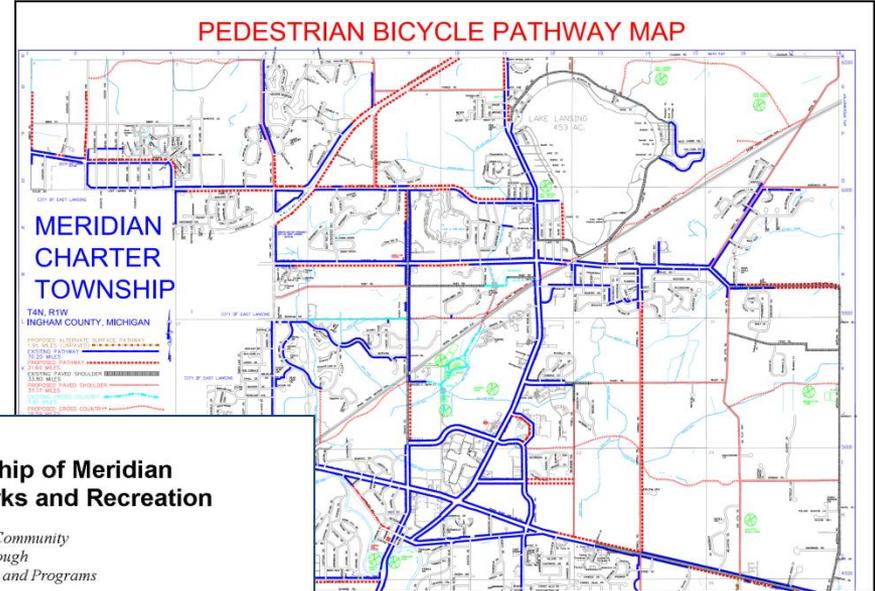


Moving toward a

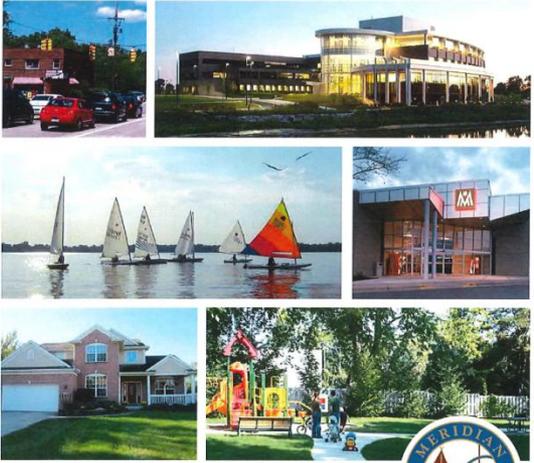
Sustainability & Climate Action Plan



Greenspace Plan



Master Plan 2016



MERIDIAN TOWNSHIP · MICHIGAN



Charter Township of Meridian Department of Parks and Recreation

*Creating Community
Through
People, Parks, and Programs*



www.meridian.mi.us



A Sustainability & Climate Action Plan can...

- provide a framework and blueprint for continuing and expanding these initiatives
- shed light on energy, water, climate, & waste (often invisible and overlooked – but with significant impact on our economy, environment, and quality of life)
- help nurture a culture of energy efficiency and environmental stewardship/appreciation

The Meridian Energy Team...

- Is interested in the connections between energy and sustainability,
- sees opportunities to improve our health, well-being, environment, and economy by reducing waste and reducing dependence on fossil fuels,
- welcomes your help (and is sharing what we're learning),
- is looking for ideas and guidance to create and implement a Sustainability and Climate Action Plan

Annual Energy Expenditures in Meridian

- \$100,000,000 (annually twp wide)
- \$350,000 annually on streetlighting
- \$300,000 on electricity and natural gas – buildings and pumps
- \$100,000 on fuel (vehicles)
- ~5000 metric tons of CO₂ annually
(not including embodied energy in materials and waste disposal/recycling)

