

## ENERGY ASSESSMENTS FOR MORGANTOWN BUSINESSES

Get an energy assessment to find out how much your business could save!!

### Overview

West Virginia University and Downstream Strategies have partnered to provide energy assessments for locally-owned small businesses throughout West Virginia. Funding from the U.S. Department of Agriculture allows us to provide this service at no cost to you! We can help you identify and evaluate opportunities for energy conservation and cost savings. We will evaluate your building and produce a report detailing specific recommendations and estimates of energy savings and implementation costs.

In most cases, the energy retrofits we recommend are cost-effective, meaning that the resulting savings on utility bills pay for themselves in a few years or less; from then on, you pocket the savings. For lighting retrofits, MonPower provides an incentive of 5 cents for every kilowatt-hour saved by upgrading your lighting systems. As shown in the first table, this incentive covers a substantial portion of the retrofit cost and in some cases 100% of the cost. Learn more at [www.energysavewv-business.com](http://www.energysavewv-business.com).

This document summarizes the results of energy assessments conducted for Morgantown businesses. The following recommendations are typical:

#### For lighting...

- Replacing T12 fluorescent lighting and magnetic ballasts with T8 lights and electronic ballasts
- Installing specular reflectors on existing light fixtures and/or reducing the number of fixtures
- Replacing incandescent lighting with compact fluorescents
- Installing occupancy sensors in rooms/buildings where full-time lighting is not needed

#### For heating and air conditioning...

- Installing programmable thermostats
- Insulating ceilings, walls, roofs, or doors
- Replacing inefficient boilers and/or recovering waste heat
- Insulating hot water pipes and heaters

### Summary of assessment results

Overall, our team has conducted energy assessments for 20 Morgantown businesses. The average impact (per business) of the proposed energy retrofits is detailed in the table below. These figures show the average impacts for a large number of businesses; for individual businesses the implementation costs, savings, and payback periods may be higher or lower. In fact, for half of the businesses assessed, the average payback period was less than three years.

#### Average energy and cost savings for Morgantown businesses

Expense	Energy saved (kWh)	Energy saved (mmBtu)	Annual savings	One-time cost	Payback period (years)	Average incentive	Average cost reduction
Lighting	5,363	n/a	\$500	\$833	1.7	\$268	32%
Heating and air	2,004	43	\$708	\$4,625	6.5	n/a	n/a
<b>Overall average</b>	<b>7,367</b>	<b>43</b>	<b>\$1,333</b>	<b>\$5,666</b>	<b>4.2</b>	<b>\$268</b>	<b>5%</b>

## Estimated savings for other Morgantown businesses

### Savings from lighting retrofits

Company name	Potential savings (kWh)	Potential savings (\$)	Estimated cost (\$)	Payback period (years)	MonPower incentive (\$)	Cost reduction of incentive
Coach's Bar and Grill	11,728	\$1,173	\$508	0.4	\$586	115%
David-Bradley Salon	1,979	\$198	\$884	4.5	\$99	11%
Donnie's Body and Frame Shop	5,104	\$468	\$2,223	4.8	\$255	11%
Eldon's Auto Service	-	-	-	-	-	-
Hot Head Hair Salon	879	\$88	\$426	4.8	\$44	10%
John D'Angelis	2,216	\$222	\$579	2.6	\$111	19%
Kuehn Sisters Diamonds	1,424	\$142	\$533	3.8	\$71	13%
Lakeside Physical Therapy	3,910	\$297	\$884	3.0	\$196	22%
Madeleine's Restaurant	4,727	\$434	\$505	1.2	\$236	47%
Massullo's Cleaners and Tailors	8,287	\$800	\$2,367	3.0	\$414	18%
Morgantown Auto Repair Service	2,394	\$239	\$1,669	7.0	\$120	7%
New Day Bakery	6,392	\$586	\$236	0.4	\$320	135%
Oliverio's Ristorante	3,482	\$348	\$820	2.4	\$174	21%
Peppebronis Restaurant	1,624	\$162	\$561	3.5	\$81	14%
Puglioni's Pasta and Pizza	3,646	\$387	\$315	0.8	\$182	58%
Richwood Grill	1,229	\$123	\$76	0.6	\$61	81%
Shoney's	26,247	\$2,625	\$2,212	0.8	\$1,312	59%
Suburban Bowling Lanes	13,626	\$907	\$1,582	1.7	\$681	43%
Tailpipes	3,738	\$343	\$102	0.3	\$187	183%
Tonique's Trilogy	4,618	\$462	\$183	0.4	\$231	126%
<b>Average impact</b>	<b>5,363</b>	<b>\$500</b>	<b>\$833</b>	<b>1.7</b>	<b>\$268</b>	<b>32%</b>

