

Reusing Brownfields to Reinvest in Communities with Brightfields

November 2023

Rocky Mountain Institute (RMI) is an independent, non-partisan, nonprofit organization dedicated to accelerating a prosperous, clean energy future for all

What We Do:

 Founded in 1982, RMI combines research, wholesystems thinking, and unconventional partnerships to support strategies that makes sense for communities to advance sustainable energy systems



EPA's Technical Assistance to Brownfields program can help communities address brownfields challenges

TAB Guidance & Services:

- Inclusive community visioning
- Acquiring, assessing, cleaning up and redeveloping brownfield properties;
- Health impacts of brownfield sites
- How to comply with voluntary cleanup requirements
- Funding and financing strategies, including EPA brownfields grant application support
- And more...



RMI is partnering with KSU TAB to help communities across America advance transformational brightfield projects.



To educate communities and site owners about brownfields reuse options that include clean energy



To provide pre-development site evaluation and analysis to communities considering "brightfields"

Our goals are...



To provide other technical assistance and tools to help with reuse planning, funding, financing, and clean energy procurement

Why are you in this session today?

- 1. I know nothing about this topic and want to learn more
- 2. I manage a redevelopment or brownfields program and want to know what's possible for my community (or those I work with)
- 3. I/my community is starting to explore this type of project and I want to vet whether this is a good idea
- 4. I'm an expert in this topic and intend to heavily critique this presentation
- 5. This seemed like the best session to attend while dreaming about lunch

"Brightfields" repurpose previously disturbed, often-contaminated land with renewables to support a more local and equitable energy transition





Brownfield:

- A property where the expansion, redevelopment, or reuse may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant
- Common brownfields include former industrial sites, inactive landfills/dumps, old factories, abandoned mines, and closed power plants

Brightfield:

• A type of redevelopment where clean energy is built on a former brownfield or Superfund site.

Communities can leverage brightfields to deliver wide ranging local benefits



Sustainable land reuse



Using existing infrastructure





Generate local revenue from innovative reuse



Hedge against rising utility bill



Environmental justice

Brightfields are increasingly becoming part of the clean energy economy across America

Pittsburgh, PA 2 MW of solar installed on old steel mill in Hazelwood Green Weirton, WV • 30 MW of solar planned for \sim 200 acres of Brown's Island Martin County, KY 200 MW of solar planned on shuttered Martiki mine land Franklin County, OH • 50 MW of solar planned on closed landfill Houston, TX • 52 MW of solar and community solar planned on 240-acre closed urban landfill • Project is spurring federal, local, and private investments in solar and STEM workforce training for 175+ residents

RMI – Energy. Transformed.

Spotlight on Weirton, WV: A large solar array on a hard-to-access brownfield will be a productive reuse without hindering other reinvestment plans



Key Project Benefits:

- ✓ Generating revenue and demonstrating progress
- ✓ Offering a productive reuse for a hard-to-redevelop site
- Leveraging existing on-site infrastructure
- ✓ Reactivating sites in the Weirton-Steubenville region for future reinvestment

Brightfields offer a large (yet largely untapped) potential market – especially with new federal incentives

Brightfields Deployed Across US by Technology



Source: US EPA Re-Powering America's Land Tracking Matrix 2022

190,000+ potential brownfield sites for clean energy deployment on <u>US EPA's RE-Powering Mapper</u>
 4,300+ closed/inactive landfills across America could host up to ~63 GW of solar (RMI)
 Only 502 completed brightfields projects totaling ~2.5 GW through October 2022 (US EPA)

Just 1% of potential brightfields sites could support ~6 GW of clean energy and 60,000+ jobs. The Inflation Reduction Act expanded the two tax credits that have been the primary economic drivers for renewable energy projects – and extended them to 2035



10-year credit on the energy produced (now includes solar too)



New federal tax credit "adders" now incentivize projects that advance an equitable energy transition

How:

• U.S.-sourced materials (domestic content)

Where:

- Clean energy installed in Energy Communities, Tribal communities, and/or low-income communities
- "Energy Communities" include brownfields, coal communities, and other communities that have relied economically on fossil fuels

Who Benefits:

• Projects that financially benefit Tribal communities or lowincome communities



Note: While the PTC is calculated differently, the incentive ratios stack the same.

