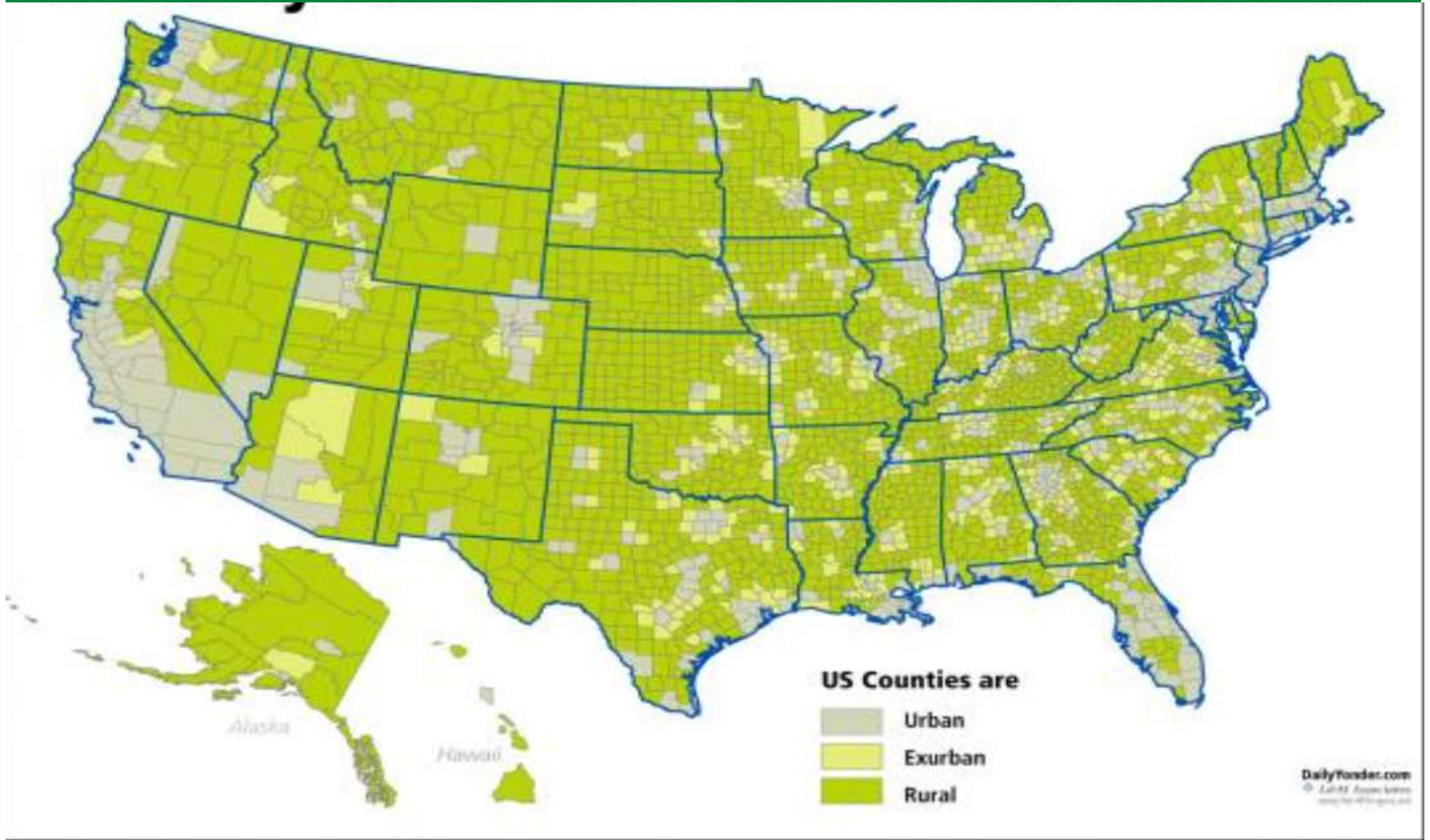




Energy Outreach and Technical Assistance in Rural Communities

Geoff Bristow
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PA DEP
February 8, 2018

