

Pennsylvania Environmental Resource Consortium

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Welcome!



Blueprint for the Future 2019 Spring Conference

Brookfield

Renewable





WiFi: attwifi Download Conference Packet www.pagreencolleges.org



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Thanks!



QUALITY OF LIFE SERVICES

Brookfield Renewable

Blueprint for the Future

2019 Spring Conference

NEXTERA ENERGY SOLUTIONS



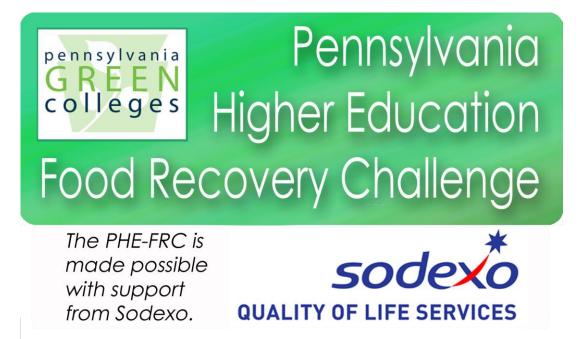
WiFi: attwifi Download Conference Packet www.pagreencolleges.org



Blueprint for the Future 2019 Spring Conference

Pennsylvania Higher Ed Food Recovery Challenge

Over 500 tons of food waste diverted!



A partnership of Sodexo, PERC and the U.S. EPA



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Sponsor's Perspective

Brian Noonan Manager, Stakeholder Relations

Brookfield

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Utilizing Hydropower To Fulfill Sustainable Development Goals

BRIAN P. NOONAN BROOKFIELD RENEWABLE

APRIL 9, 2019

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Brookfield Renewable



About Brookfield Renewable

OVERVIEW

- 4 hydropower facilities
- 22 solar distributed generation sites*
- 754 MW of power
- 70+ employees and 225+ indirect jobs
- Providing access to 25 recreational areas

\$254M

Planned Capital Projects Investments Over The Next 20 Years

230k+

610 Partnerships with local

vendors

1 M Tons of CO2 avoided

Piney Dam-Clarion, Pa.



Holtwood Whitewater Feature.

One of the largest public pure-play renewable businesses globally

100 years of experience in power generation

Full operating, development and power marketing capabilities

Over 2,500 operating employees



Brookfield Renewable



UN Sustainable Development Goal 7

"Ensure access to affordable, reliable, sustainable & modern energy for all"

Brookfield Renewable



Hydropower 101- Information & Key Facts

3

Power is generated through the flow of the river

Reservoir

Power is generated through the release of stored water



Safe Harbor, Lancaster County, Pa.

Pumped Storage

Water is stored & recycled by pumping it back up to a higher reservoir in order to be released again





Lake Wallenpaupack, Hawley, Pa.

Piney Dam, Clarion County. Pa Hydropower is the leading renewable source for electricity generation globally, **supplying 71% of all renewable electricity**. Reaching 1,064 GW of installed capacity in 2016, it **generated 16.4% of the world's electricity** from all sources.

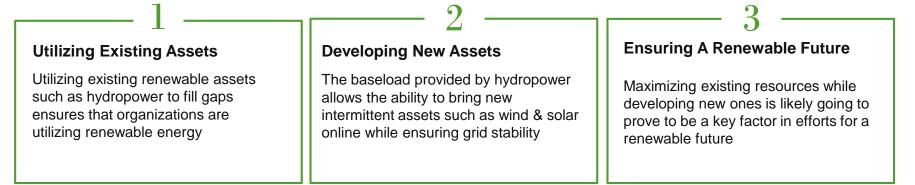
Flexible & Consistent	\diamond	Hydropower is the most flexible and consistent of the renewable energy resources	
Baseload	\triangleright	Hydropower is capable of meeting base load electricity requirements as well as, with pumped storage technology, meeting peak and unexpected demand due to shortages or the use of intermittent power sources	
Development Opportunities	\bigcirc	There are many opportunities for hydropower development throughout the world	
Unutilized Potential	\bigcirc	Estimates indicate the availability of approximately 10,000 TWh/year of unutilized hydropower potential worldwide.	

Combining Renewables For Renewable Solutions

*Stanford Study

- Research completed by Marc Jacobson of Stanford University studied the following:
- Scientists studied 139 countries & matched supply and demand in 30second increments for five years to account for the variability in wind and solar power as well as the variability in demand over hours and seasons.
- The researchers used two computational modeling programs, one to predict the amount of energy that could be produced from "weather-related energy sources," which are variable and don't necessarily produce energy when demand is highest.
- The second incorporated energy produced by more stable sources of electricity, including hydroelectric plants and tidal and wave devices and also included methods of energy storage.
- Under all three scenarios studied, blackouts were avoided in all 20 world regions for all five years examined. This suggest that "many possible solutions to grid stability with 100 percent wind, water and solar power are possible."





*Source: Hydroworld: Hydro, Wind & Solar: Undeniable Synergies

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Brookfield Renewable



Case Study: Turkey Hill Powered By 100% Renewable Energy

Turkey Hill Deal With Brookfield Renewable Brings Company to 100% Renewable

Wind, Hydropower & REC's

- Turkey Hill & Brookfield Renewable recently announced a deal where Turkey Hill has agreed to purchase 68% of their energy needs from nearby Safe Harbor Hydropower
 - This PPA, coupled with wind generation on site at the dairy & the purchase of RECs (Renewable Energy Credits) bring Turkey Hill to 100% renewable
- The two companies (Brookfield Renewable & Turkey Hill) have also supported a number of the same environmental causes, such as the Lancaster County Conservancy, Lancaster Water Week, Susquehanna Heritage, and Clean Water Partners



Power Purchase Agreements such as this are becoming increasingly utilized as ways to assist organizations in meeting their sustainability goals Brookfield

Renewable

Contacts

Brookfield Renewable Contacts

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Brian P. Noonan Manager, Community Brian Relations ble.c		Brian.Noonan@brookfieldrenewa ble.com	(617) 838-2658

Agenda 2030 in Pennsylvania

Paul Shrivastava Chief Sustainability Officer Penn State University



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Sustainable Development in Pennsylvania

Caroline Fox SDSN USA



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SDGS: A BLUEPRINT FOR MEASUREMENT, PLANNING & ACTION

Caroline Fox, SDSN USA

April 9, 2019

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK A GLOBAL INITIATIVE FOR THE UNITED NATIONS







Think globally, act locally:

the Sustainable Development Goals

THE **SDGS** ARE ...

> A set of 17 goals for the world's future, through 2030

- Backed up by a set of 169 detailed Targets
- Negotiated over a two-year period at the United Nations

> Adopted by 193 nations on 25 Sept 2015

THE **SDGS** ARE ...

- Universal they apply to every nation and every sector
- > Interconnected to achieve any, we must achieve them all
- **Transformative** they require large, fundamental change

LEAVE NO ONE BEHIND

> Should be met for all nations and people and for all segments of society

> We must endeavor to reach those who are furthest behind first





17 GOALS TO TRANSFORM OUR WORLD



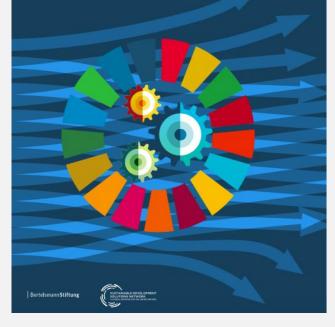
United Nations DPI

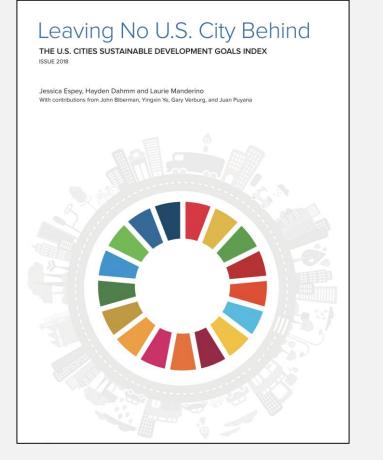
TAKING STOCK OF THE SDGS

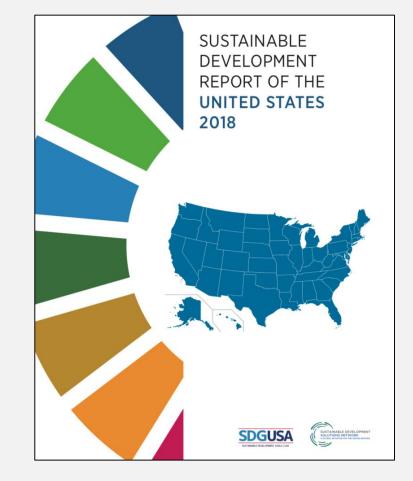
SDG INDEX AND DASHBOARDS REPORT 2018

GLOBAL RESPONSIBILITIES

IMPLEMENTING THE GOALS







SDG Index and Dashboards Report 2018

Global Responsibilities: Implementing the goals



Bertelsmann Stiftung

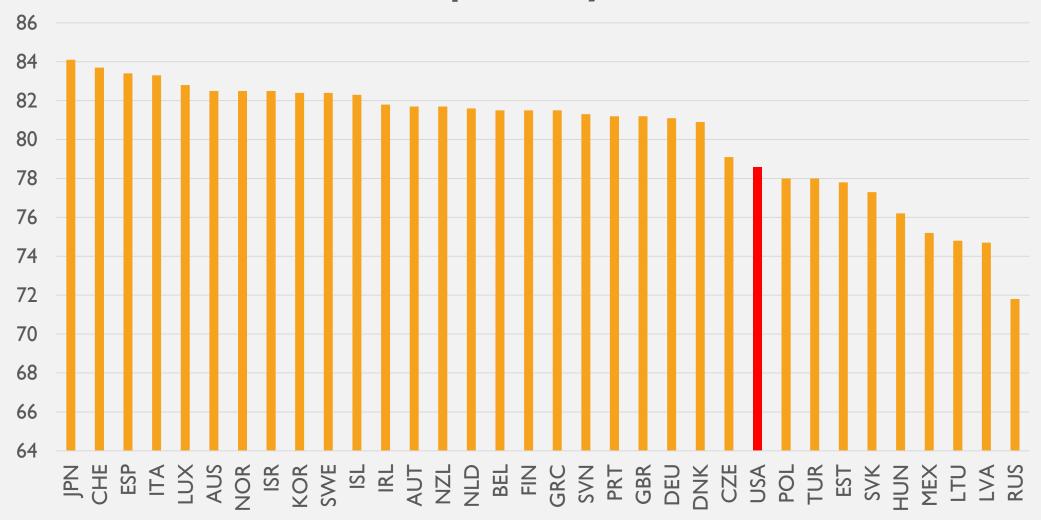




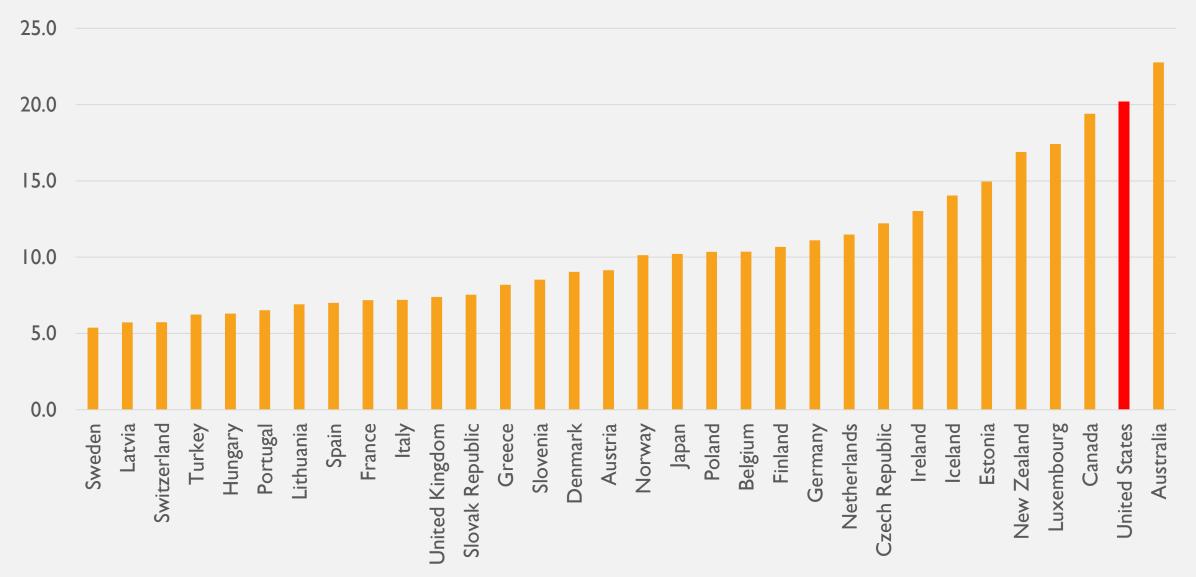
SDG I: Poverty Rate (OECD Definition, 2016)



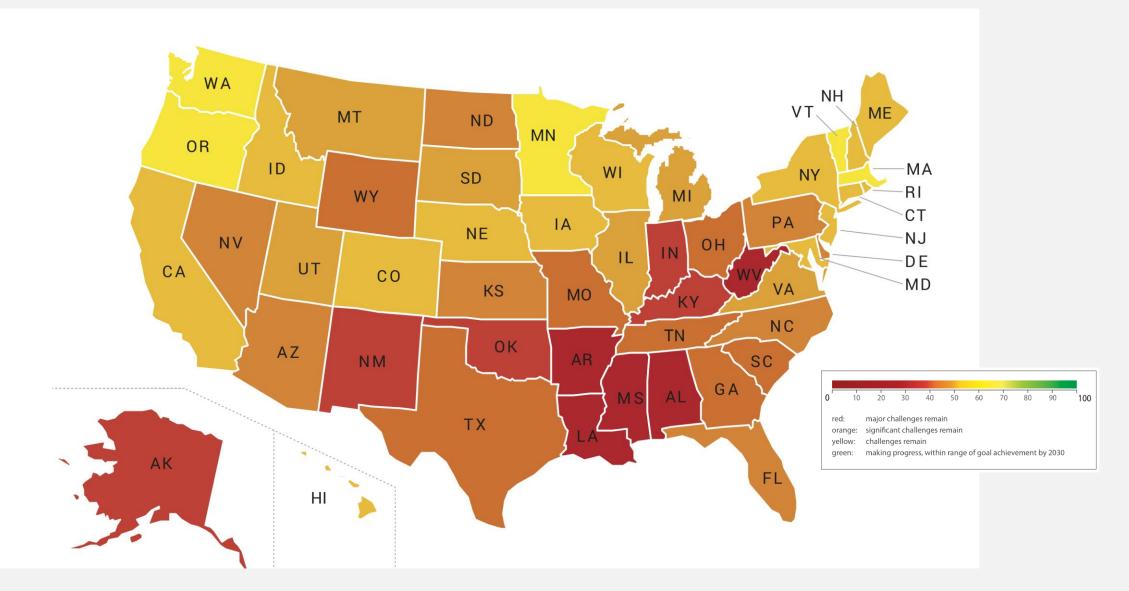
SDG 3: Life Expectancy at Birth, 2016



SDG 13 Greenhouse Gases Per Capita 2016 (Excluding Land Use)