Pulse Check: How are you feeling after learning the basics of brightfields?

- 1. Excited by this potential opportunity
- 2. Intrigued but need to learn more
- 3. Unsure
- 4. Skeptical
- 5. Not interested/Not a fit for my community
- 6. Still dreaming about lunch



Considering Whether Brightfields Make Sense for Your Community

I want to...

Incorporate clean energy as a reuse into my brownfields assessment grants

Understand how I can leverage closed landfills or brownfields in my community to generate clean energy locally

Help my community repurpose aging power plant infrastructure with new, cost-effective clean energy

Reduce what my local government or our business community may have to pay in utility bills

Find a productive reuse of a brownfield in my community that doesn't have a near-term option for economic development

Brightfields Site Selection Checklist

Strategic Reuse:

□ Is this a productive reuse of the site?

Does this reactivate a site without current plans?

Does this risk impeding future reuses nearby?

□ Is this the "highest and best use" of this site?

- How well does this align with existing site owner goals and/or community visioning?
- Are zoning, right-of-way, or land-use conditions aligned with the proposed reuse for this site?
- Can co-locating clean energy further enhance plans for the site?

Technical Reuse:

- Does the site seem like it can reasonably support clean energy?
 - What clean energy technologies (i.e., solar, wind, geothermal, or energy storage) could make sense?
 - Are there serious concerns about shading (for solar), wetlands, or floodplains?
 - □ Is there infrastructure on-site or nearby that may complement clean energy reuse?

□ Is there a reasonable pathway for how the electricity generated would be consumed?

Is there on-site or nearby demand for electricity?
Would the electricity support the utility's grid?



But developing a brightfields project is rarely a linear journey. While guidance and lessons learned can help, there is NO cookie cutter approach that can serve every project or every community.

In partnership with KSU TAB, we can help communities of all shapes and sizes determine whether a project makes sense



Identifying Your Most Promising Brightfields Opportunities

Site pre-screening Strategic reuse planning



Funding & Financing Guidance

Unpacking brightfields-related incentives and funding strategy Assistance with brownfields grant applications



Renewable energy procurement support Insights from the brightfields market

Questions & Feedback?

Matthew Popkin Manager, RMI Brightfields Accelerator mpopkin@rmi.org





Renewable Energy Efforts in Region Nine

Sam Sharp – Energy and Sustainability Planner

Promoting the development of the region through intergovernmental cooperation, community and human development, long-range planning and technical assistance.



Agenda

- Background of RNDC
- Personal Background
- Existing Projects
- Upcoming Opportunities
- Questions

R9 RNDC – Who We Are

- Est. in 1972
- Support across sectors •
- Voice for rural Minnesota







R9 Personal Background

- Graduate of University of Minnesota Duluth
- Prior experience in private sector
- Energy and Sustainability Planner















- Partnership with Ecostrat
- Funded through DOE's *Energizing Rural Communities Prize*
- Generate a profile of regional assets
- Stakeholder support
- Attract and sustain biofuels facilities





ECOSTRAT BD THE BIOECONOMY DEVELOPMENT OPPORTUNITY ZONE INITIATIVE

R9 Climate Resilience Plan

- Comfrey, MN (pop. 381)
- MPCA Grant Funding
- Comfrey Climate Committee
- Community-led approach to a changing climate
- Energy efficiency, resilience to extreme weather events, renewable energy, sustainability initiatives/"third space"



R9 Collaboration with SolSmart

- Sights set on gold and platinum
- TA Providers are a great resource
- Bringing in our communities cohort model
- Ordinance review (solar and storage)
- Turner Hall New Ulm, MN
- Lime Township, Saint James, Comfrey, New Ulm