Rural Energy



Rural Energy – Challenges

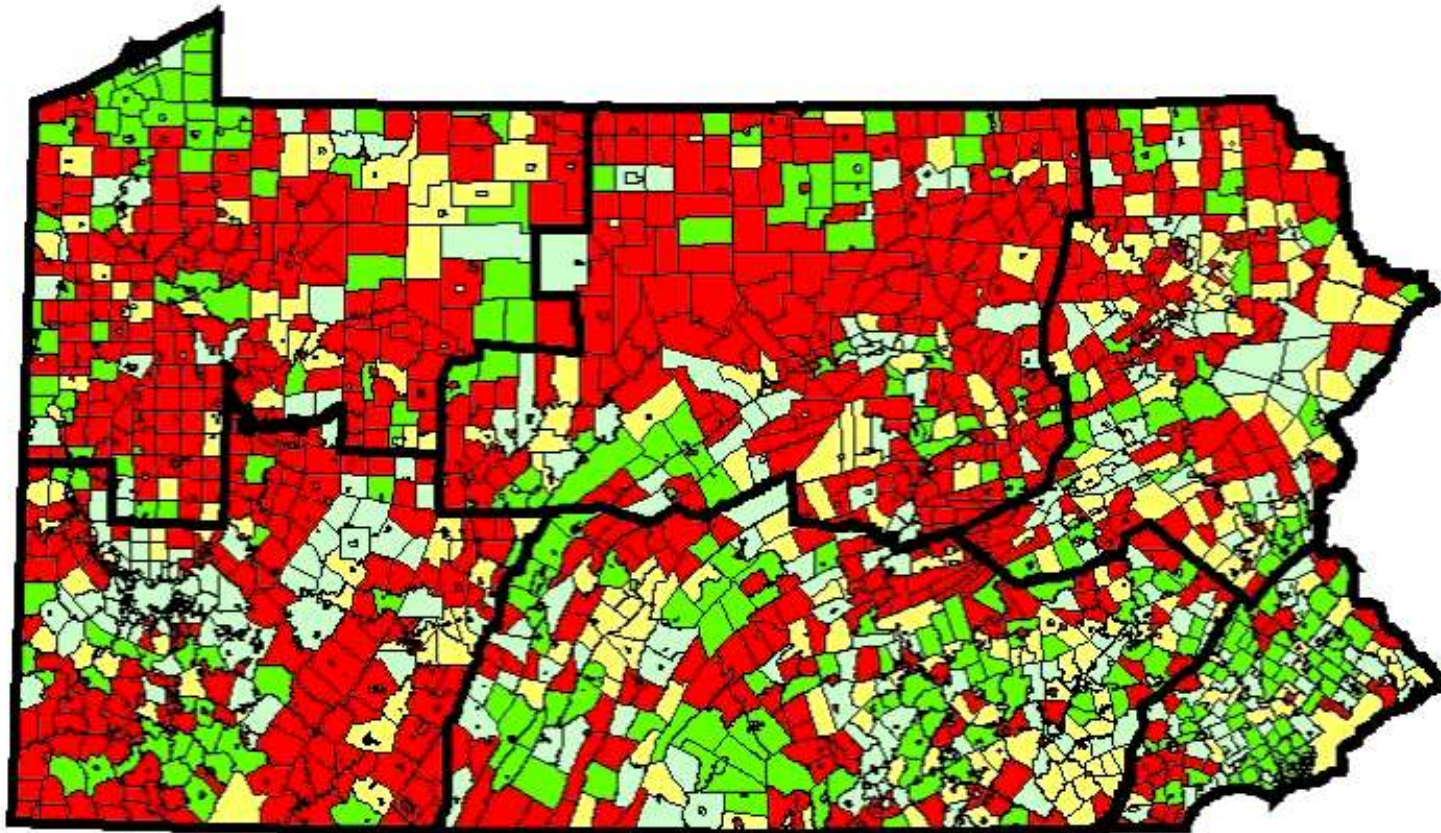
- Challenges to rural energy management
 - Aging infrastructure
 - Multiple priorities
 - Low/No economic growth