History

- 2007: Energy Team created
- 2007: Meridian joined 1060 communities in signing the [U.S. Mayors Climate Protection Agreement](#) (30 Mayors/Managers in MI)
- 2009: Energy Strategy Developed – EECBG Grant
- 2010: Technical Energy Assessments
- 2011-12: Phase 1 Energy Improvements & Demonstration Projects
- 2012-15: Mid-MI Program for Greater Sustainability & Sustainability Assessment, Sustaining our Future Series, Demonstration Projects & more.
- 2014: Phase II Energy Assessments
- 2015: Parking Lot Lighting, Fire Station Improvements, Community Solar/Solar Garden Research
- 2016: Sustainable Home Tours, Sustainability & Climate Action Plan, Master Plan Input, MI Green Communities Climate Work Group, Benchmarking Initiative with Consumers, etc.

More at <http://recycle.meridian.mi.us/energy/>

Phase 1 Energy Improvements

Energy Efficiency Retrofit Priorities

Building Code*	1 MB	2 PS	3 SC	4 NF	5 CF	6 SF	7 MAC	8 ST	9 HNC
T-8s				✓	✓	✓	✓		
High Bay/Low Bay			✓	✓	✓	✓			
Water heater Tank and pipe ins		✓		✓	✓	✓	✓	✓	
Timer for Water Circ. Pump	✓		✓						
Tune/Calibrate Htg. and ventilating	✓	✓	✓	✓		✓	✓	✓	✓
High eff. Boiler	✓	✓							
Variable speed drives	✓		✓						
Hi efficiency furnace replace				✓		✓	✓		
Control pop machine energy use	✓	✓	✓						
Occupancy Sensors									✓
Solar Demonstration									✓
Other ECMs									✓

***Building Code**

1. Municipal Bldg.
2. Public Safety
3. Service Center
4. North Fire
5. Central Fire
6. South Fire
7. MAC
8. Snell/Towar Rec. Ctr.
9. Harris Nature Ctr.

Energy Savings

- \$256 K over 6 years
- Equivalent to about one years' energy bill (pumps and buildings)
- 80% of estimated savings (conservative estimate) returned to a **Revolving Energy Fund**

In adapting to Climate Change...

local governments are leading by example



Climate Action Plans

-complete(11) or in the works(2)

- Ann Arbor
- Dearborn
- Detroit
- East Lansing
- Farmington Hills
- Grand Rapids
- Hazel Park
- Holland
- Meridian Twp
- Northport
- Southgate
- Traverse City
- Ypsilanti

www.miclimateaction.org/michigan_cities_taking_action_on_climate

Community	Date of Plan	Energy or Climate Goal
City of Ann Arbor <i>Climate Action Plan</i>	July 2012	90% GHG reduction by 2050
City of Dearborn <i>Initial Climate Action Plan</i>	August 2012	10% GHG reduction by 2015
City of Detroit <i>Climate Action Plan</i>	Plan in Development	80% GHG reduction by 2050
City of Grand Rapids <i>Sustainability Plan and Report</i>	April 2013	100% Renewables by 2025
City of Hazel Park <i>Energy Action Plan</i>	September 2012	50% GHG reduction by 2050
City of Southgate <i>Climate Action Plan</i>	September 2012	50% GHG reduction by 2050
City of Traverse City <i>Climate Action Plan</i>	February 2011	25% GHG reduction by 2012
City of Ypsilanti <i>Climate Action Plan</i>	July 2012	50% GHG reduction by 2050
Meridian Township	Plan in Development	
Plans Related to Climate Action and Renewable Energy		
City of Holland <i>Community Energy Plan</i>	September 2011	
City of East Lansing <i>Climate Sustainability Plan</i>	April 2012	
City of Farmington Hills <i>2020 Vision</i>	October 2011	
Northport Village	U/M <i>Feasibility Study</i> , April 2016	100% Renewables

Climate Action by Michigan Colleges & Military Bases

At least seven of Michigan's colleges and universities – some the size of small cities – have set clean energy or climate goals. The Army National Guard has set a goal for Michigan's Camp Grayling base to be its first base to achieve net zero energy use (and water use and waste production), with similar goals for Fort Custer and Selfridge Air Base.