State SDG Index Overall Results – all states have work to do



Most progress



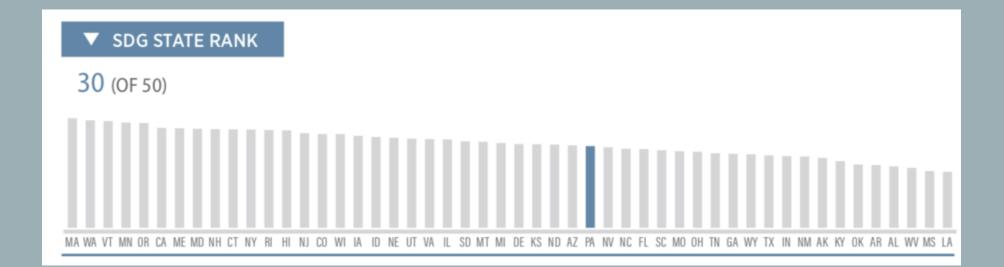
Least progress





Rank	State	Score	1	2	3	4	5	6	7	8	9	10	11	12	13	15	16
1	Massachusetts	61.0															
2	Washington	59.8															
3	Vermont	59.4															
4	Minnesota	58.6															
5	Oregon	58.3															
6	California	55.6															
7	Maine	55.4															
8	Maryland	55.1															
9	New Hampshire	54.9															
10	Connecticut	54.8															
11	New York	54.7															
12	Rhode Island	54.4															
13	Hawaii	54.2															
14	New Jersey	52.7															
15	Colorado	52.2															
16	Wisconsin	52.2															
17	lowa	51.2															
18	Idaho	50.6															
19	Nebraska	50.1															
20	Utah	49.6															
21	Virginia	49.4															
22	Illinois	49.2															
23	South Dakota	48.1															
24	Montana	47.9															
25	Michigan	47.2															
26	Delaware	46.6															
27	Kansas	46.5															
28	North Dakota	46.3															
29	Arizona	45.9															
30	Pennsylvania	45.5															
31	Nevada	44.8															
32	North Carolina	44.0															
33	Florida	43.8															
34	South Carolina	43.2															
35	Missouri	42.6															
36	Ohio	42.3															
37	Tennessee	41.5													 		
38	Georgia	41.2													<u> </u>		
39	Wyoming	40.9				_				_					—		
39 40	Texas	40.9															
40	Indiana	39.9															
41	New Mexico																
		39.7															
43 44	Alaska Koptucler	38.9															
44 45	Kentucky	37.1															
	Oklahoma	35.2															
46	Arkansas	34.9															
47	Alabama	34.2															
48	West Virginia	33.4															
49	Mississippi	31.6															
50	Louisiana	31.2															

Pennsylvania and the SDGs



https://www.sdgusa.org/sdgs

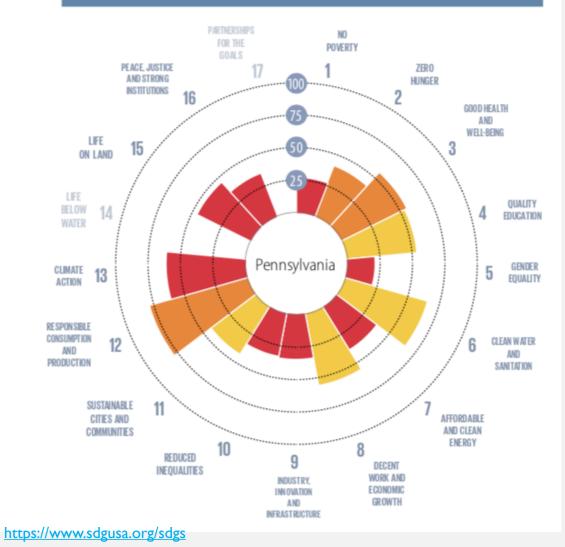
Pennsylvania 2018 State SDG Index Results

(rank 30/50)

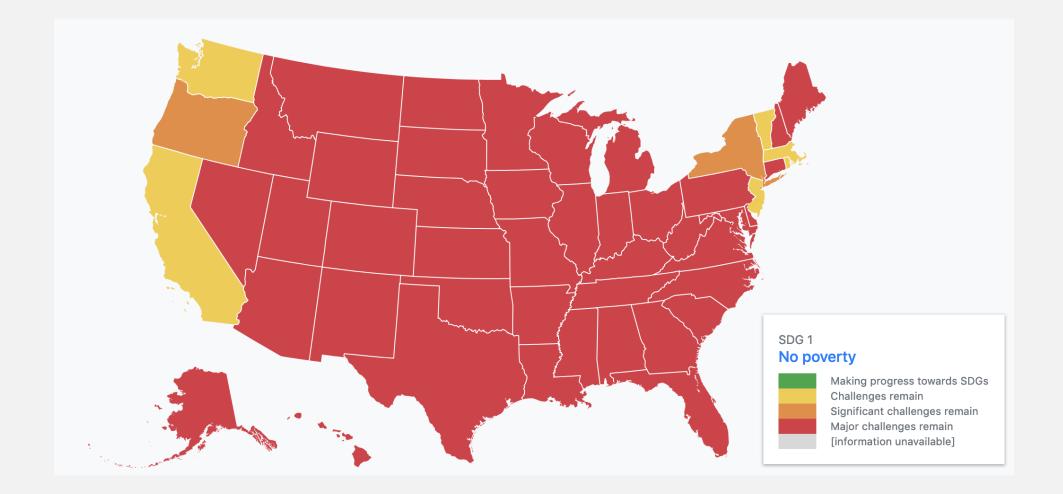
5 BEST AND 5 WORST INDICATORS

Best
Invasive management plan
Climate action plan
Weather costs
Weather injuries/fatalities
FEMA mitigation coverage
Worst
Family leave policy
Women-owned businesses
Non-carbon ecological footprint
Climate alliance membership
Sick leave policy
Effective carbon rate

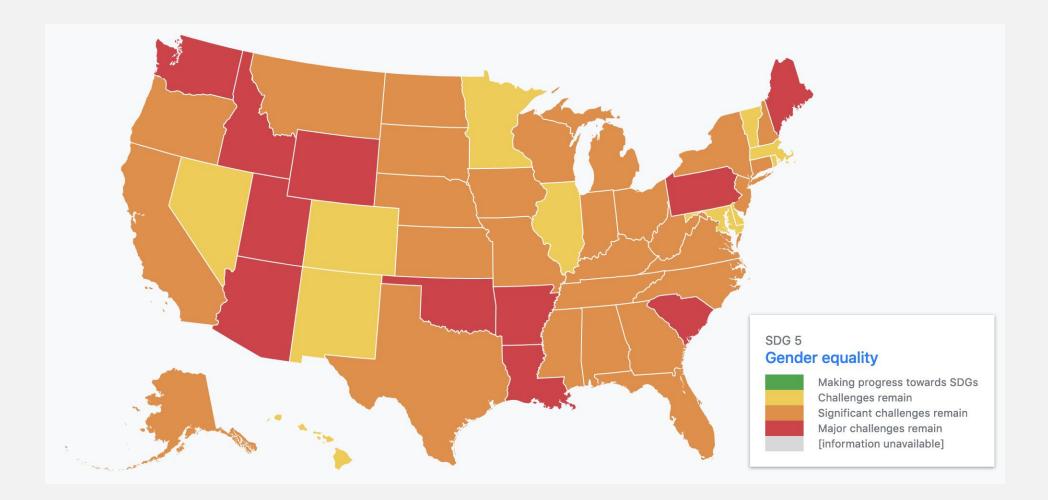
AVERAGE PERFORMANCE BY SDG



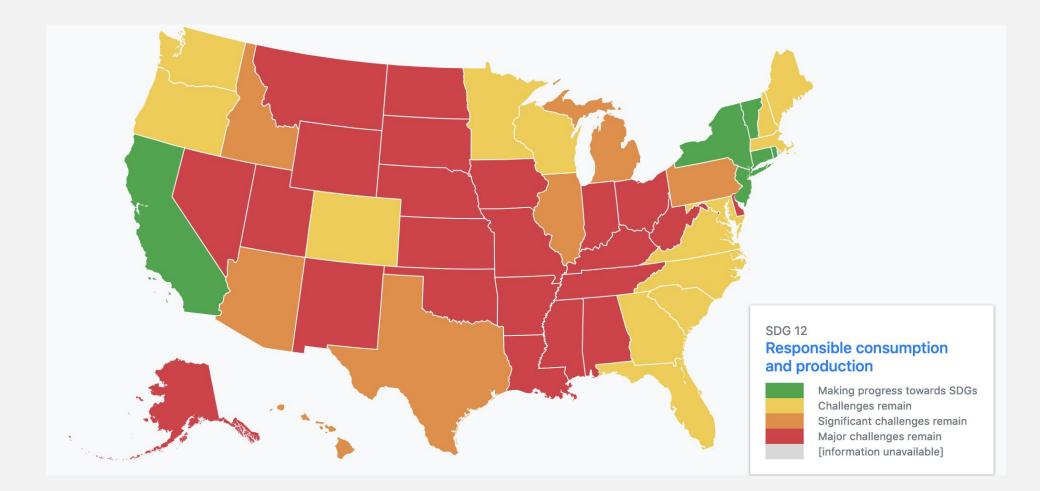
No Poverty: PA rank 20/50



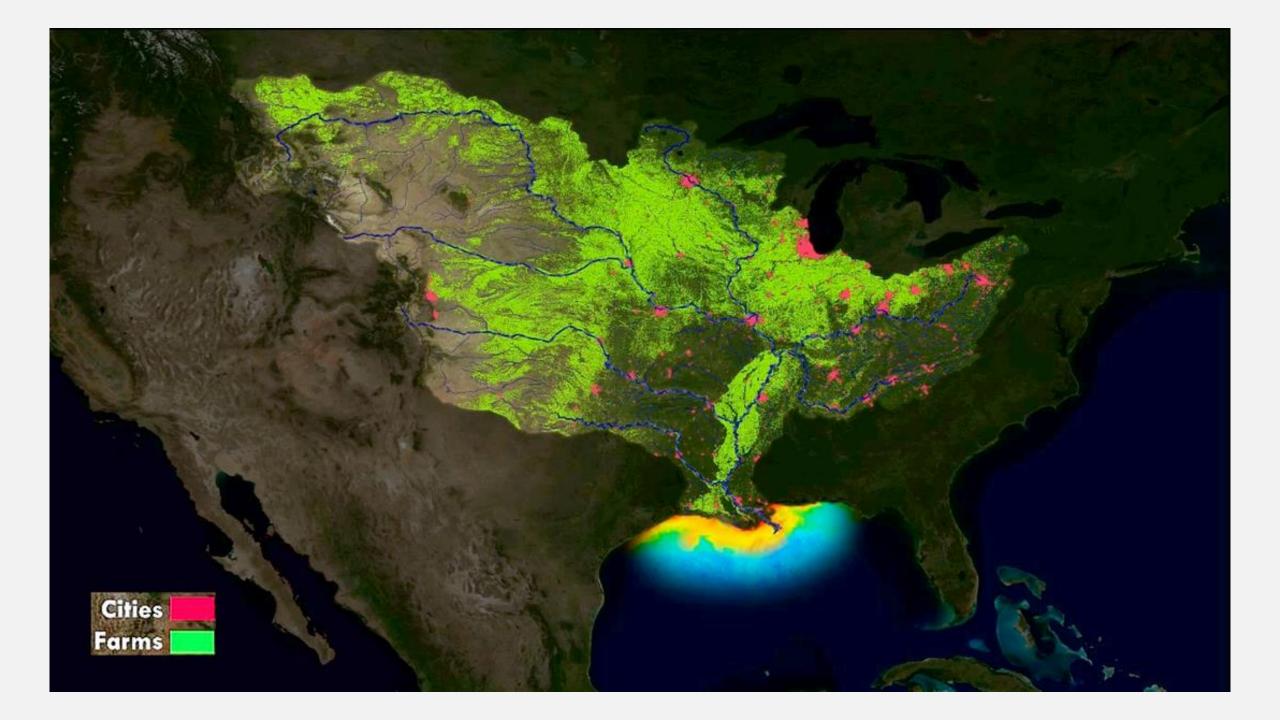
Gender Equality: PA rank 43/50



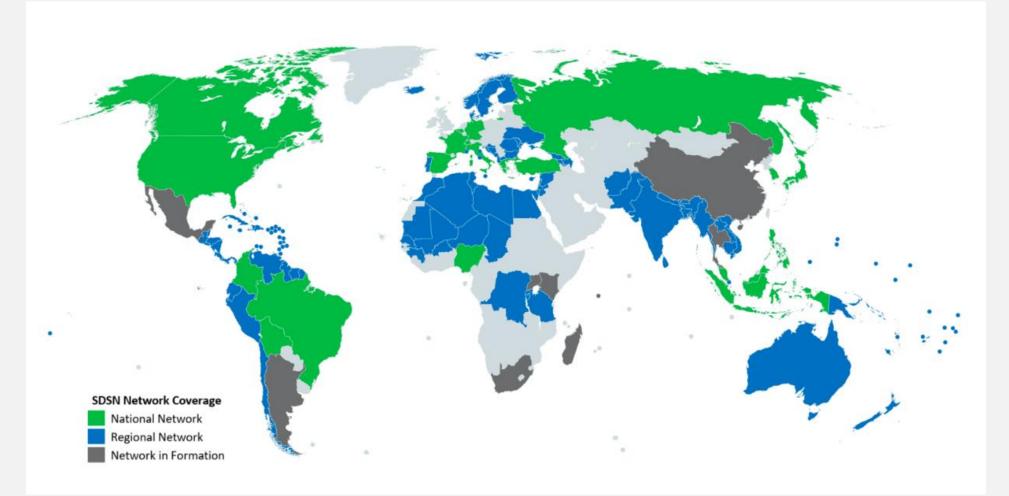
Responsible Consumption & Production: PA rank 19/50



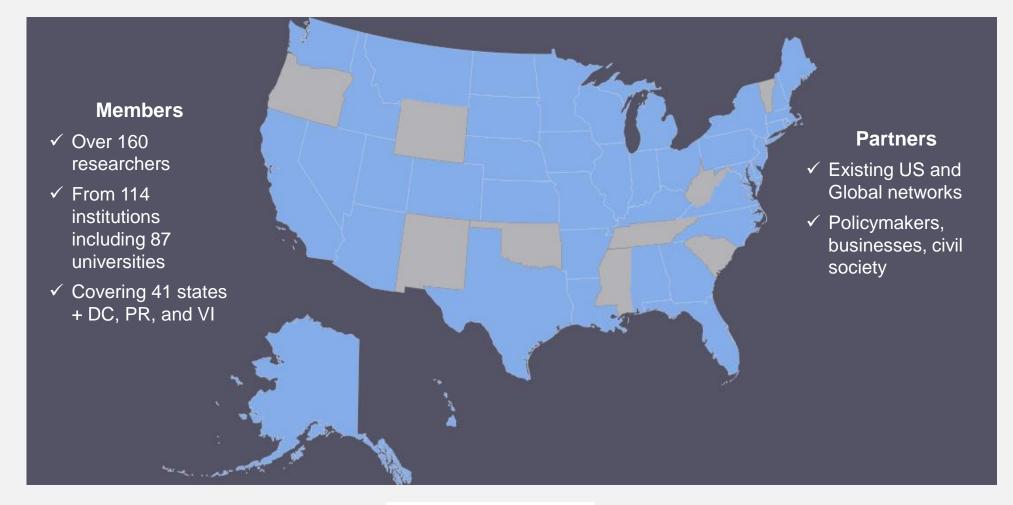
https://www.sdgusa.org/sdgs



THE SDSN GLOBAL NETWORK







SDSN USA member(s) No current members

SDSN USA NETWORK INITIATIVES

- Decarbonization Pathways Project
- Built Environment Dialogue
- Open Campus Day
- Massive Online Open Course (MOOC) on the SDGs in the United States
- 2019 SDG U.S. City Index
- 2019 SDG U.S. State Index
- SDSN USA Members meeting, likely September 2019
- Additional projects and events based on member interest & engagement





SUSTAINABLE G ALS

17 GOALS TO TRANSFORM OUR WORLD



United Nations DPI

Sustainable Development in Pennsylvania

Jeffrey Brownson Penn State University



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PennState

PERC 2019-HUB

Sowing Seeds for Solar Ecology: Pathways for systemic change in PA & abroad

sky dome

Jeffrey R. S. Brownson, PhD Associate Professor & Head Photon Wrangler

Email: solarpower@psu.edu LinkedIn: <u>heliotactic</u> twitter: <u>@heliotactic</u> blog: <u>Heliotactic Press</u> ResearchGate: <u>JRS Brownson</u>

Our SDGs are entangled!