### Savings from heating and air conditioning retrofits

Company name	Potential savings (kWh)	Potential savings (mmBtu)	Potential savings (\$)	Estimated cost (\$)	Payback period (years)
Coach's Bar and Grill	-	-	-	-	-
David-Bradley Salon	-	-	-	-	-
Donnie's Body and Frame Shop	792	33	\$348	\$1,090	3.1
Eldon's Auto Service	-	27	\$225	\$145	0.6
Hot Head Hair Salon	1,242	-	\$124	\$2,080	16.8
John D'Angelis	412	9	\$109	\$1,287	11.8
Kuehn Sisters Diamonds	1,133	27	\$413	\$1,997	4.8
Lakeside Physical Therapy	4,399	144	\$1,700	\$5,600	3.3
Madeleine's Restaurant	2,004	135	\$1,307	\$5,393	4.1
Massullo's Cleaners and Tailors	19,485	177	\$3,651	\$48,075	13.2
Morgantown Auto Repair Service	-	-	-	-	-
New Day Bakery	-	13	\$108	\$145	1.3
Oliverio's Ristorante	-	-	-	-	-
Peppebronis Restaurant	-	47	\$440	\$90	0.2
Puglioni's Pasta and Pizza	677	-	\$72	\$174	2.4
Richwood Grill	3,516	-	\$352	\$125	0.4
Shoney's	-	228	\$1,824	\$3,100	1.7
Suburban Bowling Lanes	1,851	-	\$107	\$165	1.5
Tailpipes	-	11	\$94	\$145	1.5
Tonique's Trilogy	4,571	-	\$457	\$4,384	9.6
<b>Average impact</b>	<b>2,004</b>	<b>43</b>	<b>\$708</b>	<b>\$4,625</b>	<b>6.5</b>

# West Virginia Agricultural and Rural Small Business Energy Audit Program

*Sponsored by the Rural Business - Cooperative Service,  
U.S. Department of Agriculture*

## Energy Assessment Report: [REDACTED]



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FOR:

 **West Virginia University**



**Downstream  
Strategies**  
building capacity for sustainability

**February 26, 2013**

## **PREFACE**

The work described in this report is a service provided by West Virginia University. This project is funded by the U.S. Department of Agriculture and is a partnership between the West Virginia University Industrial Assessment Center and Industries of the Future. The primary objective is to identify and evaluate opportunities for energy conservation. Data are typically gathered during a site visit and assessment recommendations are identified, energy savings are estimated, and conceptual implementation costs are provided. When an assessment recommendation involving engineering design and capital investment is attractive to the company and engineering services are not available in-house, it is recommended that a consulting engineering firm be engaged to do the detailed engineering design and cost estimations for implementing the AR. Since the site visits are brief, they are necessarily limited in scope and a consulting firm could be more thorough.

The contents of this report are offered only as guidance. All technical sources referenced in this report do not (a) make any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method or process disclosed in this report may not infringe on privately owned rights; (b) assume any liabilities with respect to the use of, or for damages resulting from the use of, any information, apparatus, method or process disclosed in this report. This report does not reflect official views or policies of the previously mentioned institutions.

The assumptions and equations used to arrive at the energy consumption and cost savings for the recommended AR's are given in the report. These assumptions are intended to be conservative.

Please feel free to contact the Principal Investigator if there are any questions or comments related to this report.