Colleges and Universities

Albion College	October 2009	Carbon neutrality by 2035
Climate Action Plan		
Grand Valley State University	January 2012	80% GHG reduction by 2050
Climate Action Plan		
Kalamazoo College	January 2010	25% GHG reduction by 2020
Sustainability and Climate Action Plan		
Michigan State University	January 2012	60% GHG reduction by 2030 and 100% clean energy transition
Energy Transition Plan		
University of Michigan	April 2011	25% GHG reduction by 2025
Ann Arbor Climate Action Plan and Sustainability Goals		
Wayne State University	September 2010	Carbon neutrality by 2030
Strategic Energy Plan		
Western Michigan University	April 2012	Climate neutrality by 2065
Climate Action Plan		

Military Bases

Michigan Army National Guard	June 2016	Camp Grayling Net Zero Energy by 2017 (100% RE)
Fort Custer, Camp Grayling, and Selfridge Air Bases		

THE POWER OF COMMITMENT

350
FACILITIES

IN

59
COUNTRIES

100% RENEWABLE
ENERGY

BY 2050



GENERAL MOTORS

Climate Adaptation & Resiliency Plans

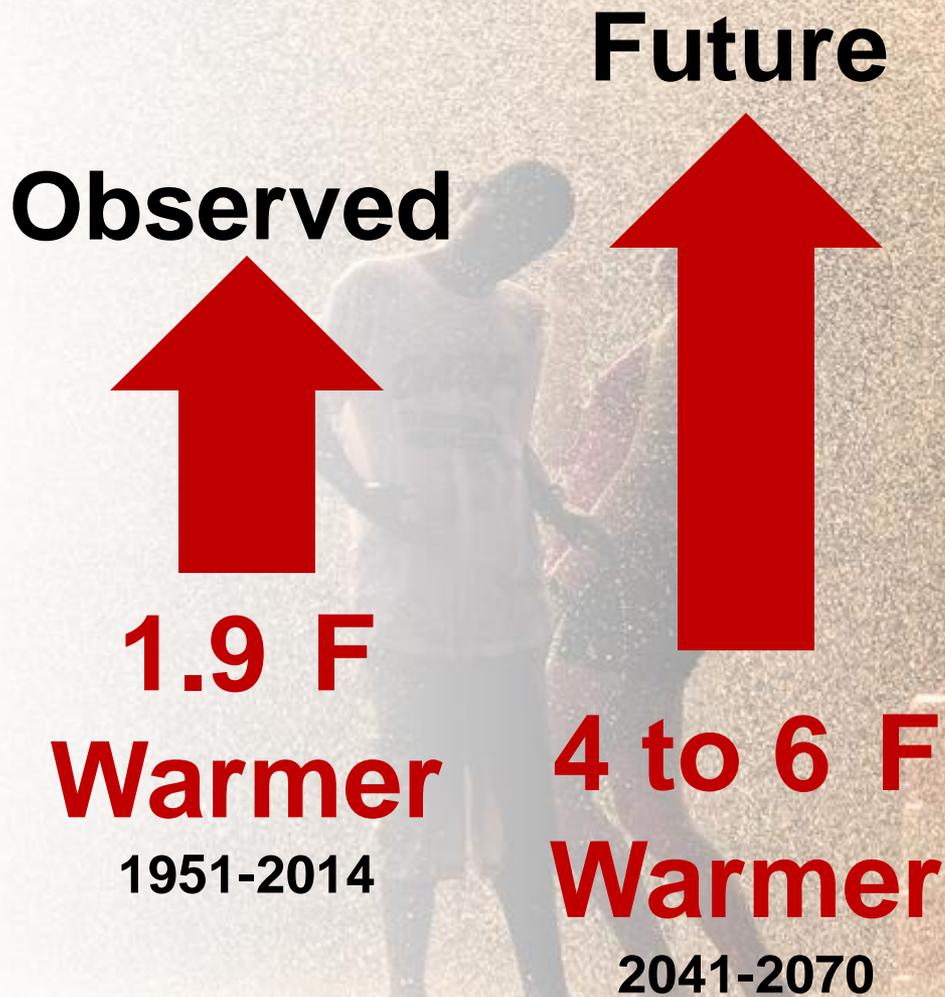
A number of communities in Michigan have developed adaptation or resiliency plans to help prepare for the impacts of climate change, like more intense storms and heat waves. These plans do not address reducing communities' GHG emissions, but that could be the next step.