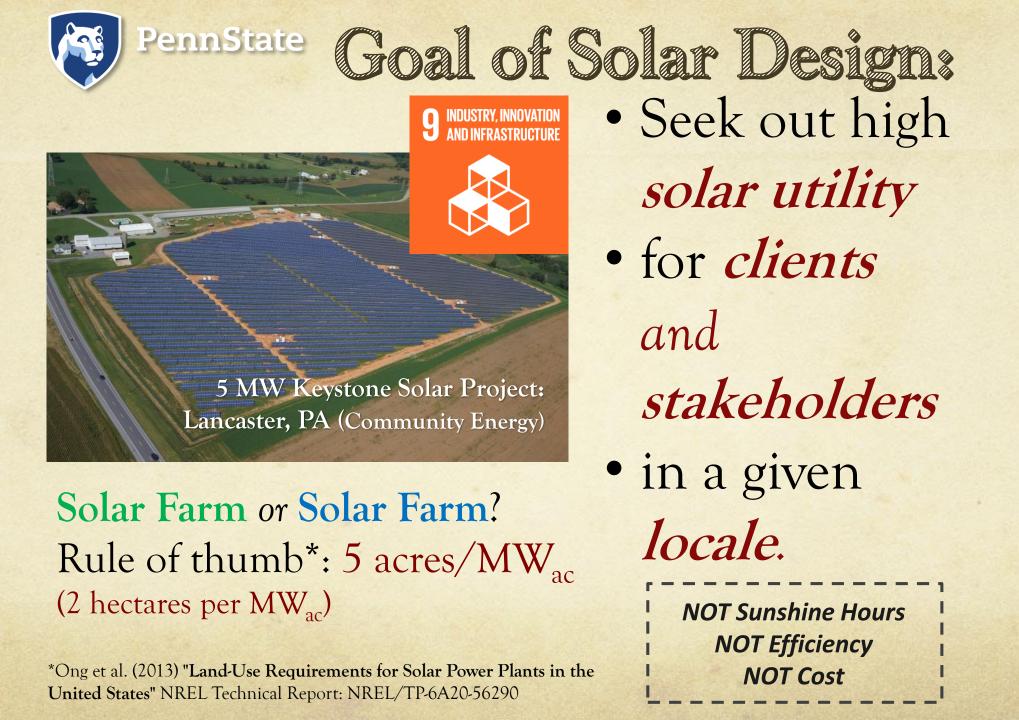


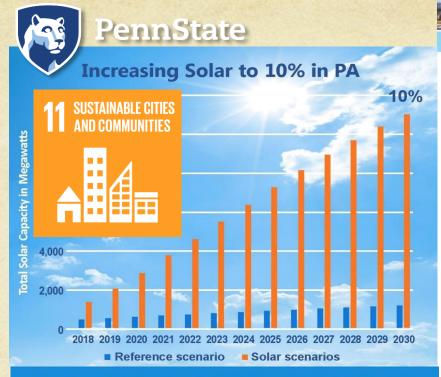


Solar as Pattern, Solar as Pattern with a Purpose

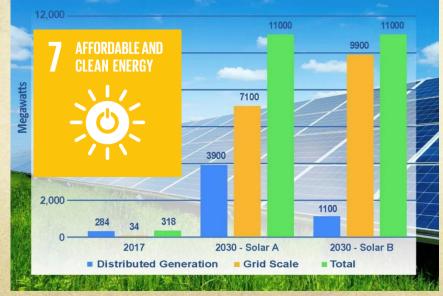
As science is the exploration of **patterns** in our universe, then **design** can be specified as <u>pattern with a purpose</u>

Solar Vernacular describes local intergenerational solar design strategies and solar-related cultural behaviors

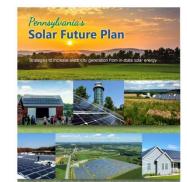




Current & Projected Solar Projects in PA



Finding Pennsylvania's Solar Future



28







PennFuture

David Althoff Jr. Principle Investigator Energy Programs Office Pennsylvania DEP

Email: <u>RA-EPPASOLARFUTURE@pa.gov</u>

pennsylvania

Energy Programs Office

Website: www.dep.pa.gov/PAsolarfuture

11 GW of Solar PV by 2030 (mostly grid tied)





Visual Shifts

How do we communicate the idea? Ecology: a study of the "home"

Solar Ecology frames systemic interactions of humans and biota and their surrounding environments, and results from the local and dynamic flow of sunlight to Earth's surface regions

GENDER EQUALITY



Solar Ecology <u>measures and values</u> systemic intra-actions among humans, biota, and their surrounding environments









PennState

Solar needs a transformative, transdisciplinary framework for research and adaptive design

- Enrich our local regimes sustainably, and develop resilient infrastructure
- Enact adaption strategies that embrace gender equality and diversity

My call: co-production of highest value solar farm metrics...

Solar Ecology E-Design Standard (SEEDS)

- Aligning language and skill with industry and community
- Form and address grand challenges, tested and managed
- Now establishing founding firms and non-profits, interested?

7 PARTNERSHIPS FOR THE GOALS













Acknowledgements:

- Dr. Erica Smithwick (PSU/Geog)
- EMS Energy Institute

Thank you Jeffrey R. S. Brownson solarpower@psu.edu @heliotactic



Director, Solar Ecology program: EMS Energy Institute Associate Professor John and Willie Leone Family Dept. of Energy and Mineral Engineering The Pennsylvania State University

Sustainable Development in Pennsylvania

Lisa Davis Pennsylvania Office of Rural Health



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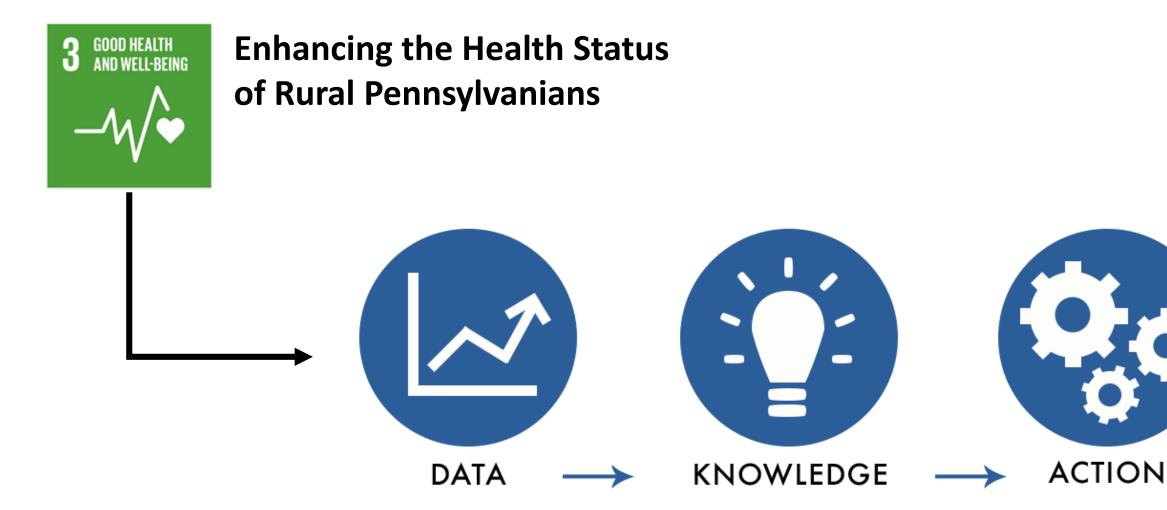
Blueprint for the Future 2019 Spring Conference

Sustainable Development and Rural Health: **Synergy Between Goals**

Lisa Davis, MHA **Director, Pennsylvania Office of Rural Health** and Outreach Associate Professor of Health **Policy and Administration, Penn State**



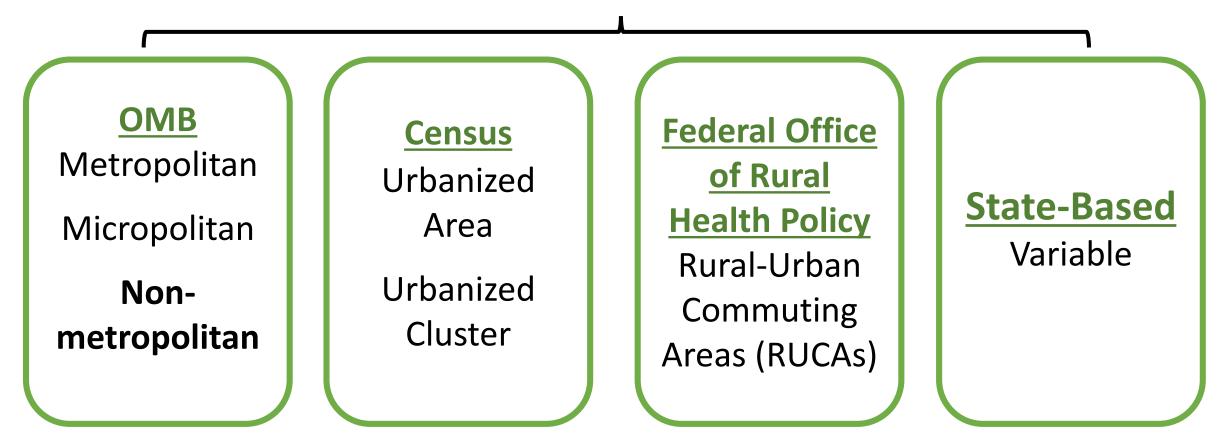
The Pennsylvania Office of Rural Health





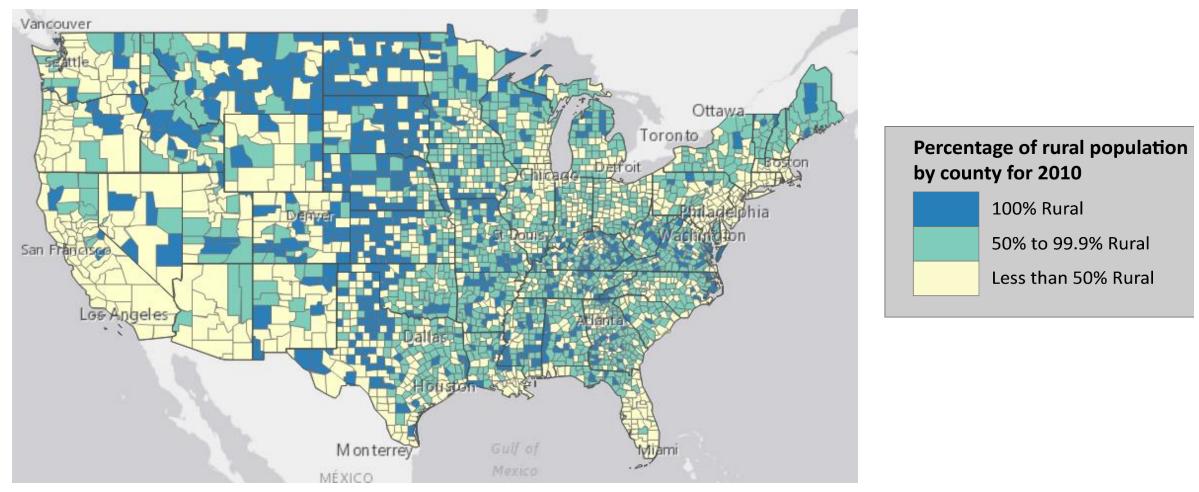
What is Rural?

It can be a difficult task trying to define the term "rural" and an even harder task trying to explain it. **Most define "rural" by default.**





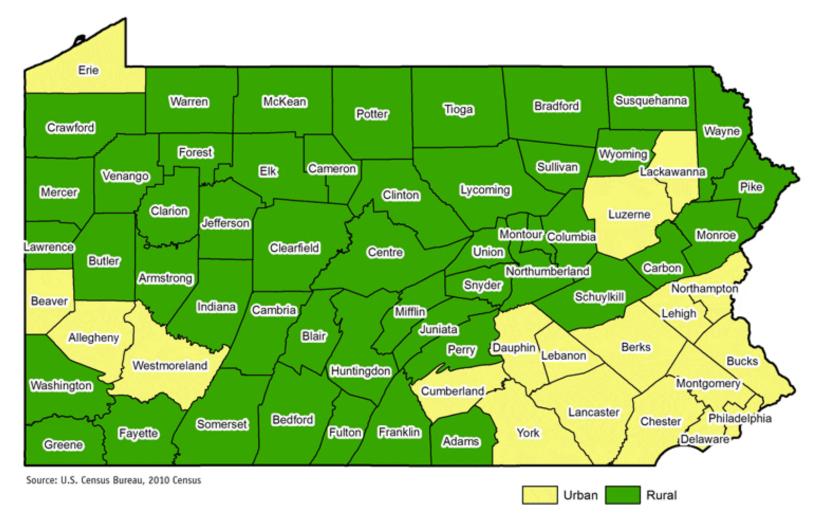
Rural Counties: 2010 Census



Continental U.S.



Rural Pennsylvania Counties



Center for Rural Pennsylvania



Social Determinants of Health (SDoH)

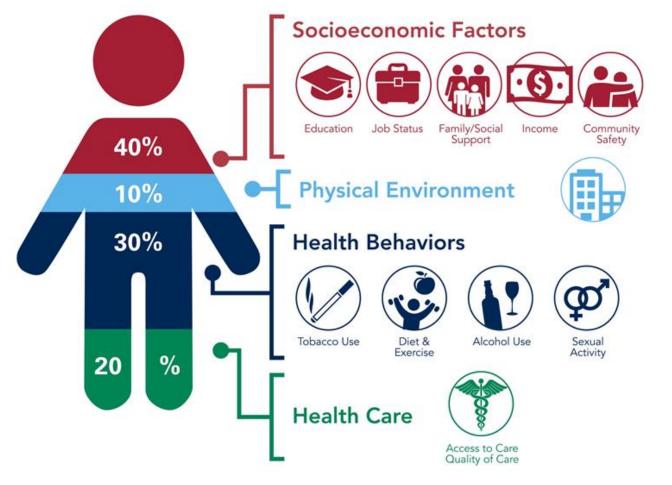


Pennsylvania Office of Rural Health

Centers for Disease Control and Prevention, Healthy People 2020

IMPACT OF SOCIAL DETERMINANTS OF HEALTH

Social determinants of health have tremendous affect on an individual's health regardless of age, race, or ethnicity.