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## ABBREVIATIONS

APCo	Appalachian Power Company
Btu	British thermal units
C	capacity of system
CEU	current energy usage
CFL	compact fluorescent light bulb
CS	current setbacks
DHH	degree heating hours
ECS	energy cost savings
Eff	efficiency of system
HH	heating hours
HVAC	heating, ventilation, and air conditioning
IC	Implementation cost
INC	Incandescent
kW	kilowatt
kWh	kilowatt-hour
LC	labor cost
LF	load factor
MH	metal halide
MMBtu	million British thermal units
NCIF	Natural Capital Investment Fund
R <sub>c</sub>	R-value of current surface
REAP	Rural Energy for America Program
R <sub>ap</sub>	R-value of proposed surface
S	current setpoint
SB	proposed setback
SH	setback hours
T	average temperature
TMC	total material cost
UF	utilization factor
USDA	United States Department of Agriculture
W	watt

## SUMMARY

Facility Name:

Location:

Assessment Date:

The assessment recommendations contained in this report could save approximately 4,414 kWh/year of electricity and 66 MMBtu/year of natural gas. The corresponding annual energy cost savings would amount to approximately \$1,020 while the total estimated one-time costs are \$5,954 yielding a combined simple payback of 5.9 years. The tables below show the cost of energy resources as well as a summary of the assessment recommendations.

**Table 1: Utility rates**

Resource	Rate	Units
Electricity	\$0.08865	\$/kWh
Natural gas	\$9.529	\$/MMBtu

**Table 2: Summary of recommendations**

No.	Description	Resource	Annual potential conservation	Annual potential savings	Estimated one-time cost	Simple payback (years)
1	Retrofit existing lighting	Electricity	4,414 kWh	\$391	\$568	1.5
2	Insulate the ceiling of the first floor with fiberglass batts	Natural gas	37 MMBtu	\$353	\$1,678	4.8
3	Insulate the walls of the first floor with spray foam	Natural gas	29 MMBtu	\$276	\$3,780	13.7
<b>Total</b>				<b>\$1,020</b>	<b>\$6,026</b>	

## RECOMMENDATION 1: RETROFIT EXISTING LIGHTING

### Recommended action

Replace the existing T12 bulbs and magnetic ballasts with T8 bulbs and electronic ballasts with specular reflectors. In some areas, the proposed lighting technology will reduce the number of fixtures and/or bulbs needed in that area. When the proposed lighting involves a reduction in the number of bulbs in a fixture, the electronic ballast should be designed for the proposed number of bulbs. These measures will reduce the lighting energy usage while maintaining approximately the same lighting levels, or better.

Lighting technology has evolved rapidly in recent years. In commercial buildings, significant reductions in energy use can be achieved by installing energy-efficient bulbs, fixtures, and controls. Retrofits to install new technologies such as electronic ballasts and specular reflectors are often cost-effective, providing a payback within a few years. In some cases the number of bulbs can be reduced by adding reflectors. If the number of bulbs is reduced, the lumen output per fixture may also be reduced, but the lighting levels will remain the same as the existing levels because the reflectors direct more light onto the working area. If and when removing bulbs from a fixture, it is advisable to disconnect the ballast in addition to the bulb, since the ballast draws energy even when there are no lamps in the fixture. The current lighting and proposed lighting systems are detailed in tables 3 and 4.

**Table 3: Existing lighting**

Area	Bulb type	Bulb size (W)	No. fixtures	No. bulbs/ fixture	Total no. bulbs	Hours of operation	Total wattage	Energy usage (kWh/yr)
Main area	8' T12	60	18	2	36	3,276	2,160	8,067
Main area	8' T8	59	6	2	12	3,276	708	2,435
<b>Total</b>			<b>24</b>		<b>48</b>		<b>2,868</b>	<b>10,502</b>

**Table 4: Proposed lighting**

Area	Bulb type	Bulb size (W)	No. fixtures	No. bulbs/ fixture	Total no. bulbs	Hours of operation	Total wattage	Energy usage (kWh/yr)
Main area	8' T8	59	10	2	20	3,276	1,180	4,059
Main area	8' T8	59	5	2	10	3,276	590	2,029
<b>Total</b>			<b>15</b>		<b>30</b>		<b>1,770</b>	<b>6,088</b>

Note: All light levels with the proposed improvements are estimated to be equal or better than existing light levels.