Community	Plan
Alger County	Climate Adaptation and Mitigation Plan
Cities of Benton Harbor and St. Joseph	Adapting to Climate Change and Variability and Resilient St. Joseph
City of Grand Haven and Grand Haven Charter Township	Resilient Grand Haven
City of Grand Rapids	Climate Resiliency Report
City of East Jordan	Resilient East Jordan
City of Ludington	City of Ludington Master Plan
City of Holland	Resilient Grand Haven
Macomb County, City of St. Clair Shores	Resilient Macomb/St. Clair
Marquette County	Lake Superior Climate Adaptation, Mitigation, and Implementation Plan
Monroe County	Resilient Monroe
Muskegon County	Muskegon County Sustainability Plan
Peaine and St. James Townships	Resilient Beaver Island

Alger Co
Benton Harbor
East Jordan
Grand Haven
Gr. Haven Twp
Grand Rapids
Holland
Ludington
Macomb Co
Marquette Co
Monroe Co
Peaine Twp
St. Clair Shores
St. James Twp
St. Joseph

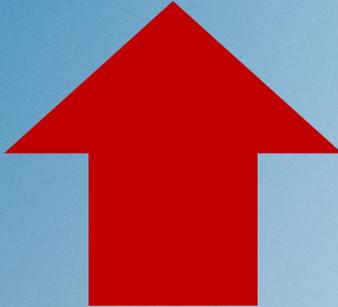
www.miclimateaction.org/michigan_cities_taking_action_on_climate

Rising Temperatures Are One Concern



Source: GLISA and Third National Climate Assessment

Winters are warming faster



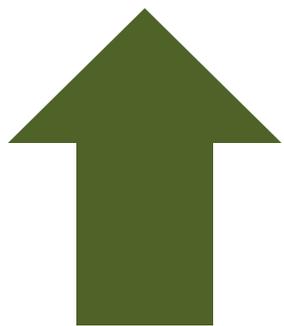
**1.9°F increase
averaged over
the entire year**



**3.2°F increase
during winter
(December – February)**

A Longer Freeze-free Season

Observed



11 Days

Longer

1951-2014

Future



30 to 70 Days

Longer

2070-2099

Observed changes
due mostly to **earlier**
last winter freeze

More Precipitation

**Total annual precipitation
has increased by:**

8.9%

**Not even across the state.
Has increased most in SE
MI (+17%). Decreased over
the Western UP (-6%)**



Precipitation Impacts: Seasonal Changes and Water Supply



Changing Seasonal Precipitation:

Warmer springs and more precipitation increase the potential for mixed precipitation and variable spring weather.



Summer Water Availability:

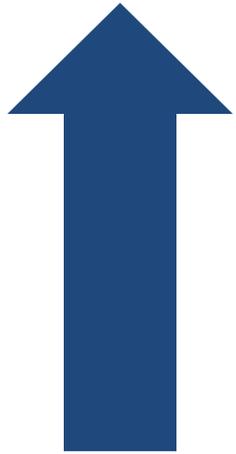
Even as annual total precipitation increases, summers may become drier.

More Problem Precipitation

1.25-inch
Precipitation Days:

25%

***Nuisance flooding and
minor damages are
reported more frequently
after these events***



Extreme Heat and Humidity



By mid-century, models project Michigan could see:



90°F Days

10-50 more days per year



95°F Days

5 to 20 more days per year

The Sustainability & Climate Action Plan...