SDoH Impact

- 20% of a person's health and well-being is related to access to care and quality of services
- The physical environment, social determinants and behavioral factors drive 80% of health outcomes



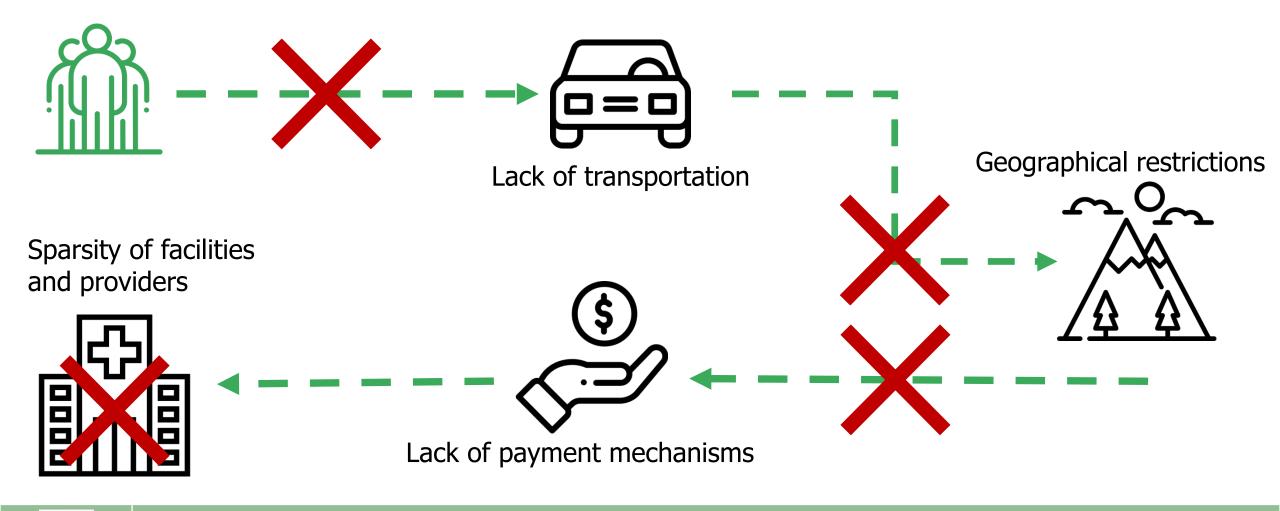
Source: Institute for Clinical Systems Improvement; Going Beyond Clinical Walls: Solving Complex Problems, 2014 Graphic designed by ProMedica.

Health & Health Care: Rural United States and Pennsylvania

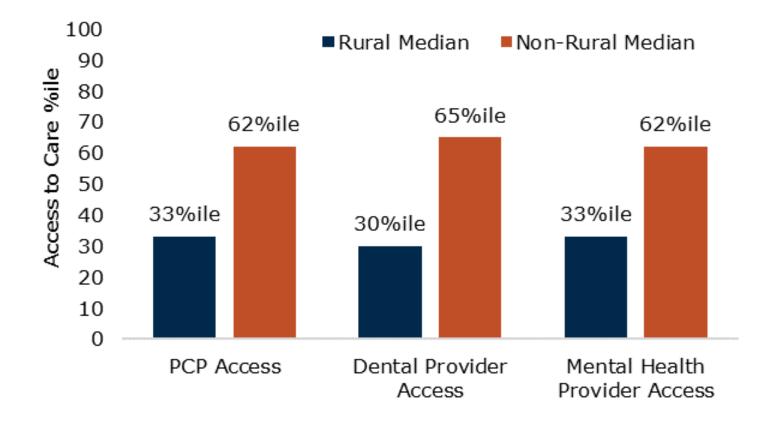
	United States	Pennsylvania
Population	327.2 M	12.8 M
% of population considered to be rural	23%	27%
% of landmass	97%	75%
# Critical Access Hospitals	1,349	15
# Rural Hospitals	1,875 (30% of all community hospitals)	48 (24% of all community hospitals)
# Rural Health Clinics	4,177	72
# FQHC/CHC Sites	1,373	273
# Rural FQHC/CHC Sites:	?	91 (33% of all sites)



The Primary Issue for Rural Health Care Is ... ACCESS



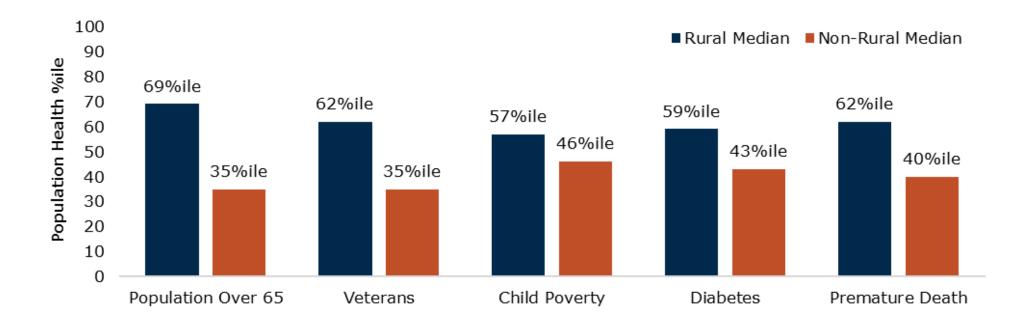
Access to Primary, Dental, and Mental Health Care



National Rural Health Association



Rural Hospitals Care for Vulnerable Populations

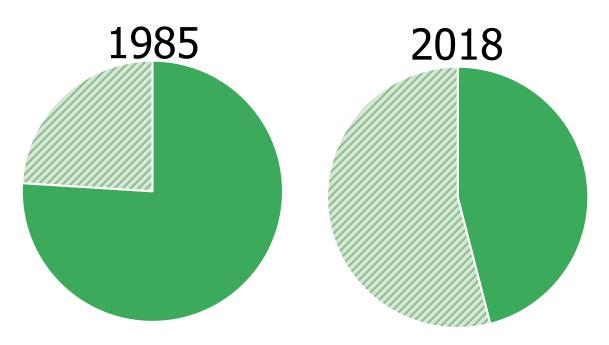


87 Rural Hospital Closures Since 2010 ~ 700 Rural Hospitals Currently at Risk for Closure

National Rural Health Association



Maternity Care



% of rural hospitals with OB services
% of rural hospitals without OB services

200

Number of rural maternity wards closed between 2004 and 2014

50%

of women living in rural communities live more than the recommended 30 minutes away from maternity services Higher rates of challenging pregnancies

 $\overline{\mathbb{W}}$

Higher rates of **delivery complications** for mother and baby



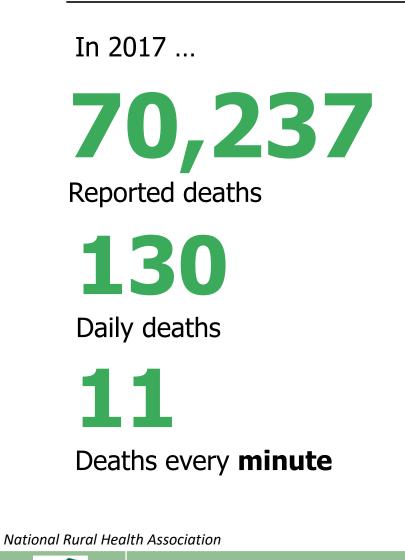
Higher and longer **absenteeism** before and after delivery

National Rural Health Association

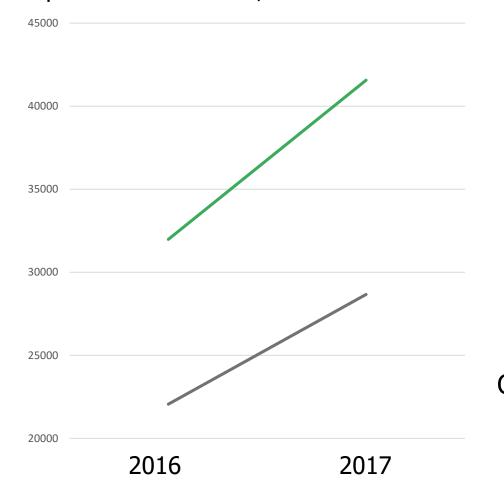


Opioid-related Deaths (ORD)

Pennsylvania Office of Rural Health



Opioid-related deaths, rural vs. non-rural



Increase in ORD among 18-25 year olds in rural areas

3x

Increase in ORD among females in rural areas

The forgotten people:

ORD underreported by 30% among Native Americans and Alaska Natives

Rural Transportation Issues

103 million non-emergency medical transportation trips each year Cost: \$26-\$29 per trip

25% of 30% of appointments among rural patients are missed because of:





"Ridge-and-valley" topography creates obstacles



Hazardous winter driving conditions



Challenges accessing gasoline, vehicles, etc.

National Rural Health Association

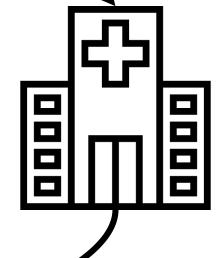
Impacts: Medicare enrollees are 10x likely to have barriers | Increased level of acuity, cost of care, etc.



Economic Impact of the Health Care Sector

Keeping rural health care local

- Among largest employer in rural communities
- Economic anchor for existing and new development
- Every \$1 invested health care "rolls over" as \$1.50 back to the community





Challenges of Addressing the Social Determinants of Health in Rural Areas

Example County: Susquehanna, PA 84% rural population

Neighborhood & Built Environment

Education

Social and Community Context

Economic Stability

- Access to exercise opportunities: 42% (PA 84%)
- Primary care to patient ratio: 2,720:1 (PA: 1,230:1)
- Dentist to patient ratio: 4,550:1 (PA: 1,460:1)
- Mental health providers to patient ratio: 1,640:1 (PA: 530:1)
- Percentage of adults with some college education: 48% (PA: 64%)
- Adult illiteracy rate: as high as 22% (PA: 13%)

• Physical inactivity: 28% (PA: 22%)

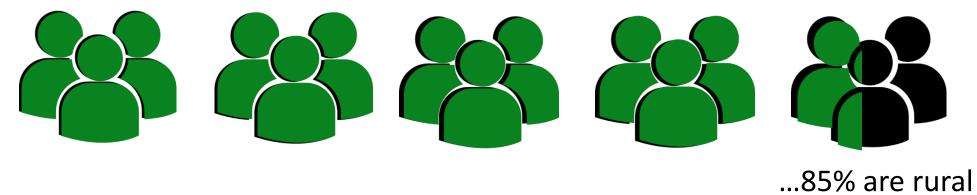
- Alcohol-impaired driving deaths: 48% PA: 28%)
- Flu vaccinations: 40% (PA: 50%)
- Premature death: 8,100 (PA: 7,500)
- Unemployment rate: 4.7% (PA: 4.9%)
- Income inequality ratio: 4.3:1 (PA: 4.8)
- Children in poverty: 22% (PA: 17%)

County Health Rankings, 2019 National Center for Education Statistics, 2003



Rural populations and poverty

Of the 353 persistently poor countries in the United States....



Of the U.S rural families headed by a female...



Over half of single, rural women with children live in poverty

Economic Research Service, USDA

Sustainability: Synergy Between Goals





Pennsylvania Office of Rural Health 118 Keller Building University Park, PA 16802 Telephone: (814) 863-8214 Fax: (814) 865-4688

> Lisa Davis: lad3@psu.edu porh@psu.edu www.porh.psu



Networking Break



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Sponsor's Perspective

Ted Monk

Vice President, Sustainability and Corporate Responsibility





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Working with Our Communities

Shaunna Barnhart Bucknell University



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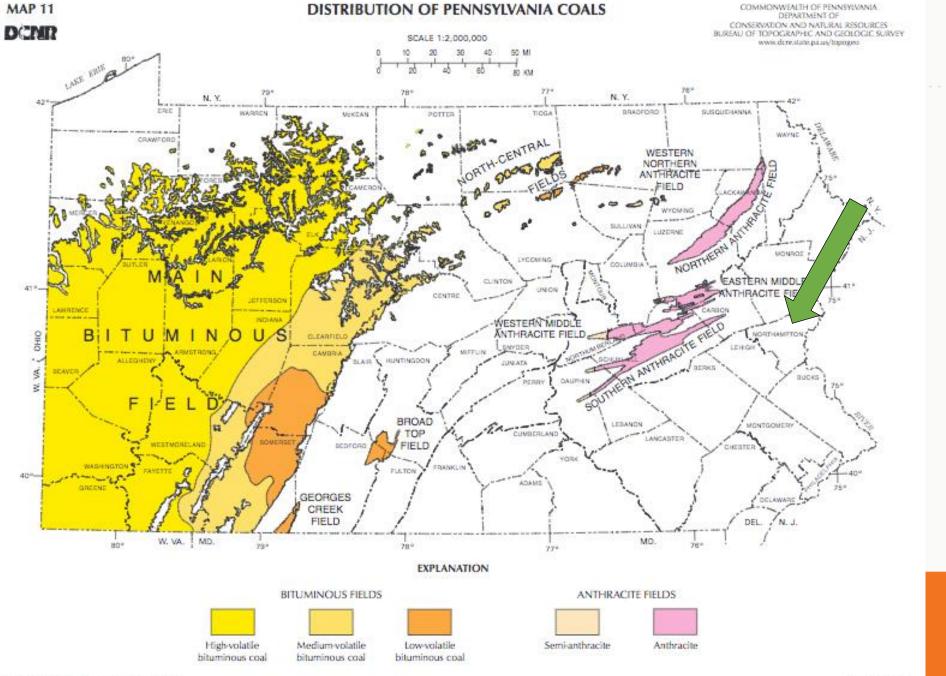


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Building Towards Sustainable Development Goals: A Field Station Model for University-Community Partnerships

> Shaunna Barnhart, PhD Director, Place Studies program Center for Sustainability and Environment

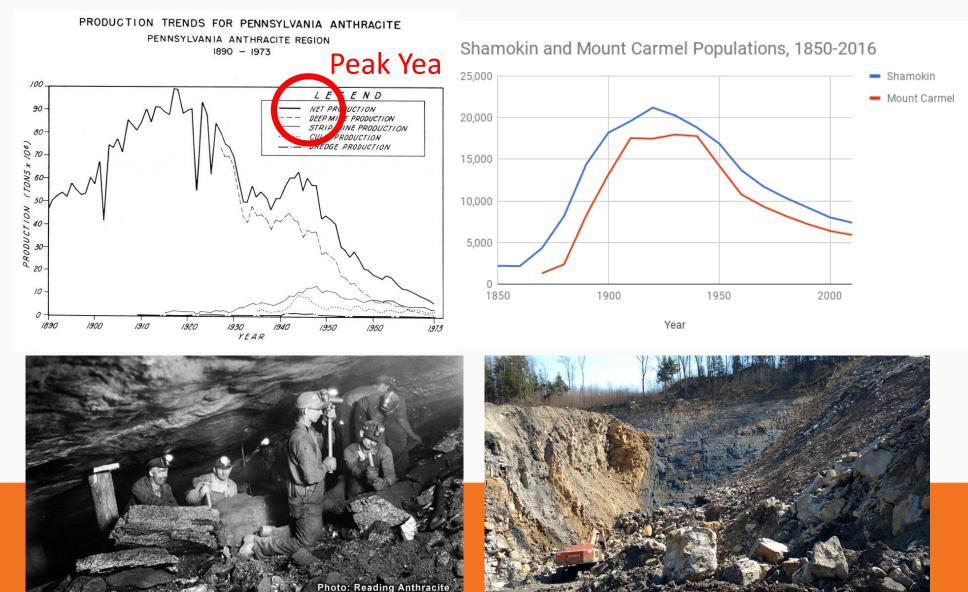






Prepared by Bureau of Topographic and Geologic Survey, Tried Edition, Revised, 2000, Third Printing, 2008.

A Brief History . . .





Coal Region Today: A Snapshot

	Pennsylvania	Mount Carmel Pop: 5893 (2010)	Shamokin Pop: 7374 (2010)
Poverty rate (2015)	12.9%	18.1%	24%
Poverty rate for families with children (2015)	15.9%	20.1%	24.2%
Median household income (2015)	\$53599	\$32025	\$31088
Free and reduced lunch in respective school districts (2016)	51.4%	65.2%	100%

Living Wage Calculator: http://livingwage.mit.edu/counties/42097





Problems, yes . . .

- Environmental degradation
- Declining populations
- Increasing poverty

But . . .