**Table 5: Anticipated savings**

Type of savings	Calculation	Savings
Energy savings	Existing energy usage - Proposed energy usage	<b>4,414 kWh/year</b>
Energy cost savings (ECS)	4,414 kWh/year x \$0.08865/kWh	<b>\$391 /year</b>
Annual CO <sub>2</sub> savings	1 kWh saves 2.19 pounds of CO <sub>2</sub>	<b>9,667 pounds/year</b>

**Table 6: Implementation cost**

Type of cost	Calculation	Cost
<b>Total material cost (TMC)</b>		
Electronic ballasts	9 fixtures x \$25/fixture	\$225
Specular reflectors	15 fixtures x \$10/fixture	\$150
59 W, 4 foot, T8 bulbs	18 bulbs x \$7.50/bulb	\$135
<b>Subtotal, TMC</b>		<b>\$510</b>
<b>Labor cost (LC)</b>		
Electronic ballasts, bulbs	(20/60) hours/fixture x 9 fixtures x \$10/hour	\$33
Specular reflectors	(10/60) hours/fixture x 15 fixtures x \$10/hour	\$25
<b>Subtotal, LC</b>		<b>\$58</b>
<b>Implementation cost (IC)</b>	<b>TMC + LC</b>	<b>\$568</b>

Note: Retrofitting the existing lighting system is required. It is estimated that it would take 30 minutes to retrofit each fluorescent fixture and 5 minutes to retrofit each incandescent fixture. It is recommended to remove 1 of the existing T8 fixtures, which will yield 2 bulbs and 1 ballast that can be reused in the proposed T8 fixtures recommended for installation elsewhere in the building.

**Table 7: Simple payback period**

	Calculation	Result
Payback period	IC / ECS	1.5 years

Even without making use of possible financial resources described at the end of this report, the annual cost savings would pay for the implementation cost in 1.5 years, after which the business would save approximately \$391 per year in energy costs.

## RECOMMENDATION 2: INSULATE THE CEILING OF THE FIRST FLOOR WITH FIBERGLASS BATTS.

### Recommended action

Insulate the ceiling of the first floor of the building garage area with 6", R-19 fiberglass batts.

The roof in the building is currently uninsulated and the second floor of the building is used only for long-term storage, so is infrequently occupied. Fiberglass insulation batts can be installed in the ceiling of the first floor as insulation, which will increase its thermal resistance value (R-value). This translates to a lower thermal conductance value (U-value) for the ceiling and can be expected to generate significant energy savings. Radiation effects are not considered in this recommendation.

**Table 8: Heating system information**

System no.	System type	Utilization factor (UF)	Efficiency (Eff)
1	Natural gas radiant tube heater	38%	95%
2	Natural gas radiant tube heater	38%	95%

**Table 9: Heating conditions**

Area of ceiling (A)	R-value current (R <sub>c</sub> )	R-value proposed (R <sub>p</sub> )	Degree heating hours (DHH)
2,750	2	21	74,929

DHH were obtained from <http://www.degreedays.net> for the building's location. DHH were calculated based on two different setpoints as the building's thermostat is currently setback in the evenings and other periods of non-use.

**Table 10: Anticipated savings**

Type of savings	Calculation	Savings
Energy savings	$(1/R_c - 1/R_p) \times A \times DHH \times UF/EFF/10^6$	37 MMBtu/year
Energy cost savings (ECS)	37 MMBtu/year $\times$ \$9.529/MMBtu	\$353 /year
Annual CO <sub>2</sub> savings	1 MMBtu saves 119 pounds of CO <sub>2</sub>	4,403 pounds/year

**Table 11: Implementation cost**

Type of cost	Calculation	Cost
Total material cost (TMC)	$A \times \$0.43/\text{ft}^2$	\$1,183
Labor cost (LC)	$A \times \$0.18/\text{ft}^2$	\$495
Implementation cost (IC)	TMC + LC	\$1,678

**Table 12: Simple payback period**

	Calculation	Result
Payback period	IC / ECS	4.8 years

Even without making use of possible financial resources described below, the annual cost savings would pay for the implementation cost in 4.8 years, after which the business would save approximately \$353 per year in energy costs.