Rural Energy – Sector Approach



Rural Energy – Municipal Sector



Pennsylvania: 2,561 municipalities & 4,897 units of local government

CAMBRIDGE SPRINGS ELECTRIC

	DEC '15	JAN '16	FEB '16	MAR '16	APR '16	MAY '16	JUN '16	JUL '16	AUG '16	SEP '16	OCT '16	NOV '16	TOTAL
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Sewer Plant

Grant Street

METER #S55033874

PRESENT READING KWH	59,483		59,951	60,188	60,450	60,735	61,051	61,426	61,746	62,081	62,362	62,653	
KV	41,400		34,650		39,300	42,750	47,400	56,250	48,000	50,250	42,150	43,650	
COST	\$2,387.71	\$3,492.65	\$2,111.34	\$2,156.66	\$2,330.84	\$2,688.73	\$2,929.98	\$3,473.25	\$2,983.10	\$3,260.34	\$2,882.55	\$2,981.29	\$33,678.44

New Water Plant

Snow Alley

METER #G17852443

PRESENT READING KWH		16,561	16,834	17,144	17,419	17,707	17,966		18,562	18,870	19,138	19,422	
KV		25,152	26,208	29,760	26,400	27,648	24,864		25,920	29,568	25,728	27,264	
COST	\$2,335.06	\$2,320.28	\$2,365.15	\$2,570.56	\$2,281.25	\$2,306.73	\$2,152.82	\$2,518.98	\$2,239.40	\$2,442.26	\$2,270.91	\$2,331.60	\$28,135.00

Street Lighting

26 Federal Street

146 - HPSV 100w

1 - HPSV 70w

3 - HPSV 100w

8 - HPSV 150w

COST	\$1,285.51	\$1,283.52	\$1,282.85	\$1,282.85	\$1,282.85	\$1,282.85	\$1,282.85	\$1,282.85	\$1,282.61	\$1,282.60	\$1,282.60	\$1,282.60	\$15,396.54
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Boro Office

161 Drake Ave. / Carringer St.

METER #G21258524

PRESENT READING KWH		18,996	21,240	23,318	24,856	27,003	29,935		35,863	37,407	39,369	42,191	
KV		2,105	2,244	2,078	1,538	2,147	2,932		2,326	1,544	1,962	2,822	
COST	\$283.85	\$253.97	\$224.86	\$213.39	\$158.25	\$273.90	\$303.85	\$350.98	\$269.46	\$209.46	\$202.48	\$253.31	\$2,997.76

Meter at Tower

South Main Street

METER #S50997738

TOTAL KWH	49,366	51,682	54,237	56,882	58,831	60,724	62,714		67,038	68,743	70,566	72,323	
KV	2,470	2,316	2,555	2,645	1,949	1,893	1,990		2,152	1,705	1,823	1,757	
COST	\$235.50	\$231.21	\$294.02	\$245.61	\$213.06	\$249.55	\$205.96	\$214.35	\$264.57	\$181.84	\$191.81	\$196.80	\$2,724.28

Fire Department

302 Venango Avenue

METER #G21022222

PRESENT READING KWH	72,040	73,710	75,049	76,271	77,234	78,287	79,551	81,633	82,908	84,017	85,336	86,575	
KV	1,461	1,670	1,339	1,222	963	1,053	1,264	2,082	1,275	1,109	1,319	1,239	
COST	\$124.56	\$144.81	\$118.12	\$106.45	\$85.33	\$93.96	\$109.87	\$178.15	\$110.75	\$97.22	\$115.78	\$107.81	\$1,392.81

Rural Energy - Municipal

Example – Sewage Treatment Plant

- Ridgway Borough, Elk County
 - Energy assessment
 - Identified potential projects
 - Implemented “de-nitrification”



- \$650 capital investment
- \$14,000/yr electric savings
- \$17,000/yr chemical savings

Rural Energy - Municipal

Example – LED Street Lights

- Kane Borough, McKean County
 - Borough-wide utility bill analysis
 - 344 MV/HPS street lights
 - Street light rate calculator