- Strong sense of place
- Community resiliency
- Openness to change



Coal Region Field Station: Mission



This evolving university-community collaboration engages Bucknell students, faculty, and staff with communities in the anthracite coal region by linking together and building upon collaborative projects in community-identified needs for revitalization, explorations of local histories and heritage, and envisioning future possibilities in the common goal of developing sustainable communities.



Coal Region Field Station: Vision

By engaging in collaborative, real-world projects addressing community-identified needs, students will become engaged and responsible leaders who respect and value the knowledge and experience of diverse groups, while partner organizations are empowered to enact their visions for thriving, prosperous communities.





By the **NUMBERS** (through Spring 2019)

300+ Students involved through coursework

- 70+ Media stories in local, regional and international news
- **50+** Faculty and staff on Coal Region Working Group listserv
- 55 Projects through classes
- 39 Courses in Art and Art History,
 Comparative Humanities, Engineering,
 English, Environmental Studies, Geography,
 Management, Math and Sociology
- **25+** Student interns and research assistants
- 22 Offices and Departments involved
- 17+ Community partners
- **9+** Faculty research projects
- 4 Years and counting . . .









Coal Region Field Station: Project Examples





- Economic development strategies
- Organizational strategic planning
- Cultural heritage studies
- Green space development
- Renewable energy installation potential
- Improving food pantry operations
- Reviving high school greenhouse
- Planning and expanding community garden
- Church architecture analysis
- Visual identity and web development for downtown development group



"For the goals to be reached, everyone needs to do their part: governments, the private sector, civil society and people like you."



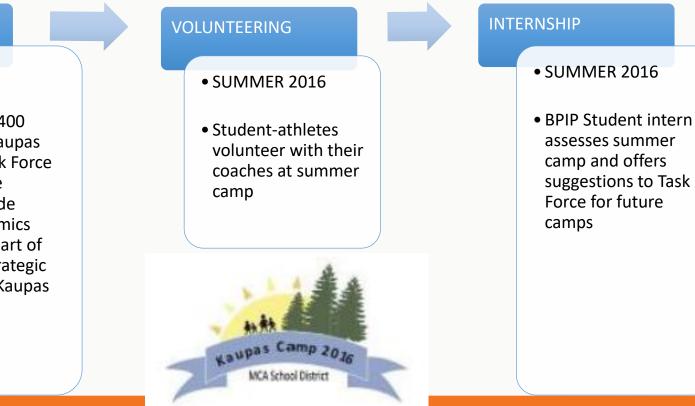


4 QUALITY EDUCATION

Chaining – From Class to Volunteering to Internship

CLASS

- SPRING 2016
- Students in MSUS 400 worked with the Kaupas Summer Camp Task Force on planning for the inaugural 5-8th grade athletic and academics summer camp as part of their project on Strategic Planning with the Kaupas Center.







Building Local Food Resiliency

Projects ranging from . . .

- Food pantry
- High School Greenhouse
- Community garden
- ... with an Americorps VISTA position to carry projects forward









Sustainable Communities



- Green space projects . . .
 - Community garden
 - Library reading garden
 - Trail project
- Cultural heritage
- Housing
- Renewable energy







STOKING HOPE IN A COAL TOWN

Bucknellians help rejuvenate an economically depressed community 40 miles from campus

FEBRUARY 15, 2016

SHARE THIS STORY

The first thing Erin Mahanoy City was University junior ar mining town befor MORE FROM Fall 2017

BY SUSAN LINDT

f 🍠 🖬 🤨

Mayor Philip "Bing" Cimino is the consummate small-town mayor: filling roles in Mount Carmel when others won't, staying on in those roles longer than he really wants, figuratively cheerleading a town that hasn't managed to be "in the game" for years, living life around emergencies — because he's also a longtime linchpin of the volunteer fire company.





Julia Tomeo '16

ts went door-to-door ocated in the rolling il-mining boom, its nts now living below



Coal Region Field Station

Bucknell work in Mt. Carmel a 40-mile 'miracle'

ration between the Weis Center

during a presenta-

BY SARAH DESANTIS

The Rev. Martin Moran, pastor

When he arrived at the church.

"A conservative coal town and one of America's most respected liberal arts universities may seem far apart on many levels, but the Bucknell-Mount Carmel relationship is proving that, as the world gets smaller, we can all learn from each other, and grow with each other."

"This experience will help me in my development of becoming a more understanding person and gain a more diverse perspective to real issues in our nation."

"This project also helped me learn about a different type of town I would otherwise have never spent time in."



Thank you.



Contact: Shaunna Barnhart, PhD sb060@bucknell.edu Director, Place Studies program Center for Sustainability and Environment



Working with Our Communities

Ilona Ballreich Penn State University



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Sustainable. Computies Partnerships and Possibilities



Sustainability is the simultaneous pursuit of **HUMAN** health & happiness, **ENVIRONMENTAL** quality and **ECONOMIC** well-being for current and future generations



Engaged Scholarship...

... is defined as out-of-classroom academic experiences that complement in-classroom learning.



The Sustainable Communities Collaborative

- We connect campus courses with local community partners to address sustainability challenges through an engaged and collaborative effort.
 - Bridge the gap between town and gown
 Explore possibilities that make a difference
 - Apply student expertise to community's needs Share technical and creative expertise across the community
 - Create high quality, high impact projects













Sustainable Communities Collaborative at University Park



Centred

Centred Outdoors is a program of ClearWater Conservancy, the local land trust and natural resource conservation organization.





GD 301: Logo & Branding

COMM 473: Marketing & PR Plan GEOG 550: Ecosystem Services Assessment

HDNRE: Program Evaluation **RPTM 433:** Human Health Assessment IST Interns: Website; Mobile App; Social Media

https://www.centredoutdoors.org/

Thank You!

Working with Our Communities

Olivia Termini Dickinson College



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Blueprint for the Future 2019 Spring Conference



Dickinson

UN Millennium Development Goals: A Student's Perspective on Community Based Research

Olivia Termini '19

Classical Studies & Environmental Studies



Dickinson

Community-Campus Partnerships at Dickinson

- Community Based Research & Service Learning Courses
- Faculty-community Learning and Action Networks
 - Community Health
 - Northside Carlisle Neighborhoods
- Community Impact Assessment Summer 2018
 - 45 community partner interviews assessing impact of curricular and co-curricular relationships
- Over 4 million in different Andrew W. Mellon Grants
 - Center for Sustainability Education
 - Funding for Community Based Research Courses
 - Center for Civic Learning and Action (New \$900,000 Grant)

UN Millennium Development Goal Correlations

- Development Goal 2 "Zero Hunger" and Development Goal 3 "Ensuring healthy lives and promote well-being for all at all ages"
 - ENST 311 Food, Poverty and Place
- Development Goal 11 "Make cities inclusive, safe, resilient, and sustainable"
 - SUST 301 Building Sustainable Communities: Carlisle Community Resilience Project



Carlisle Resilience Research Project Fall 2016

Building Sustainable Communities

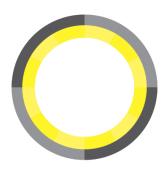
- 16 Students
- 4 Teams
 - Health & wellbeing
 - Economy & society
 - Infrastructure & ecosystems
 - Governance & planning

Participants & Partners

- 30+ community members
- Borough of Carlisle
- Greater Carlisle Project
- Dickinson College

Research goals

- Measure and understand resilience in Carlisle
- Evaluate Carlisle's strengths and weaknesses
- Catalyze and inform community conversations
- Incorporate resilience thinking in planning and promote actions to build resiliency
- Provide a data driven comprehensive set of indicators, variables, and metrics that will allow Carlisle to measure its resiliency over time



Dickins⊗n °







ARUP



City Resilience Index

4 Dimensions

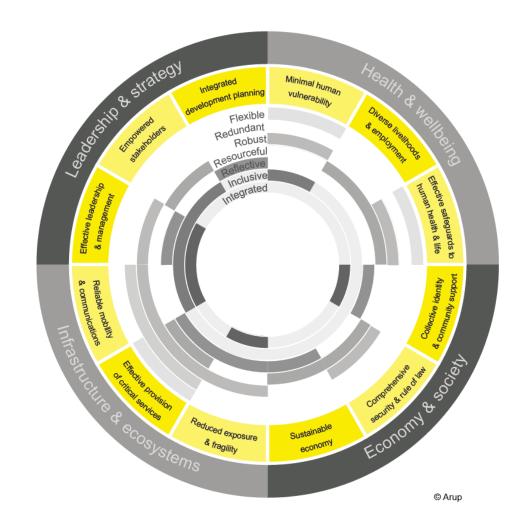
12 Goals

52 Indicators

7 Qualities

156 Questions

Primary Cities New Orleans, USA Cali, Columbia Concepcion, Chile Cape Town, South Africa Semarang, Indonesia Surat, India



Research methods:

- Interview key informants & Review written documents
- 'Score' 52 resilience indicators
- Validate scores

Carlisle Resilience Research Project Spring 2017

Independent Research

- 3 Students
- 2 Dimensions
 - Health & wellbeing
 - Economy & society
- 3 goals per dimension, 5+ indicators within each of those goals



Research goals

- Execute research plan which includes a literature review, extensive data collection, community focus groups, final report and community presentation.
- Provide Carlisle a way to measure resilience and provide resilience recommendations for Carlisle
- Build long lasting relationships with the Carlisle community
- Educate community partners and empower them to make targeted changes in the Carlisle community.

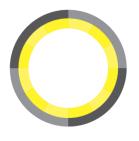
Spring 2017 Targeted Indicators (4)

Health & Wellbeing

- 1. Health insurance and use of public healthcare
- 2. Affordable Housing

Economy & Society

- 1. Perception of Crime
- 2. Sustainable Wages Income and wealth distribution Average length of jobs



UN Millennium Development Goals and Student Benefits

- Student Introspection and Reflection
- Experiential and Place Based Learning
- Real World Experiences that Build Civic Dispositions
 - Community involvement
 - Commitment to service and civic duty
 - Exposure to norms of personal efficacy and tolerance
- Career Exposure and Identification
- Contribution to Solving Real World Problems, e.g. UN Millennium Goals



Take Aways...

Community Based Research

- Provides a one of kind learning experience
- Is mutually beneficial to the students and community partner
- Builds future leaders
- Questions?



Lunch



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Blueprint for the Future 2019 Spring Conference



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Keynote Address John Quigley Director, Center for Environment, Energy & Economy Harrisburg University

Blueprint for the Future 2019 Spring Conference

SUSTA

DEVELOPME

17 GOALS TO TRANSFORM OUR WORLD

Posters & Networking



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Blueprint for the Future 2019 Spring Conference



2019 Campus Sustainability Champions

Blueprint for the Future 2019 Spring Conference

Student	Institution
Gabrielle Cressman	Lebanon Valley College
Abbey Ford	Millersville University
Mira Lerner	Franklin & Marshall College
Kristian Fox	Bucknell University
Non-Student	Institution
Len Litowitz	Millersville University
Jen Schneidman Partica	Bucknell University
Climate Action Plan	Lebanon Valley College

Committee

Operational Success Stories from across the Commonwealth

> Nick Goodfellow University of Pittsburgh



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Blueprint for the Future 2019 Spring Conference



Food Waste Reduction & Diversion at Pitt Nick Goodfellow Sustainability Coordinator Business & Auxiliary Services ngoodfellow@pc.pitt.edu

University of Pittsburgh

- State-related research university
- Founded 1787
- 28,642 students
 - 19,326 undergraduate
 - 62% from Pennsylvania
 - 11% International Students
- 12,942 staff
- Dense, urban campus





A PROGRAM OF FOOD RECOVERY NETWOR





FOOD RECOVERY HEROES

RECOVERING SURPLUS FOOD SINCE 2014 28,000 LBS OF SURPLUS FOOD RECOVERED TO DATE

University of Pittsburgh



News Releases from Region 03

University of Pittsburgh Receives Accolades From EPA For Food Recovery Achievements

12/11/2018

Contact Information: EPA Region 3 Press Office (R3press@epa.gov)

PHILADELPHIA (December 11, 2018) – Today, the U.S. Environmental Protection Agency (EPA) recognized the University of Pittsburgh for its food recovery achievements that include composting more than 135 tons of food in 2017 that would have otherwise ended up in a municipal landfill.



Food Recovery Heroes win PRC's 2019 Zero Waste Excellence Award

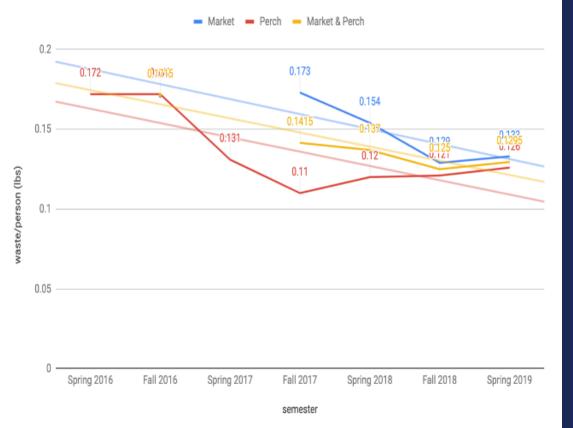
Food Waste Audits

- Bi-annual post-consumer food waste audits in two dining halls
- Track progress and make recommendations to reduce food waste
- Significant reductions in food wa since starting audits



Food Waste Audit Results

Market, Perch and Market & Perch



- Consistent reduction in postconsumer waste
- Estimated 16 ton avoidance YOY in Market Central (largest dining hall)



Event Composting

- Students concerned about waste from large events
- Greet Team move-in waste mitigation team deployed to large move-in week events



Green Certified Events

- GCE program launched to formalize zero waste events
- Applications reviewed by the Student Office of Sustainability
- 115 GCE events since 2016
- New Green Certified Offices program
 launching fall 2019



Food Waste Drop-Off Program

- Offer food waste drop-off at weekly campus farmers markets
 - Instructions for how to collect and store
 - Engage customers about composting
 - Collect data to illustrate interest/demand





Dining Hall Composting Pilot

- Pre- and post-consumer composting in 2nd large
- Limited bin types incompatible with docks
- Inconvenient
- Pilot cancelled after two semesters



Fall 2019 Compost Expansion

- Regular food waste composting in 5 buildings in fall 2019
- Pilot program
- Working with newer composting haulers

University of Pittsburgh

Compost



(includes fruit, vegetables,

meat, dairy, bread)



Apkins, Essues, Paper Towels, Pizza Boxes &

Not Accepted: Plastic, Recyclables, Non-compostable K-pods, Non-BPI Coffee Cups (i.e. Starbucks)

Soiled Paper

Compostable Dinnerware, Cups & Utensils (labeled BPI-certified or compostable)



Tea Bags, Coffee Grounds & Filters & Compostable K-pods (Tayst, OneCup)

> PittSustainability sustainable.pit.edu Questions? E-mail.sustainability@pit.edu

Operational Success Stories from across the Commonwealth

> *Rob Cooper Penn State University*



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Blueprint for the Future 2019 Spring Conference



PERC Conference

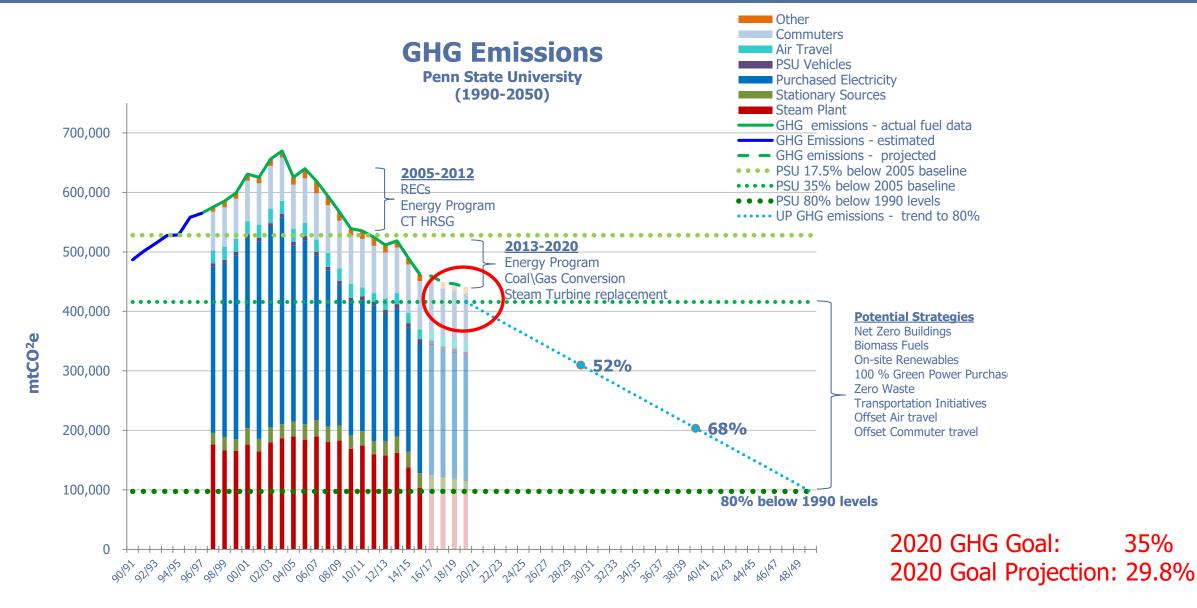
pennsylvania GREEN colleges

Pennsylvania Environmental Resource Consortium

Offsite Renewable Electric Generation Purchase

4/9/19

Background – GHG Emission Reduction



Penn State GHG Emissions include stationary sources, purchased electricity, OPP & Fleet vehicles and estimated commuter miles, air travel, waste, refrigerants and animal management.