## RECOMMENDATION 3: INSULATE THE WALLS OF THE FIRST FLOOR WITH SPRAY FOAM

### Recommended action

Insulate the walls of the first floor of the building with polyisocyanurate spray foam insulation of 1-inch thickness.

The walls in the building are currently uninsulated and the second floor of the building is used only for long-term storage, so is infrequently occupied. It is recommended that recommendations 2 and 3 be implemented together to maximize the effectiveness of both. Polyisocyanurate spray foam insulation of 1-inch thickness can be applied to the bare walls as insulation, which will increase its thermal resistance value (R-value). This translates to a lower thermal conductance value (U-value) for the ceiling and can be expected to generate significant energy savings. Radiation effects are not considered in this recommendation.

**Table 13: Heating system information**

System no.	System type	Utilization factor (UF)	Efficiency (Eff)
1	Natural gas radiant tube heater	38%	95%
2	Natural gas radiant tube heater	38%	95%

**Table 14: Heating conditions**

Area of walls (A)	R-value current ( $R_c$ )	R-value proposed ( $R_p$ )	Degree heating hours (DHH)
2,520	2	9	74,929

DHH were obtained from <http://www.degreedays.net> for the building's location. DHH were calculated based on two different setpoints as the building's thermostat is currently setback in the evenings and other periods of non-use.

**Table 15: Anticipated savings**

Type of savings	Calculation	Savings
Energy savings	$(1/R_c - 1/R_p) \times A \times DHH \times UF/EFF/10^6$	29 MMBtu/year
Energy cost savings (ECS)	29 MMBtu/year $\times$ \$9.529/MMBtu	\$276 /year
Annual CO <sub>2</sub> savings	1 MMBtu saves 119 pounds of CO <sub>2</sub>	3,451 pounds/year

**Table 16: Implementation cost**

Type of cost	Calculation	Cost
Total material cost (TMC)	$A \times \$1.00/\text{ft}^2$	\$2,520
Labor cost (LC)	$A \times \$0.5/\text{ft}^2$	\$1,260
Implementation cost (IC)	TMC + LC	\$3,780

**Table 17: Simple payback period**

	Calculation	Result
Payback period	IC / ECS	13.7 years

Even without making use of possible financial resources described below, the annual cost savings would pay for the implementation cost in 13.7 years, after which the business would save approximately \$276 per year in energy costs.

## **NEXT STEPS: FINANCIAL RESOURCES TO HELP PAY FOR YOUR RETROFITS AND REDUCE YOUR ENERGY COSTS**

The following resources may help you help finance your recommended energy retrofits and efficiency improvements. For further assistance, or to ask questions related to your energy assessment, contact the WVU Program Coordinator Kathleen Cullen, at (304) 293-2867 or [Kathleen.Cullen@mail.wvu.edu](mailto:Kathleen.Cullen@mail.wvu.edu).

### **United States Department of Agriculture (USDA), Rural Energy for America Program (REAP)**

USDA-REAP offers grants and guaranteed loans to help farmers, ranchers, and rural small businesses purchase renewable energy systems and make energy efficiency improvements. Eligible projects include improvements that reduce energy consumption. Grants range from \$2,500 to \$250,000, and cannot exceed 25% of total project costs. The maximum guaranteed loan is \$10 million, which may not exceed 50% of total project costs. An energy audit is required for all projects. For more information, contact Richard Satterfield at (304) 284-4874 or [Richard.Satterfield@wv.usda.gov](mailto:Richard.Satterfield@wv.usda.gov).

### **Natural Capital Investment Fund (NCIF), Small Business Energy Loan Program**

NCIF is a community development non-profit lender based in West Virginia that provides technical assistance and loans for energy efficiency improvements and renewable energy projects to small businesses. NCIF helps small businesses improve their efficiency and reduce operating costs by:

- Getting an energy assessment to find out how much energy is being wasted and how to reduce energy costs by purchasing new energy efficiency equipment or better insulation.
- Finding available resources to reduce the cost of energy efficiency uplifts in your area.
- Getting technical assistance to apply for cost share programs, energy rebates and financing.