Categories...

- Energy Efficiency
- Renewable Energy
- Recycling & Waste Reduction
- Transportation
- Water Management

Energy Efficiency

Objectives

- Complete energy conservation measures
- Explore other opportunities and partnerships
- Inform citizens and businesses about energy opportunities

Objective a.1: Complete Phase II Energy Recommendations and HVAC Engineering Study

Strategies:

- Review list of Energy Conservation Measures (ECMs) in summary above
- Review Recent Engineering Study/Capital Improvement Plans
- Include major HVAC upgrades in Capital Improvement Plans
- Seek bids on ECMs
- Hire contractor(s) to do work not performed in-house
- Monitor savings and return 80% of savings to Revolving Energy Fund

Phase II Energy Improvements

		Cost	Savings	Savings kWh/Yr	Rebate	ROI (Yr)	
	ECM*	Est. (\$)	Est. (\$/Yr)		Est. (\$)		Bid?
MU.BLDG	Energy Recovery Ventilation	\$14,000	\$3,129.37	8,887	\$750	4.2	pending study (1)
MU.BLDG	Condensing Boilers	\$18,000	\$2,407.00	0	\$1,240	7.5	pending study
MU.BLDG	Air Handler VFDs	\$8,000	\$1,235.52	11,232	\$600	6	pending study
P.SAFETY	Recommissioning for Gas	\$1,500	\$688.75	0	0	2.2	yes
P.SAFETY	Energy Recovery Ventilation	\$9,000	\$1,728.48	3,863	\$725	4.8	pending study
SERVICE	Exhaust Fan Timer	\$500	\$1,022.87	2,464	0	0.5	?
SERVICE	Pump Timer	\$150	\$60.39	549	\$44	1.8	?
SERVICE	Beverage Machine Timer	\$150	\$66.00	600	\$65	1.3	?
S.FIRE	28W T8	\$420	\$85.88	685.3	\$53	4.3	yes
S.FIRE	Incandescent to CFL	\$38	\$12.34	94	\$8	2.4	yes
S.FIRE	Wallpack/Sign LED	\$1,200	\$313.46	2,730	\$272	3	yes
S.FIRE	Pole Induction	\$1,100	\$174.40	1525.7	\$152	5.4	yes
N.FIRE	Insulate Ductwork	\$200	\$66.56	272	\$60	2.1	yes
N.FIRE	95% AFUE Furnaces	\$9,000	\$780.70	900	\$540	10.8	yes
N.FIRE	Occupancy Sensors	\$915	\$301.97	2,745	\$175	2.5	yes
N.FIRE	8ftT12HO to T8HO	\$305	\$154.27	1,139	\$78	1.5	yes
N.FIRE	28W T8	\$833	\$121.34	969.4	\$74	6.3	yes
N.FIRE	High Bay Induction	\$1,650	\$299.63	2,497	\$200	4.8	yes
HARRIS	Occupancy Sensors	\$340	\$72.46	510.3	\$100	3.3	yes
HARRIS	HID to Induction	\$1,625	\$272.26	1,847	\$184	5.3	yes

Renewable Energy

- Develop policies and procedures that encourage the use of renewable energy
- Increase the use of renewable energy in Township facilities
- Educate the community about renewable energy
- Encourage and promote the installation of renewable energy systems
- Monitor savings and environmental benefits

Lansing Area Virtual Solar Tour



Saturday, October 1, 2016 2–4pm
Meridian Township Hall Room
5151 Marsh Road, Okemos MI 48864

Recycling & Waste Reduction

- Increase residential recycling rates
(in single and multi-family households)
- Offer recycling events
- Educate about the 5 Rs
(refuse, reduce, reuse, repurpose, and recycle)

Carts

INCREASED RECOVERY.

Programs using carts, common suite of materials, strong outreach and other BMPs can recover 400-450 lbs/hh/yr.

**400-450
LBS. PER
HOUSEHOLD
PER YEAR**



MORE CONVENIENCE.