Gap: 33,000 mtCO2

Strategies

- Increase Energy Savings Projects (ESP) funding by \$45M
- Purchase renewable electric generation

Solar

- Higher value than wind solar generates during peak price times
- Appears doable by 2020

• Wind

Lower value than solar – wind frequently generates during low price times



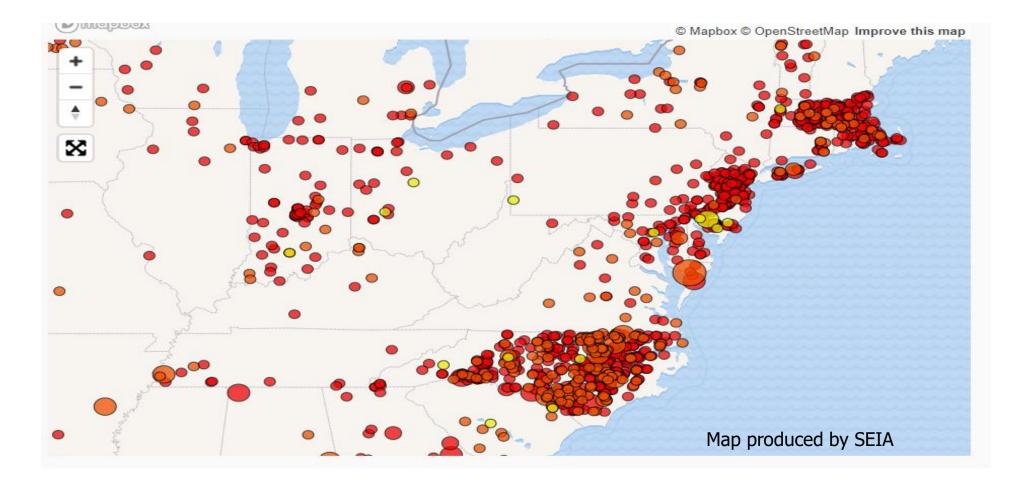
- Internal analysis suggested Offsite Solar Project viable, but lots of questions remained
- RFI was issued in January 2018 to help answer questions and inform the development of an RFP
 - What projects are out there?
 - Are they big/small enough to meet our current needs?
 - How many projects can be in operation by 2020?
 - Are we targeting the right size project?
 - What kind of terms would be available?
 - Does Solar really beat wind?
 - Where would we take the power?
 - How close to breakeven can we get?
 - Will developers keep and operate the project or flip it?
 - What are the available contract structures?
 - Are there many qualified and experienced vendors?
 - What kind of land would be used?
 - What is the cost difference between projects in PA and projects in other states?

PennState			
THE PENNSYLVANIA ST	THE PENNSYLVANIA STATE UNIVERSITY		
REQUEST FOR INFORMATION SCOPE & SPECIFICATIONS DOCUMENT			
RFI #GMZ-PRCH-RFI-1332E			
Renewable Electricity Generation			
CRITICAL MILESTONES	DATE		
Release of RFI	November 29, 2017		
Deadline for Questions	December 13 2017		
Deadline for Questions Information Due Date	December 13, 2017 January 5, 2018		



Regional Major Solar Projects

PA solar market has been less vibrant than markets with tax incentives (NJ, NC, MA)

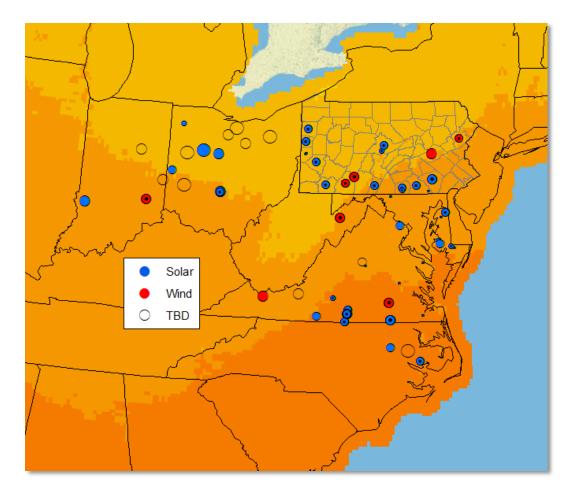


1



18 Responses out of 30 Invitations

- Solar indicative rates beat wind
- Virginia is currently the lowest cost market for solar projects, but PA viability is growing
- Most projects can meet a June 2020 inservice date
- Over 64% of projects meet or exceed the size of our targeted purchase size





Steering Committee

- 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



THE PENNSYLVANIA STATE UNIVERSITY

REQUEST FOR PROPOSAL SCOPE & SPECIFICATIONS DOCUMENT

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

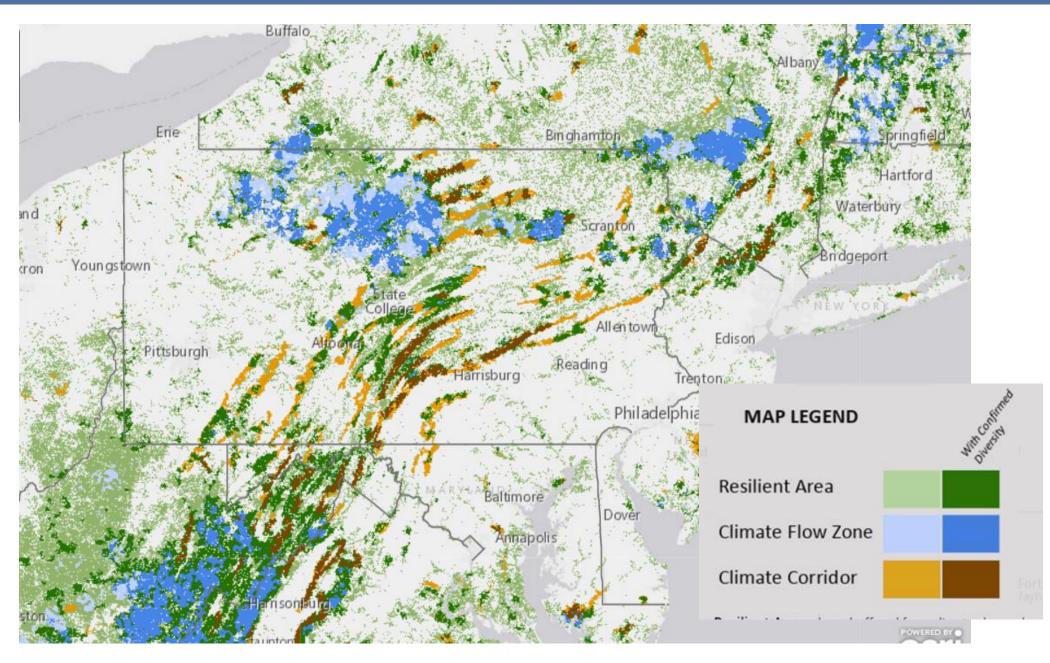
Pennsylvania State University Solar Electricity Generation

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



Resilient and Connected Network







Migrations in Motion



Natural Flow Patterns

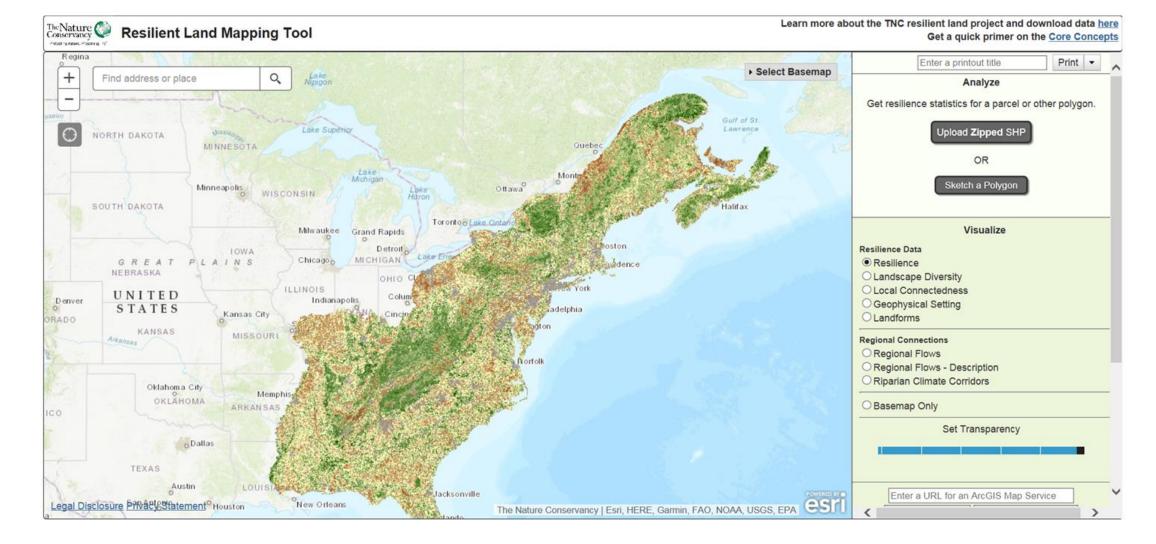


The gradual movement of populations across the landscape in response to climate change



Resilient Land Mapping Tool





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



Purchase Specs

Purchase Size

• 60 million kWh per year

Location

- Broader 11 state PJM region
- Preference for PA

Schedule

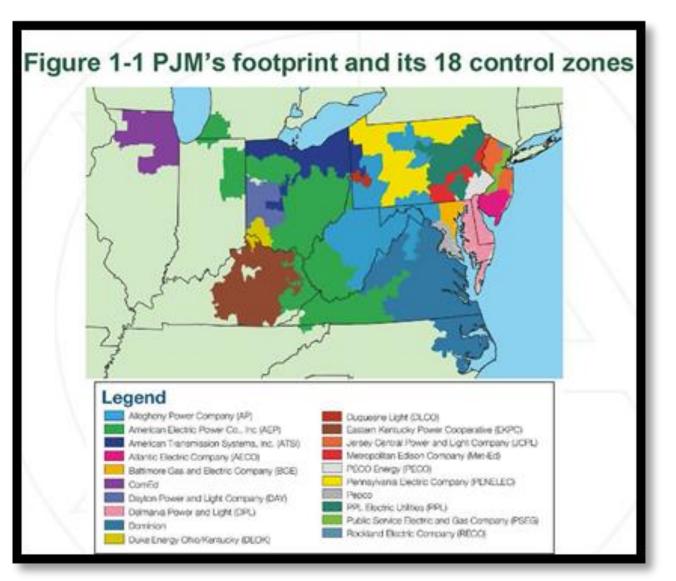
In-service by June 2020

Renewable Energy Certificates

Bundled w/ the Project

Contract Structure

- Power Purchase Agreement
- Term 20 to 30 years





RFP Results Summary

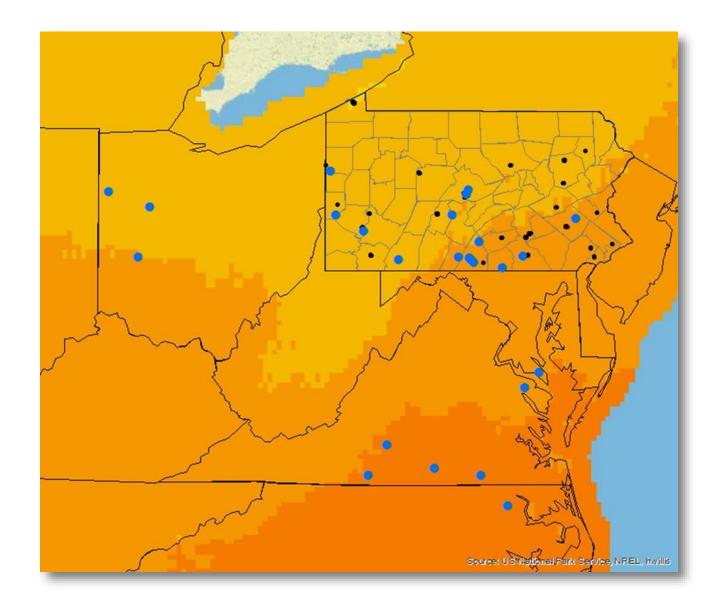
43 Invitations/15 responses

Location

- 25 distinct project sites
- 15 sites in PA

Multiple Options

- Sizes
- Term Lengths
- In-Service Dates
- Escalators





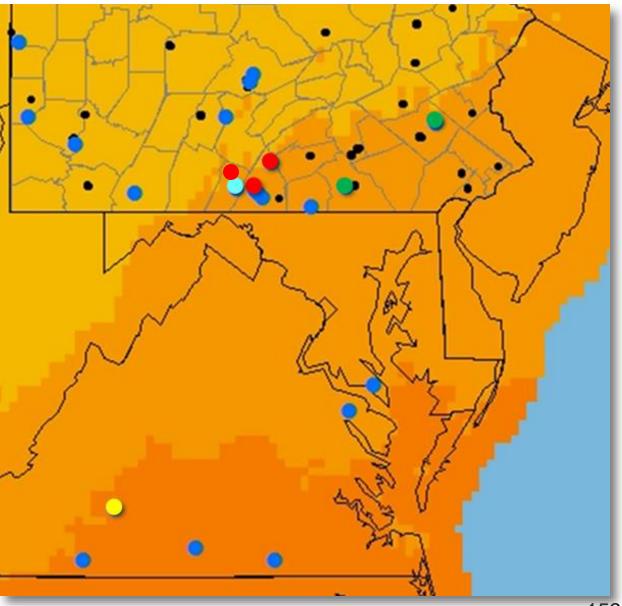
Top Four Projects

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





Offsite Solar Purchase

- Developer: Location: Generation: Delivery: GHG Reduction: In Service Date: PPA Term: Year 1 Savings: Total Savings:
- Lightsource BP Pennsylvania 101 million kwh in year 1 APS Zone 57,000 mtCO2e per year July 2020 25 Years, 0% escalator \$272,000 \$14M NPV