Your energy loan may range from \$15,000 to \$250,000, depending on the project. NCIF is able to partner with traditional lenders, community development funds, and government credit-enhancement programs to participate in financings, which increases capital flow to energy projects. To learn more, visit [http://www.ncifund.org/small business energy loan program](http://www.ncifund.org/small_business_energy_loan_program), or contact Rita Cruise at (304) 250-0966 or [rcruise@conservationfund.org](mailto:rcruise@conservationfund.org).

### **Appalachian Power Company (APCo) Energy Saving Programs for West Virginia Business Customers**

This program helps business customers in the APCo service area generate energy savings through high efficiency lighting, HVAC, and motors. Projects must involve new facility improvements resulting in permanent reductions in electrical usage. Incentives vary depending on the type of efficiency improvement, with the maximum total rebate at \$150,000 per year. Check your electric bill to see if you are an ApCo customer. An equivalent program is not yet available for FirstEnergy customers. For more information, call (888) 446-7719, or visit <https://www.appalachianpower.com/save/programs/>.

### **Federal financial incentive: Energy-Efficient Commercial Buildings Tax Deduction**

This federal tax deduction applies to qualifying systems and buildings placed in service through December 31, 2013. A deduction of \$1.80 per square foot is available to owners (and possibly tenants) of new or existing buildings who install (1) interior lighting; (2) building envelope; or (3) heating, cooling, ventilation, or hot water systems that reduce the building's total energy and power cost by 50% or more. Deductions of \$0.60 per square foot are available to owners (and possibly tenants) of buildings in which individual lighting, building envelope, or heating and cooling systems meet target levels that would reasonably contribute to an overall building savings of 50% if additional systems were installed. Learn more by visiting <http://www.dsireusa.org/incentives/> and clicking on "See Federal Incentives."





## About Downstream Strategies



### Our perspective

Downstream Strategies offers environmental consulting services that combine sound interdisciplinary skills with a core belief in the importance of protecting the environment and linking economic development with natural resource stewardship.

### What we do

We have considerable background in environmental science and policy, Geographic Information Systems, field monitoring, watershed planning, chemistry, permitting, and acid mine drainage treatment design. Our skills also include environmental economics and survey design and execution. We have an established track record of managing successful projects from inception to completion.



### What we offer

- Case studies
- Curricula development
- Economic analyses
- Education and outreach
- Energy audits
- Expert testimony
- Feasibility analyses
- Field monitoring
- Geo- and database development
- Grant writing
- Interviews and surveys
- Litigation support
- Mapping and custom cartography
- Modeling and visualization
- Permitting and mitigation
- Planning, visioning, and facilitation
- Policy analyses
- Programmatic reviews
- Project development
- Project management
- Scenario development
- Scientific research
- Spatial analyses
- Stakeholder involvement
- Training and technical assistance
- Vulnerability analyses

# Tools



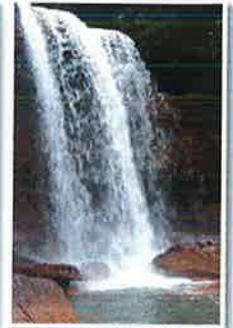
## Geographic Information Systems

Geographic Information Systems (GIS) are invaluable tools for storing, analyzing, and understanding location-based information. Our team offers extensive GIS expertise, including water quality modeling, natural resource management, policy analyses, and environmental research. We offer a full suite of GIS tools to support analyses, planning, monitoring, and decision-making.



## Stakeholder involvement and perspectives

We provide a wide array of techniques to foster involvement and include perspectives of citizens and stakeholders to enhance planning, policy development, and decision-making. We offer expertise in social science research, as well as planning, visioning, facilitation, education, and interpretation. We offer interviews, surveys, and case studies.



# Programs

## Water

Our team catalogs current conditions, links policy and management options with scientific data, and writes detailed plans. We also perform economic and policy analyses, provide expert testimony and litigation support, and conduct field monitoring. We arm our clients with the technical expertise needed to improve and protect water resources.