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GREAT PLAINS INSTITUTE

R9 Energy Conversations

- EJG2G MPCA Joint Application pending
- Weatherization and EE ulletinitiatives for LMI populations
- Partnerships with community • organizations
- Energy audit opportunities ullet





Minnesota

R9 Upcoming Opportunities

- Collaboration with Delta, • GreaterMSP, and more on MN SAF Hub
- DOT's Fueling Aviation's Sustainable • Transition (FAST) Grant
- Sustainable Modular Housing
- DOE's TSED Grants Program ullet**Tranche 1 Transmission Line** Project





MINNESOTA SUSTAINABLE AVIATION FUEL HUB Powend by the GREATER SMSP Partnership

COMMERCE DEPARTMENT SOLAR FOR SCHOOLS









Questions

W. R. W.





STAY CONNECTED (507) 387-5643 | WWW.RNDC.ORG





Cuyahoga County Together We Thrive

Cuyahoga County Department of Sustainability

Mike Foley, Director

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GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY

The largest global alliance for city climate leadership across the globe.

Learn More About Us





PEOPLE



100+ GLOBAL PARTNERS



Cuyahoga County Community GHG Emissions Inventory: Overview





- 2010 MTCO2 = 24,941
- 2020 MTCO2 = 18,004
- Energy (electricity and natural gas), Transportation, Waste, and Industrial Processes
- 28% total decrease in emissions
- All Energy emissions decrease by 30.3%
 - Electricity 43% lower
 - Natural Gas 14.4% lower
 - Transportation 16.4 % lower



Cuyahoga County Climate Change Overview: Annual Average Temperature





Source: Midwestern Regional Climate Center

Graph illustrates three climate periods including: Historic 100-Year Average, 30-Year Average (normal), and the Most Recent 10-Year Average.

Data pulled from stations at Cleveland-Hopkins Airport and 2717 Euclid Ave. in Cleveland.

- Recent 10-year vs.
 - 100-year increased by 1.76°F or about 1°C
 - 30-year increased by 1.01°F



Cuyahoga County Climate Change Overview: Growing Season





After USDA Plant Hardiness Zone Map, USDA Miscellaneous Publication No. 1475, Issued January 1990. Arbor Day Foundation Plant Hardiness Zone Map published in 2015.



Zone

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Cuyahoga County Climate Change Overview: Precipitation – Ave. Annual per year



Source: Midwestern Regional Climate Center Precipitation is rainfall + melted snowfall

Recent 10-year vs.

- 100-year increased by 7.56 inches or 17.1%
- 30-year increased by 3.33 inches or 7.5%





Cuyahoga County Climate Change Overview: Historic Extreme Precipitation





- Recent 10-year vs.
 - 100-year increased by 26.2%
 - 30-year increased by 16.6%

Source: Midwestern Regional Climate Center



Cuyahoga County Climate Change Overview: Ice Cover

 Lake ice cover shows a long-term, declining trend (winter seasons of 1973 to 2017). The greatest negative trends are in Lakes Superior, Huron, St. Clair and Erie. In total, a 69% loss in all Great Lakes annual average ice cover is observed over the entire 45-winter period.







Source: GLERL (Great Lakes Environmental Research Laboratory)



Climate Change Action Plan (CCAP)



- Greenhouse Gas Emissions Reduction Goals:
 - 45% overall reduction in GHG emissions from the 2010 baseline by 2030 (Currently ~12.66% reduction)
 - Net-zero emissions by 2050
- Five Focus Areas:
 - Energy
 - Transportation
 - Natural Systems
 - Health
 - Land Use
- Complete CCAP can be found on the County Planning Website



Climate Change Action Plan

Energy

- o 100% Renewable Energy by 2050
- Electricity and natural gas make up over half of our total emissions.
- Strategies & Projects:
 - Residential Solar Co-op
 - Municipal Solar Co-op
 - Cuyahoga County Green Bank
 - Brooklyn Landfill Solar Project
 - County Utility!! And Microgrids



Five Focus Areas:

- Energy
- \clubsuit Transportation
- ✤ Natural Systems
- ✤ Health
- ✤ Land Use



Climate Change Action Plan

Residential Solar Co-op

- Participants save roughly **20%** on solar by purchasing through the co-op.
- Next Co-op Round just starting
- You can attend one of the meetings held at public libraries, cities halls, etc. or watch a recorded session to learn more.