3 Separate Project Sites Second largest solar project in PA

Project 1

Project 2

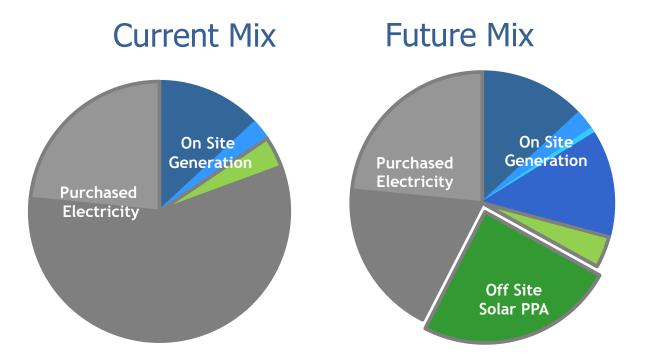


Project 3





Sources of Electric Generation



Combustion Turbine at East Campus

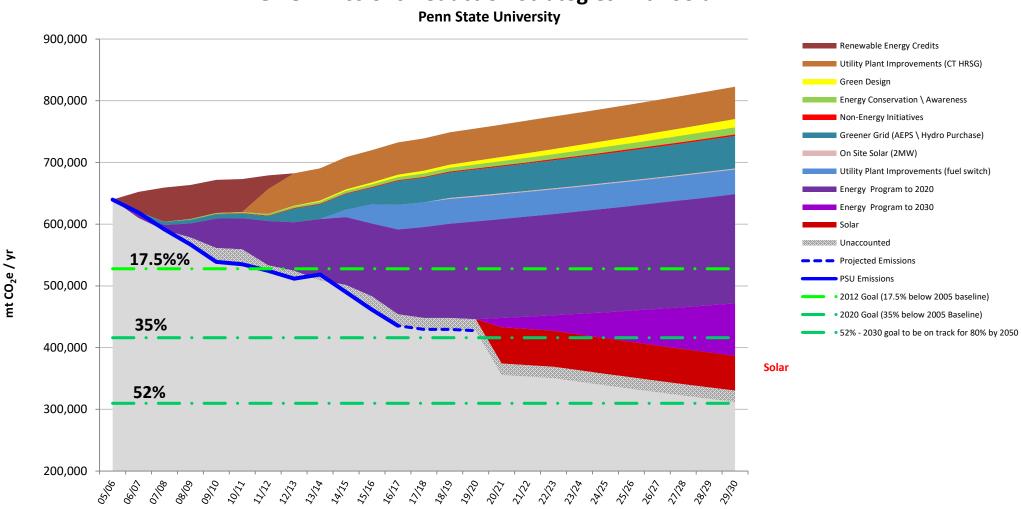
Steam Turbines at West Campus

Orchard Rd Solar (3M kwh\yr)

- Combustion Turbine at West Campus
 Hydro Power PPA
- Off Site Solar PPA (106M kWh\yr)
 Univeristy Park Purchased

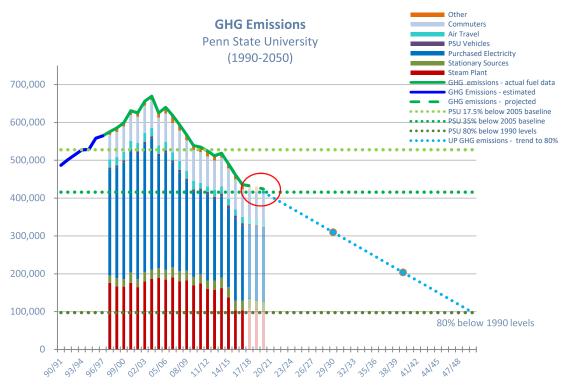
Commonwealth Campuses -Purchased







- 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



Penn State GHG Emissions include stationary sources, purchased electricity, OPP & Fleet vehicles and estimated commuter miles, a



- 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







Thank You



Operational Success Stories from across the Commonwealth

> *Chris Steuer Millersville University*



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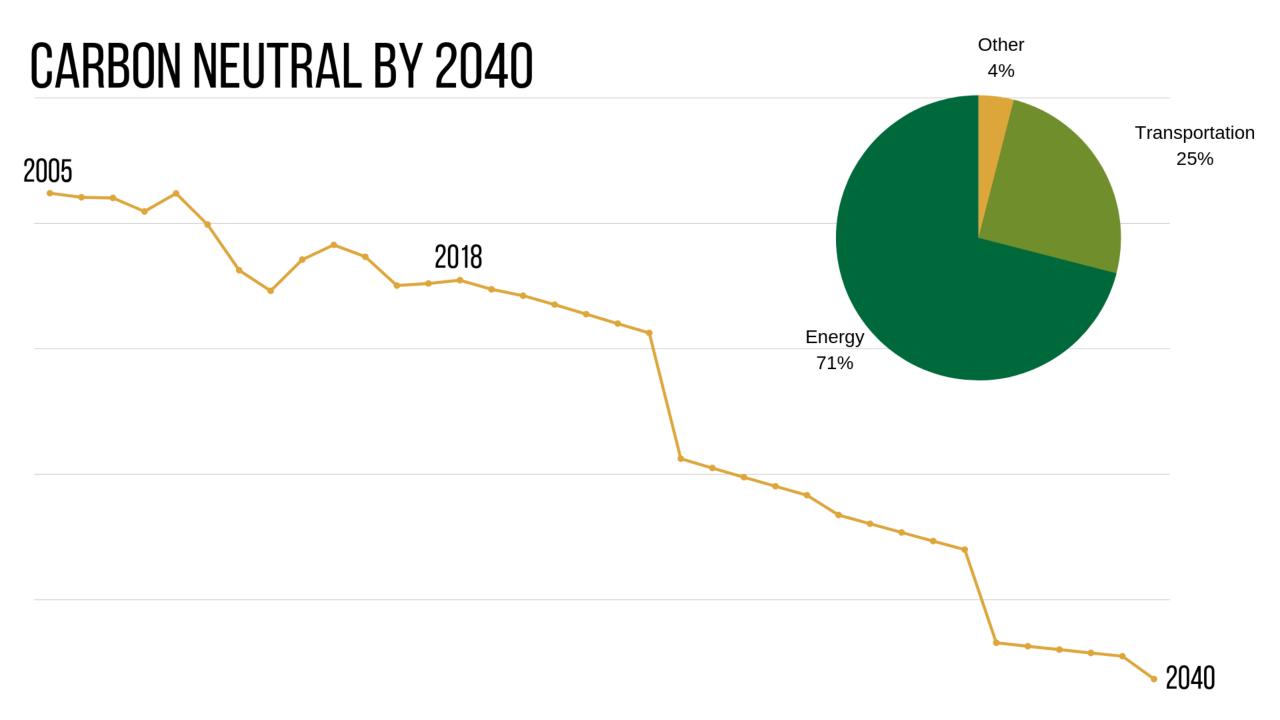
Generating Positive Energy @ Millersville University

Chris Steuer, Sustainability Director, Millersville University 2019



LOMBARDO WELCOME CENTER





ZEROENERGY CERTIFICATION



ZERO ENERGY BEGINS WITH ENERGY EFFICIENCY

A tight building envelope, proper siting, heating and cooling zones, passive heating and cooling, energy efficient lighting and equipment all help make the Lombardo Welcome Center about 70 percent more efficient than other campus buildings.

Energy use intensity: 25 kBtu/GSF/year



West Roof 72, 327 W Panels

Wax-

-

Solar Glass 69 Pieces Center Roof 144, 345W Panels

East Roof 312, 327 W Panels

> Ground Array 20, 345W Panels

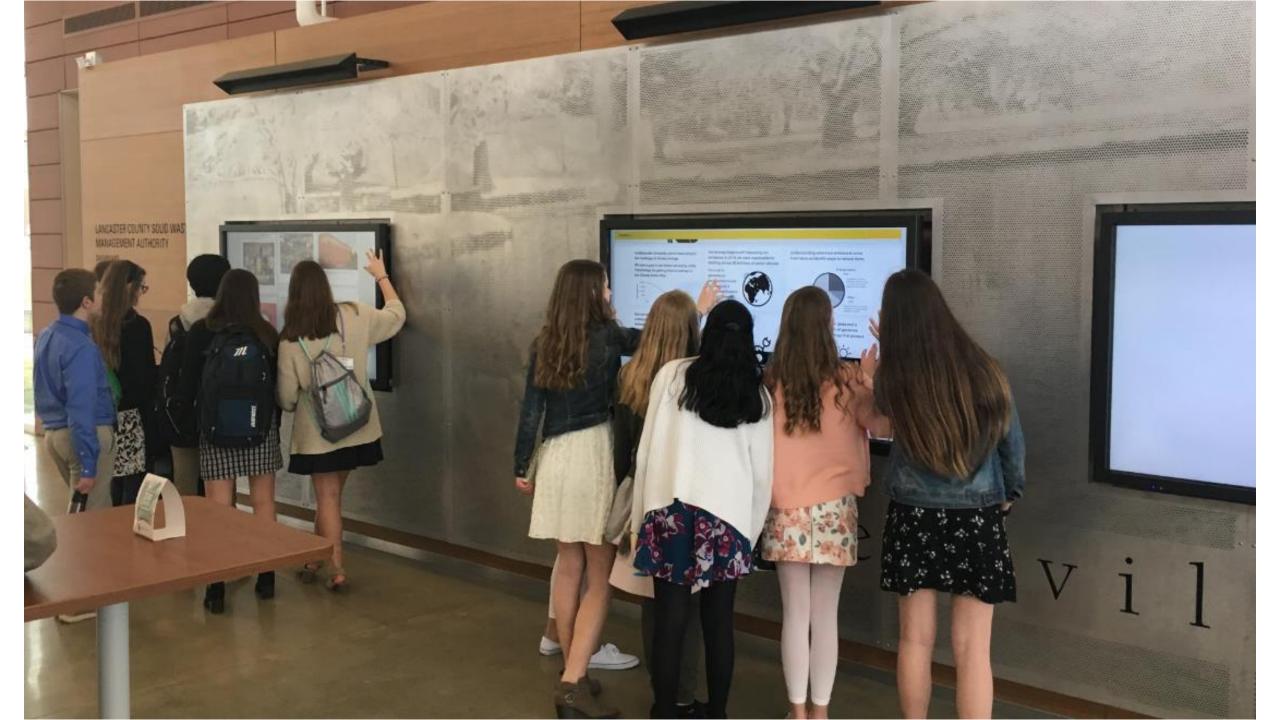
Geothermal Field 20 Wells











MILLERSVILLE + YOU

🔶 Learn More





ADMITTED STUDENT EXPO April 6, 2019

University Fast Facts

Do You Have My Major?

Sustainabilit

Efforts at MU



Wayfinding

What Global Problem Will You Solve?

🖸 in

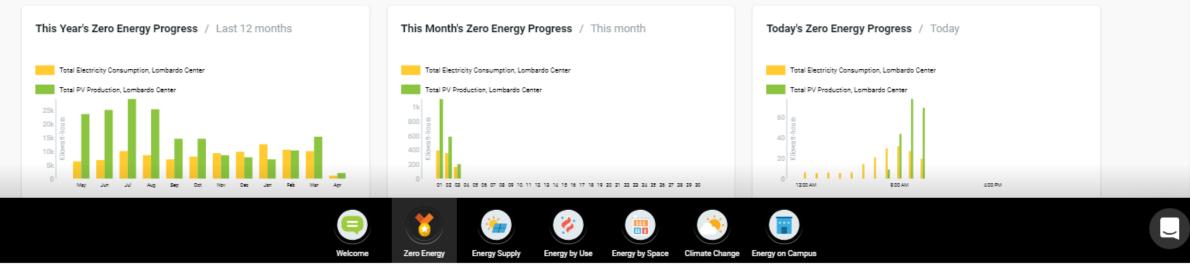
Pursuing Zero Energy Certification

We will pursue zero energy certification for the Lombardo Welcome Center through the Living Future Institute. To achieve this certification we will have to demonstrate that the building produces as much energy as it uses over the course of one year.

So far the building seems to be doing well (see the charts below). If solar energy production (green) is greater than energy use (yellow), we're a positive energy building!











+ You



Millersville



ve Global ? Goals (\mathbf{F})

Sustainability

on Campus



Energy

Dashboard



Social Media

Feeds



Directions



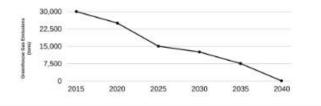
Fast Facts



buildingOS_

At Millersville University, we're responding to the challenge of climate change.

We have a goal to be carbon neutral by 2040. The strategy for getting there is outlined in our Climate Action Plan.



As a net zero energy building, the Lombardo Welcome Center uses many techniques and technologies that support our goal of carbon neutrality.



Our strategy begins with measuring our emissions. In 2016, we were responsible for emitting almost 30,000 tons of carbon dioxide.

For a car to generate an equivalent amount of emissions, it would need to drive around the world -2,500 times!



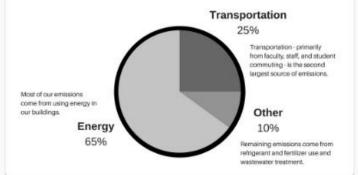
Good insulation, passive heating, and energyefficient lighting, heating and cooling systems make the building about 60 percent more energy efficient than the average

Energy Supply





Understanding where our emissions come from helps us identify ways to reduce them.



Over 500 solar panels, solar glass and a geothermal heating system all generate carbon-free, renewable energy that powers the building.

Our Climate Action Plan calls for using similar practices in other







+ You



.....







Energy by Use



Energy by Space



Climate Change



Energy on Campus





Millersville

My Major? Goals

Zero Energy

Sustainability on Campus

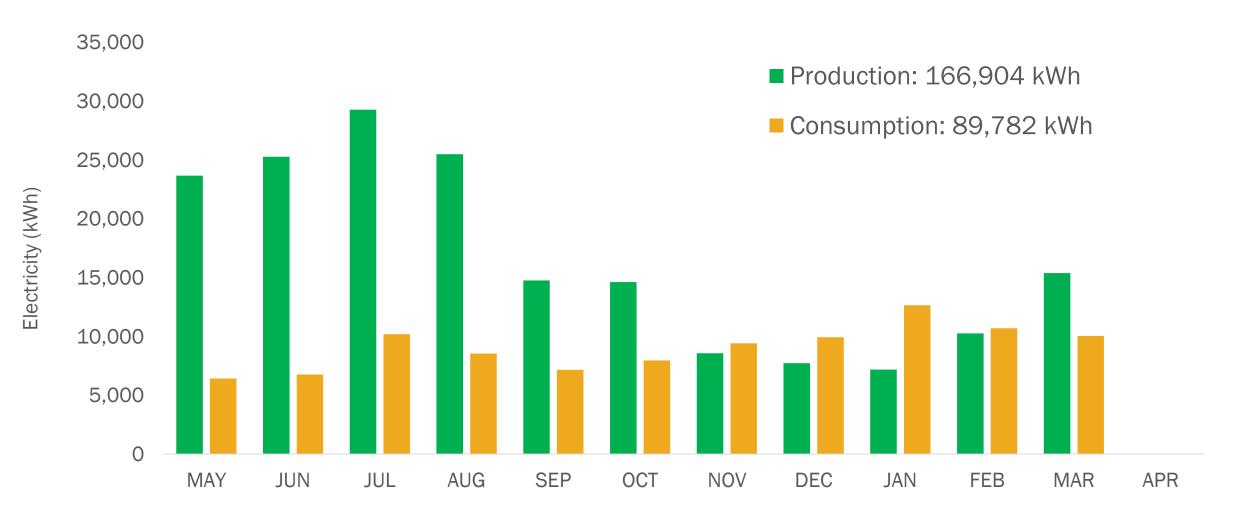
Energy Dashboard

Social Media Feeds

Wayfinding Directions

University Fast Facts

How are we doing?