## Energy

Our team analyzes energy markets and the impacts of energy development on economies and the environment. We support strategic approaches to energy and climate change by developing plans, policies, and projects that are grounded in economic and policy analyses. We also assist communities and individuals in developing local energy and economic transition strategies.

## Land

Our team offers expertise in land-based issues ranging from rural economies to food systems. Our services include land use planning, food system assessments, and economic and policy analyses for a variety of issues related to agricultural science and policy, energy, and food systems.

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**Downstream  
Strategies**

building capacity for sustainability



# Energy Program

Downstream Strategies analyzes energy markets and the impacts of energy development on economies and the environment. We support strategic approaches to energy and climate change by developing plans, policies, and projects that are grounded in economic and policy analyses. We also assist communities and individuals in developing local energy and economic transition strategies.

### Energy and climate planning and analyses

Our team develops energy scenarios for alternative energy futures and assesses renewable energy and energy efficiency opportunities. We:

- Calculate potential costs of energy development
- Conduct feasibility studies for distributed energy systems
- Review policy to understand state and regional issues such as market barriers and energy policies
- Create energy scenarios and greenhouse gas inventories
- Perform cost benefit analyses of alternative carbon reduction and climate mitigation strategies
- Conduct lifecycle and sustainability assessments

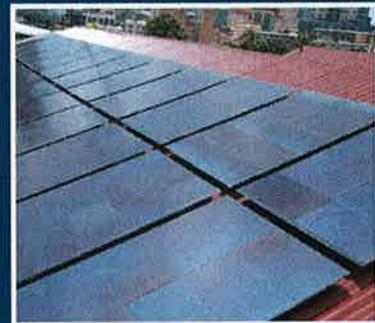


### Our perspective

Downstream Strategies offers environmental consulting services that combine sound interdisciplinary skills with a core belief in the importance of protecting the environment and linking economic development with natural resource stewardship.

### What we offer

- Economic and policy analyses
- Energy planning and analyses
- Economic diversification and transition
- Climate policy and mitigation strategies
- Renewable energy and energy efficiency project development
- Geographic Information Systems
- Stakeholder involvement and perspectives



TO INFORM OUR RESEARCH,  
WE TAP INTO OUR NETWORK OF  
GRASSROOTS ORGANIZATIONS,  
ACADEMICS, LOCAL AND STATE  
OFFICIALS, AND NATIONAL LEADERS.

# Tools



## Geographic Information Systems

Geographic Information Systems (GIS) are invaluable tools for storing, analyzing, and understanding location-based information. Our team offers extensive GIS expertise, including water quality modeling, natural resource management, policy analyses, and environmental research. We offer a full suite of GIS tools to support analyses, planning, monitoring, and decision-making.



## Stakeholder involvement and perspectives

We provide a wide array of techniques to foster involvement and include perspectives of citizens and stakeholders to enhance planning, policy development, and decision-making. We offer expertise in social science research, as well as planning, visioning, facilitation, education, and interpretation. We offer interviews, surveys, and case studies.

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## Economic diversification and transition support

Appalachia's renewable energy resources, manufacturing centers, and labor skills can drive a transition to "green" jobs that can help improve rural poverty and public health. We:

- Identify economic transition opportunities
- Examine barriers to economic and energy development
- Identify approaches with the greatest potential for economic diversification and greenhouse gas reductions
- Conduct economic benefits analyses for specific projects or development strategies
- Develop plans for existing industries that address human health and environmental goals
- Analyze incentives and investment structures to help policymakers implement economic transition strategies

## Economic and policy analyses

Our team assesses energy markets and barriers to energy development. We analyze the economic and environmental impacts of existing and potential energy development, help develop energy-related policy, conduct economic and fiscal policy studies, and provide expert testimony.

## Project development for energy efficiency and renewable energy

With our expertise in a range of renewable energy technologies, our team works with engineers and venture capitalists to develop on-the-ground projects. Using GIS and other decision-support tools, we perform site-selection analyses and create conceptual designs for renewable energy facilities. We conduct feasibility and economic benefits studies and analyze strategic and creative financing options. We also conduct energy audits.

**Downstream  
Strategies**

building capacity for sustainability