- \$0 capital investment
- 200,000 kWh/yr reduction
- \$21,500/yr bill savings



Rate Calculator



FIXTURE TYPE	NEW FIXTURES				NEW ENERGY USAGE			NEW DISTRIBUTION CHARGES		ADDITIONAL CHARGES						NEW TOTAL BILL (BEFORE SUBSIDY)					
	Fixture Type	Tariff Schedule Number	Fixture Wattage	# of Fixtures	kWh per Fixture		Total kWh per Billing Period	Distribution Charge per Unit per Billing Period	Total Distribution Charge per Billing Period	Total Generation Charge per Billing Period			Total Energy Efficiency Charge (Phase II) per Billing Period			Total Bill per Billing Period					
	(from bill)	(from tariff schedule)	(from bill)	(from bill)	(from bill)		(= E x G)	(from "Fixture Information" Tab)	(= E x N)	Total kWh for Billing Period	Generation Rate	Total Price to Compare	Total kWh for Billing Period	Multiplier	Total Energy Eff. Charge	(from bill)					
Mercury Vapor (MV)	8150L MV Cobra	57	175	()	x	74) = 0	\$8.81	\$0.00	0	x	\$0.04430	=	\$0.00	0	x	\$0.00145	=	\$0.00	0	
	11500L MV	51	250	()	x	103	) = 0	\$11.48	\$0.00											
	21500L MV	51	400	()	x	162	) = 0	\$14.11	\$0.00											
		52	400	()	x	162	) = 0	\$14.62	\$0.00											
	60000L MV	51	1,000	()	x	386	) = 0	\$21.87	\$0.00											
				TOTAL:	0		TOTAL:	0	TOTAL:	\$0.00											
Sodium Vapor (SV)	9500L SV	52	100	()	x	51) = 0	\$10.72	\$0.00	0	x	\$0.04430	=	\$0.00	0	x	\$0.00145	=	\$0.00	0	
		54	100	()	x	51	) = 0	\$10.12	\$0.00											
	9500L SV Cobra	57	100	()	x	51	) = 0	\$10.71	\$0.00											
		59	100	()	x	51	) = 0	\$10.39	\$0.00											
	22000L SV	53	200	()	x	86	) = 0	\$18.66	\$0.00											
		54	200	()	x	86	) = 0	\$13.69	\$0.00											
	22000L SV Cobra	57	200	()	x	86	) = 0	\$14.26	\$0.00											
		53	400	()	x	167	) = 0	\$21.75	\$0.00											
	50000L SV	54	400	()	x	167	) = 0	\$20.03	\$0.00											
				TOTAL:	0		TOTAL:	0	TOTAL:	\$0.00											
LED	Cobra	72	50	(188)	x	18) = 3,384	\$5.52	\$1,037.76	8248	x	\$0.04430	=	\$365.39	8248	x	\$0.00145	=	\$11.96	\$2,482.36	
	Colonial	72	50	()	x	18	) = 0	\$8.85	\$0.00											
	Acorn	72	50	()	x	18	) = 0	\$14.73	\$0.00											
	Cobra	72	90	(152)	x	32	) = 4,864	\$6.94	\$1,054.88											
		Colonial	72	90	()	x	32) = 0	\$9.74												\$0.00
	Acorn	72	90	()	x	32	) = 0	\$15.57	\$0.00											
	Cobra	72	130	()	x	46	) = 0	\$7.38	\$0.00											
	Cobra	72	260	()	x	91	) = 0	\$11.44	\$0.00											
				TOTAL:	340		TOTAL:	8,248	TOTAL:	\$2,092.64											
GRAND TOTALS				340			8,248		\$2,092.64					\$365.39					\$11.96	\$2,482.36	

Rural Energy – Other Sectors

- Commercial/Institutional
 - HVAC, building envelope, lighting
- Industrial/Manufacturing
 - Process heat, boilers, steam, compressors, pump systems
- Transportation
 - Aging fleets, access to alternative fueling infrastructure
- Residential
 - Weatherization, access to cleaner & cheaper fuels
- Agriculture
 - Vacuum systems, lighting, drying, digesters
 - Biomass energy opportunities

Rural Energy – Biomass

- Biomass thermal/CHP
 - Woody biomass
 - Low value forest thinnings/residue
 - Wood products residuals
- Digesters (biogas)
- Potential policy positions
 - RPS considerations
 - Level playing field with other renewables
 - High capacity factor
 - Carbon reduction (varies by source)
 - Substantial economic development



Biomass Boiler System





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