MILLERSVILLE + YOU

🔶 Learn More





ADMITTED STUDENT EXPO April 6, 2019

University Fast Facts

Do You Have My Major?

Sustainabilit

Efforts at MU



Wayfinding

What Global Problem Will You Solve?

🖸 in

WHAT PROBLEM WILL YOU SOLVE?

Millersville University has a mission to provide diverse, dynamic, meaningful experiences that help you learn and grow intellectually and personally to help you contribute positively to local and global communities. Click a Global Goal to the right to explore programs of study that can position you to help create a vibrant, abundant and prosperous future.









....

Global Goals



y Energy Dashboard



Feeds





13 CLIMATE ACTION





IMAGINE...

Preventing Climate Change

RELATED PROGRAMS OF STUDY

Biology

- Biology (B.A., B.S., B.S. Ed., Cert.)
- Biology with Inclusive Education 7-12 (B.S. Ed.)
- Environmental Biology (B.S.)

Center for Disaster Research and Education

• Emergency and Disaster Management (M.U.C.P.B.)

Chemistry

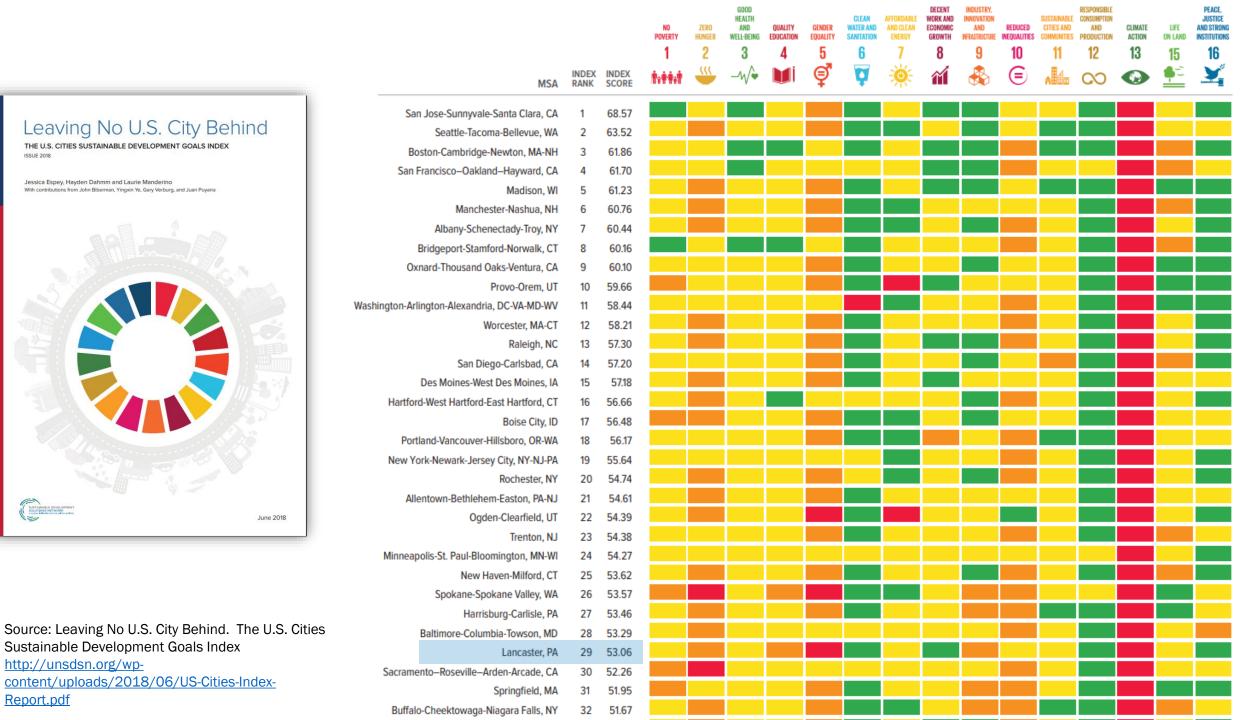
• Environmental Chemistry (B.S.)

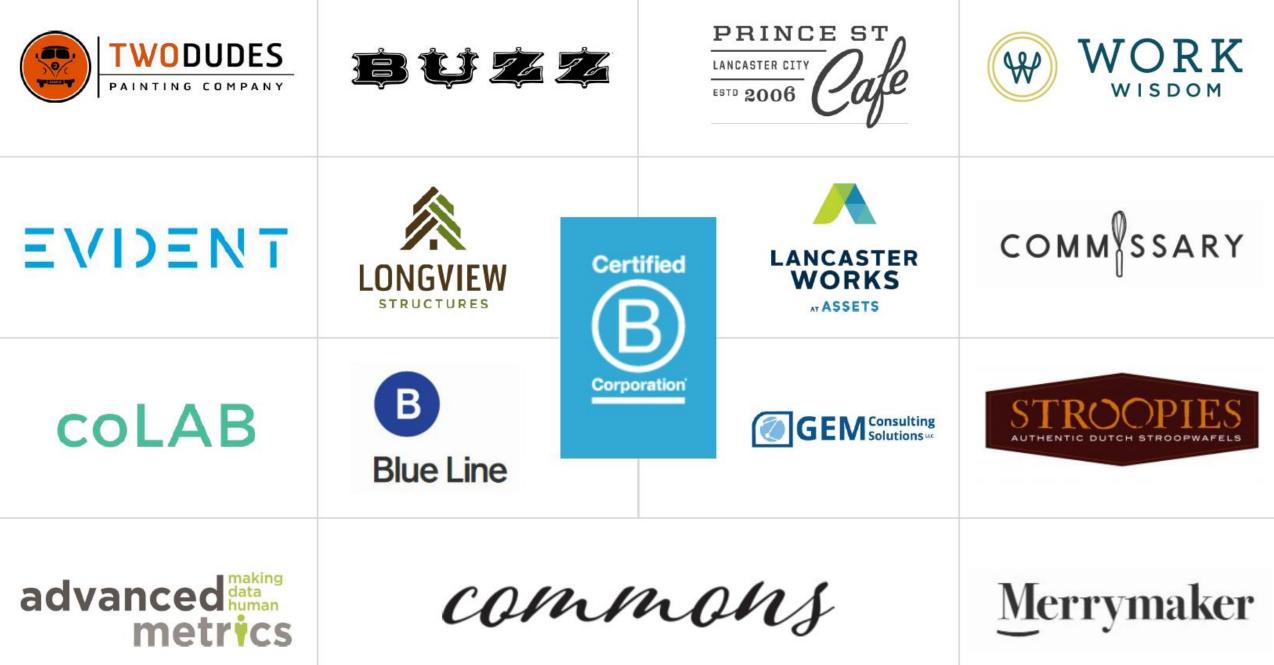
Early, Middle, and Exceptional Education

• Middle Level Education - Social Studies Grades 4-8 (B.S. Ed.)









Used with permission from Craig Dalen, ASSETS

B Lab Partners with United Nations Global Compact to Develop Online Platform for SDG-Focused Impact Management

February 7, 2019

A new online platform under development this year will leverage the B Impact Assessment to allow companies around the globe to manage their impact through performance on the United Nations Sustainable Development Goals (SDGs). Thanks to the generous support of our funding partners, and working closely with the United Nations Global Compact, B Lab will develop the tool this year so it's ready for launch in 2020 to help companies chart their next decade of progress on the SDGs.

Through this publicly available online platform, businesses will be able to assess, compare, and improve their performance against the SDGs, delivering tangible progress on them by 2030. Companies will also be able to access online resources through the platform to improve their impact and benchmark against key indicators and peers. The online tool will feature select questions from the **B Impact Assessment** that have been mapped to the SDGs, supplemented by new performance measures based on the expertise of anchor partner the UN Global Compact and other advisors.

A special initiative of the UN Secretary-General, the UN Global Compact is a call to companies everywhere to align their operations and strategies with 10 universal principles in the areas of human rights, labor, environment, and anti-corruption. Launched in 2000, the mandate of the UN Global Compact is to guide and support the global business community in advancing UN goals and values through responsible corporate practices.



Supporting youth-led innovation to achieve the SDGs

SDSN Youth Solutions Report Policy Brief no.1

July 2017

YOUTH

SOLUTIONS

Jessica Kempner (Analyst, The Social Investment Consultancy Nicolaj Nielsen (Researcher, The Social Investment Consultancy) Dominique Mainzot (Project Officer, SDSN Youth) Dario Piselli (Project Leader, SOSN Youth) Sushil Rajagopalan (Project Officer, SDSN Youth)

INTRODUCTION

ple as "critical agents for change" (UNGA 2015a: para.51) and encouraging the UN Major Groups (in-Nearly two years since the adoption of Transform- cluding the UN Major Group on Children and Youth) ing our World: the 2030 Acendo for Sustainable to participate in the review of and report on their Development (UNGA 2015a), it is increasingly clear contribution to the achievement of the SDGs (UNGA that the challenges facing our societies and econo- 2015a: para.89). mies will need the participation of all stakeholders In order to move beyond statements of principles and demographics. Crucially, this includes young however, it remains essential to assess the real expeople ared 15-30, who currently represent ap- tent to which young people worldwide are deliverproximately one quarter of the world's population ing solutions to sustainable development challeng-

(US Census Bureau 2016) and constitute a primary es at all levels, as well as to investigate (and learn source of untapped potential in the implementation how to overcome) the barriers preventing young of the Sustainable Development Goals (SDGs). innovators and problem-solvers from implementing their projects and bringing them to scale. Among its repeated references to the importance

of partnerships for sustainable development, the SDSN Youth, the global youth chapter of the Sus-2030 Asenda convincinely embraces this notion, tainable Development Solutions Network (SDSN). emphasizing the role of children and young peo- published the first edition of the Youth Solutions Re-

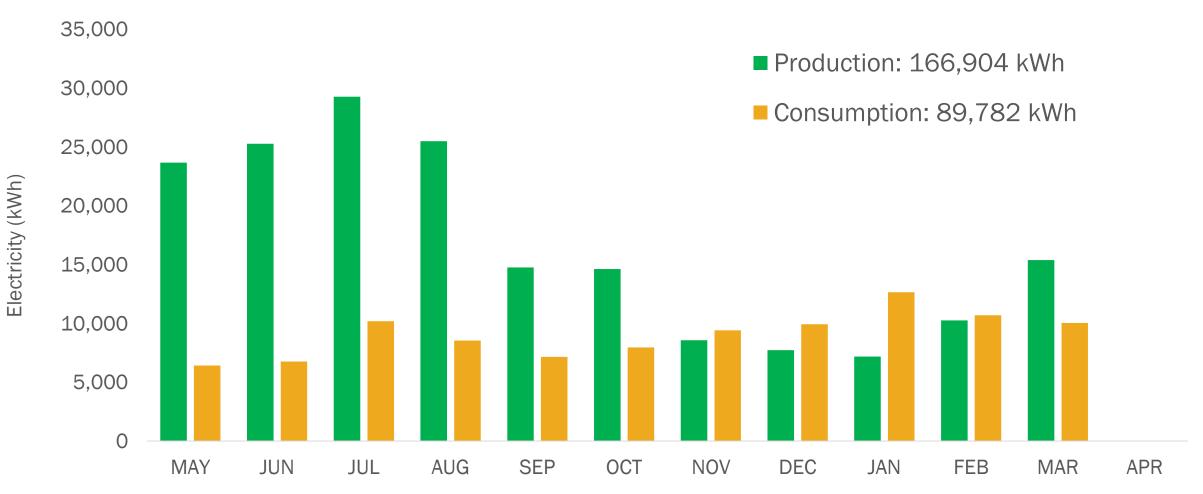
Supporting youth-led innovation to achieve the SDG

Overcoming barriers to Youth-led Innovation for the SDGs

- Provide access to funding
- Build capacity and provide mentorship
- Increase visibility and access to networks
- Understand regional disparities and knowledge gaps

Source: Supporting youth-led innovation to achieve the SDGs http://www.youthsolutions.report/publications

How are we doing?





POSITIVE ENERGY AWARD PROGRAM

Use the utility rebates and cost savings associated with the Positive Energy Lombardo Welcome Center to provide micro-grants for faculty, staff and student projects that contribute positively to local communities using the Global Goals framework.



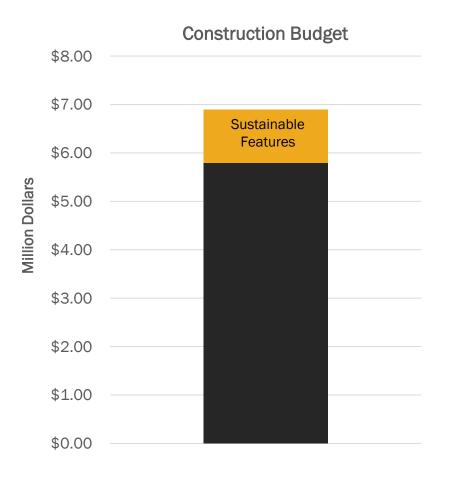


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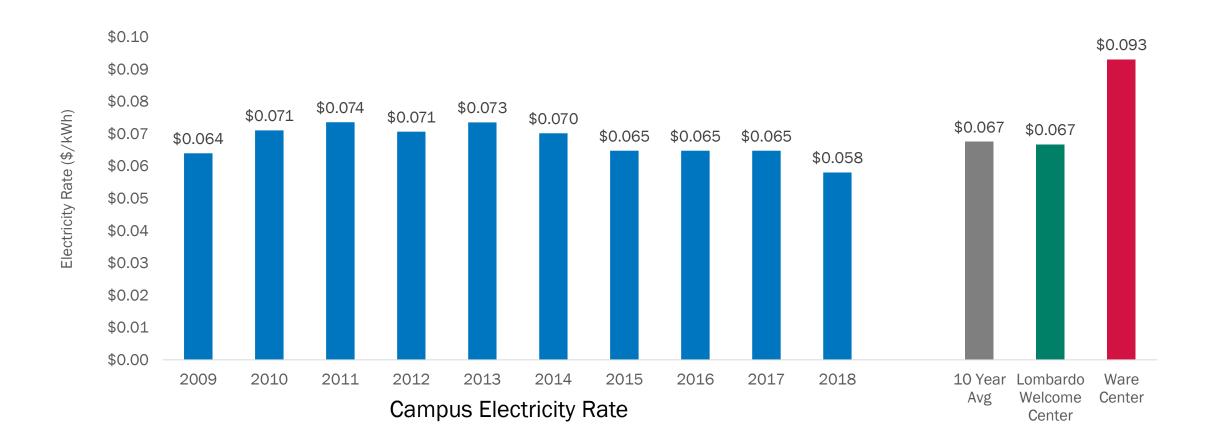
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Budget



- Total Budget: \$6.9 million
- Sustainable Features: \$1.1 million
 - Solar Array \$450,000
 - Geothermal \$230,000
 - Lighting \$320,000
 - Heat Pumps \$110,000
- Donor Contributions: \$1.5 million
 - Additional donor costs: Lobby, Feng Shui considerations, Lobby Dashboard

Electricity Rate Comparison





What have we learned?

- The building must meet occupant needs (e.g., comfort) first
- Ongoing occupant engagement helps identify issues, maintains interest and encourages energy-conscious behaviors
 - Resolving occupant concerns is probably the best form of engagement
- Expect and resolve challenges.
 - Close monitoring allows for identifying and resolving issues
- Need a building advocate/ambassador
 - Promote what is going well.
 - Tailor the message to diverse audiences.
- Physical reminders (e.g., solar array, dashboard) encourage energyconscious behaviors.



Networking Break



Resource Consortium

QUALITY OF LIFE SERVICES

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Sustainability Café

Michele Halsell Peter Buckland Penn State University



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In Closing...



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