SolarUnitedNeighbors.org/Cuyahoga

-Or-

https://youtu.be/WlraSmLvLX0



SAMPLE CASH PURCHASE:

EXAMPLE PRICINGIONLY, ACTUAL SYSTEM SIZE WILL WARY.	4kW	8kW
Average OH solar co-op pricing (\$2.75/Watt)	\$11,000	\$22,000
30% Federal tax credit (calculated before SREC sale)	-\$3,300	-\$6,600
Net cost	\$7,700	\$15,400
Solar Renewable Energy Credit (annual estimate)	\$15	\$30
Estimated year 1 electricity savings*	\$600	\$1,100
Estimated year 10 savings (cumulative)*	\$6,000	\$12,500
Estimated lifetime savings (25 years)*	\$17,500	\$35,000
Net Profit	\$9,800	\$19,600

SAMPLE LOANS:

These are sample prices, actual cost will depend on system size, interest rate, credit score, and other factors. These prices do not include incentives besides 30% tax credit.

Home equity line of credit loan, interest rate 4%, 30% down (then take tax credit)

	4kW SYSTEM -\$11,000		BkW SYSTEM - \$22,000	
	10 YEAR TERM	15 YEAR TERM	10 YEAR TERM	15 YEAR TERM
Monthly loan payment	\$78	\$57	\$155	\$113
Monthly electric savings**	-\$50	-\$50	-\$100	-\$100
Net monthly payment	\$28	\$7	\$45	\$13
Net Profit (after 25 years)	\$8,000	\$7,000	\$16,000	\$14,500



Climate Change Action Plan

Local Government Solar Co-op

o Power purchasing agreement with AEP Onsite Partners

- o County Buildings
 - Animal Shelter
 - Medical Examiner Building
 - Harvard Road Garage
 - Jane Edna Hunter Social Service bldg.
- o "Piggyback" provision:
 - Local Governments
 - Nonprofits
 - Schools





• The City of Lakewood and Cleveland Heights both took advantage of the contract. Lakewood installed 691 kW systems for 10.8% of their energy use and save almost \$600,000 over a 20-year period. Cleveland Heights add solar to 4 buildings.



Brooklyn Landfill Solar o Closed and Capped landfill in Brooklyn

0 Virtual Net Metering with CPP

0 Brooklyn receiving lease payments for 20 years

035,520 solar panels

0 Covers about 8% of power needs for 6 County buildings





Cuyahoga County Green Energy – Our new County Microgrid Utility

- Existing Distribution Utility Companies in Cuyahoga County struggle to meet the changing needs of power consumers and energy developers
- Economic development opportunities increase with local capability to provide value in electricity beyond simple supply
 - Resiliency
 - Low/No Carbon Power
 - Energy Efficiency and Demand Response Programs
 - Transportation Electrification
- An innovation-focused, nimble Distribution Utility Company can provide these services, and is within the rights of the County to create, develop and operate.



What is a Microgrid?

A microgrid is a contained energy system capable of balancing captive supply and demand resources to maintain reliability

- Incorporates multiple distributed generation and control technologies
- Maximizes reliability and operational efficiency
- Can function in "islanded mode" disconnected from larger utility grid















Questions??

Mike Foley Director of Sustainability Mfoley@cuyahogacounty.us



Cuyahoga County Together WeThrive Administrative Headquarters 2079 East Ninth Street Cleveland, Ohio 44115 216-443-7178 www.cuyahogacounty.us