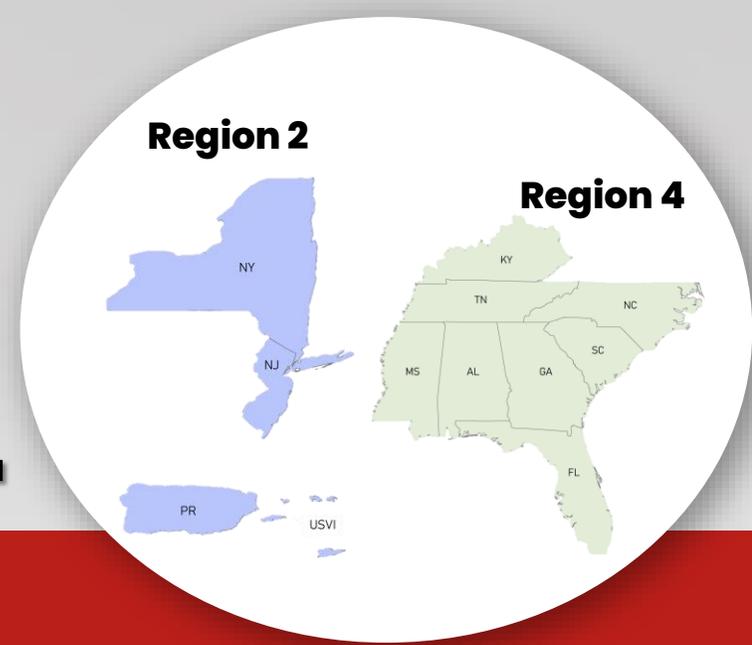


# NJIT TAB EPA REGIONS 2 & 4

NJIT has served as an EPA designated technical assistance provider since 2008

NJIT TAB serves as an independent resources to state, territory, regional, county, tribal, and local government entities, and nonprofits attempting to learn about, identify, assess, cleanup and redevelop brownfields.

Assistance is *free!*



# Questions & Answers

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NJIT provides free technical assistance to state, regional, county, tribal, and local government entities and nonprofit organizations interested in learning about, identifying, assessing, cleaning up, and redeveloping brownfield sites in EPA Regions 2 & 4.

**Thank you for attending today's webinar!**



[tab@njit.edu](mailto:tab@njit.edu)

**Q&A Session**



(973) 642-4165

**Have any more questions after today?**

**Contact Us**



[www.njit.edu/tab](http://www.njit.edu/tab)



<https://www.linkedin.com/company/njit-tab/>



<https://bit.ly/zoom-njit-tab>

# Upcoming Events 2025

## TAB On Tour

**BROWNFIELD BASICS WORKSHOP** | **Vacant to Vibrant:**  
A Community Learning Session on Brownfields

Register here:  
<https://bit.ly/Vacant-to-Vibrant>

Hosted by **Rodney T. Clements, Jr.**  
PROSPERITY COMMUNITY DEVELOPMENT COUNCIL

with guest speaker **Joe Reiner**  
BROWNFIELD REDEVELOPMENT SPECIALIST, NJIT TAB

**January 20, 2025**  
1:00pm CST  
Bishop State Community College  
351 North Broad Street, Mobile, AL 33604

For questions or assistance: [joseph.reiner@njit.edu](mailto:joseph.reiner@njit.edu)  
878-642-4169

NJIT TAB TECHNICAL ASSISTANCE TO BROWNFIELD COMMUNITIES

MADE POSSIBLE WITH FUNDING FROM THE US EPA

January 20, 2025

Vacant to Vibrant: A Community Learning Session on Brownfields

Mobile, AL

CHOOSE YOUR OWN ADVENTURE WITH NJIT TAB  
YOU'RE THE STAR OF THIS VIRTUAL WORKSHOP!  
USE YOUR IMAGINATION!

**THE GREAT GEORGIA GAS STATION CLEANUP**  
February 12th, 12:00pm

with **CAILYN BRUNO**  
Director of Environmental Services - NJIT TAB  
**JOE REINER**  
Brownfield Redevelopment Specialist - NJIT TAB  
**SHANNON D. RIDLEY**  
Brownfield Coordinator - Environmental Protection Division

REGISTER TODAY!  
<https://bit.ly/GGCleanup>

Scan here!

February 12, 2025

The Great Georgia Gas Station Cleanup

Virtual

### TAB On Tour

If you'd like NJIT TAB to visit your area, feel free to contact us!



# Join the conversation!

- Conversations among a member of our team and special collaborators
- Delve deeper into the different intersections of brownfield redevelopment
- **Upcoming talks include:**
  - Understanding your Phase 1 ESA Reports
  - Highlighting Non-Profits
  - Brownfields on Main Street
  - History of Brownfields
  - Exploring the Green Economy and the "New" Jobs it Creates
  - And more!



# In Case You Missed It

NJIT  
**TAB** TECHNICAL ASSISTANCE TO BROWNFIELD COMMUNITIES  
presents  
**Carrie Martin, AICP**  
Environmental Sustainability Planner, Center for Community Systems

## Climate Change and Brownfields 101

Thursday, March 7, 2024  
12:00pm - 1:00pm EST

Made possible with funding from the US EPA.

**Climate Change and Brownfields 101**

NJIT  
**TAB** TECHNICAL ASSISTANCE TO BROWNFIELD COMMUNITIES  
presents  
**Cailyn Bruno, PG, LSRP**  
Director, Environmental Services

## Pop-Up Progress:

*Unveiling the Magic of Temporary Brownfield Makeovers*

February 8, 2024

with guest speaker,  
Spencer Gobet, AICP @ DVIRPC

Made possible with funding by the US EPA.

**Pop-Up Progress: Unveiling the Magic of Temporary Brownfield Makeovers**

DECEMBER 12, 2024, 1:00PM  
**Preserving Communities:**  
*Brownfield Redevelopment to Minimize Displacement and Uplift Legacy Residents*

IN PARTNERSHIP WITH:  
UMass Dartmouth

Carrie Martin  
Gail Montplaisir  
Nefeli Bompoti  
Alexander McClean

SIGN UP NOW:  
QR CODE

## WEBINAR

For More Information Contact TAB Via [in](#) [f](#) [X](#) [v](#) <https://bit.ly/PreserveCommunity>

Made possible with funding by US EPA.

**Preserving Communities: Brownfield Redevelopment to Minimize Displacement and Uplift Legacy Residents**

**Both these webinars with associated presentations and resource links can be found on our website!**

[www.njit.edu/tab/webinars](http://www.njit.edu/tab/webinars)