Residents can more easily fit all of their recyclables into one container, then simply roll those items to the curb.



Transportation

- Encourage employee and citizen participation in Smart Commuting
- Decrease use of fuel in Twp. vehicle fleet
- Use land-use planning to reduce vehicle miles traveled
- Educate about transportation alternatives
- Monitor energy and cost savings and eco-benefits

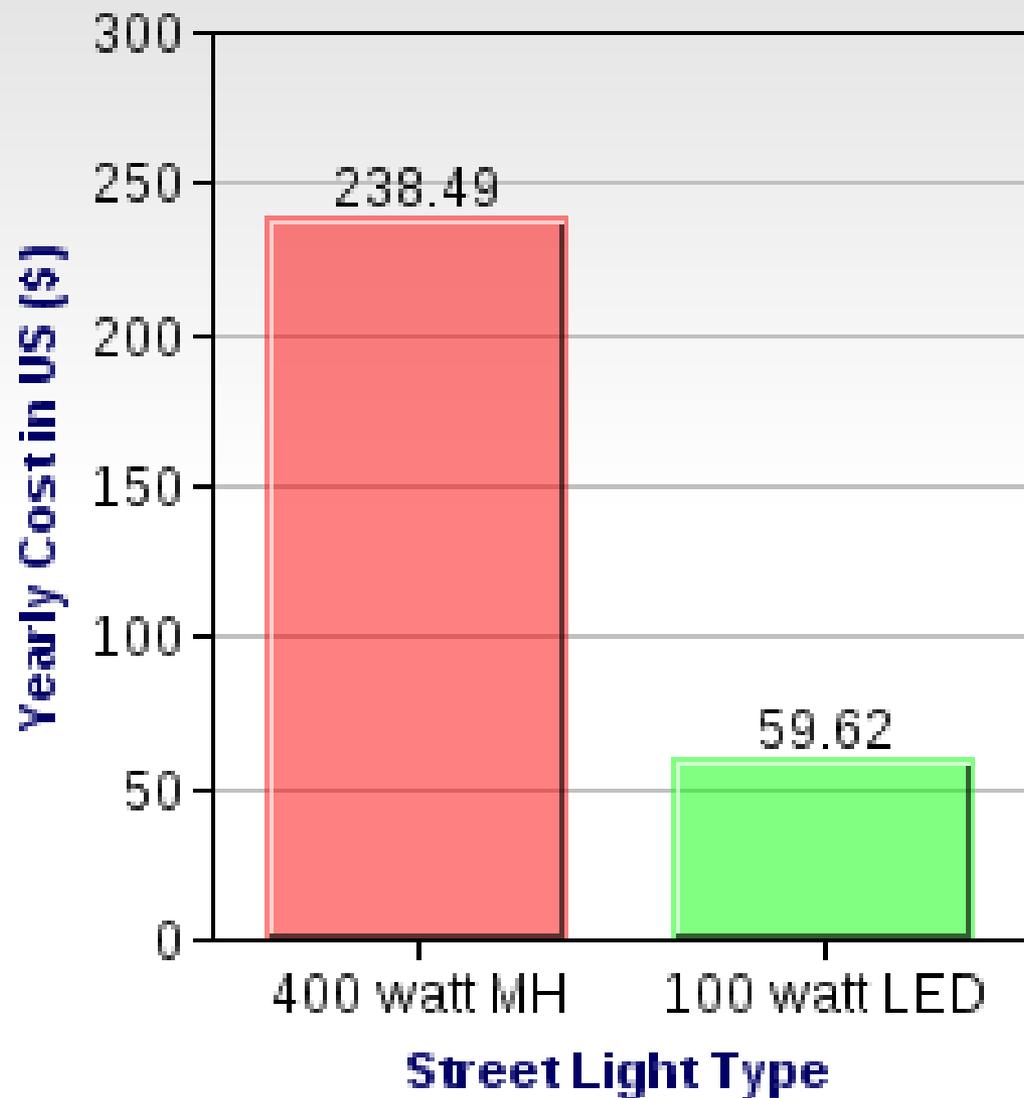


Water

- Decrease water usage in Twp. facilities
- Reduce storm water runoff
- Educate about water conservation
- Monitor water and cost savings
- Explore water efficiency improvements in Meridian's water supply and sewage treatments systems



Yearly Cost of Energy - Street Light



Next Steps & Discussion

- View the plan <http://recycle.meridian.mi.us/energy/plan>
- Provide suggestions
- Michigan Green Communities Peer review Dec 22
- Continue to learn, share, and act. More at <http://recycle.meridian.mi.us/energy>
- Other....

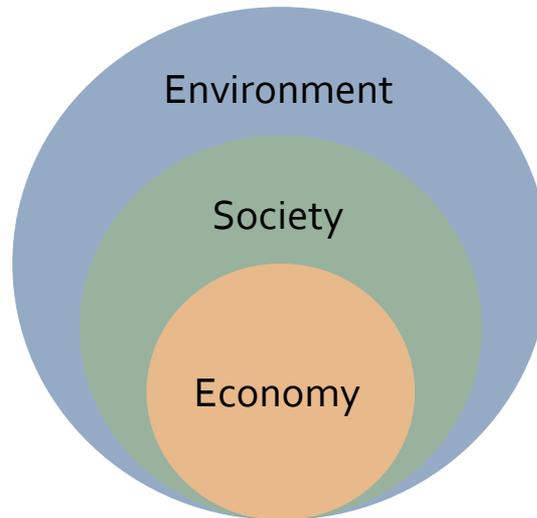
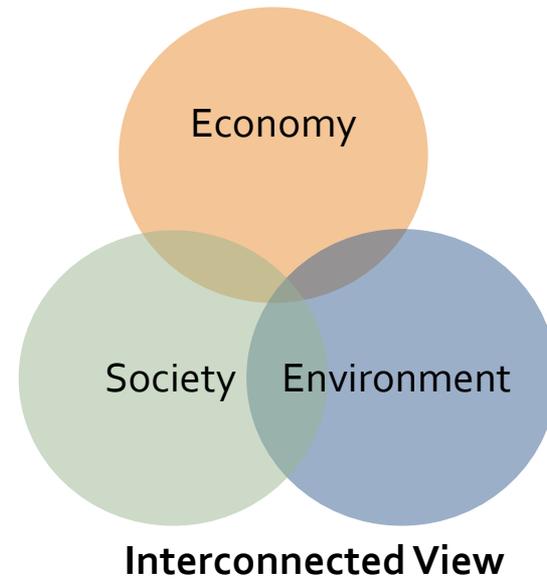
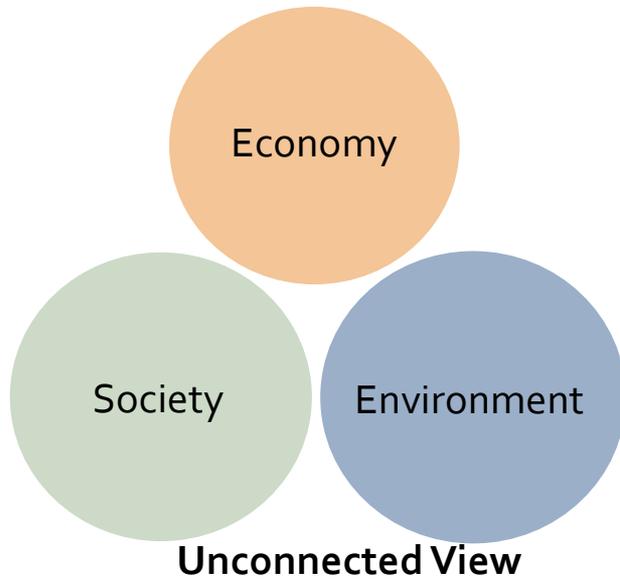
Questions and Suggestions?

*Please contact LeRoy Harvey at
harvey@meridian.mi.us or (517) 853-4466*

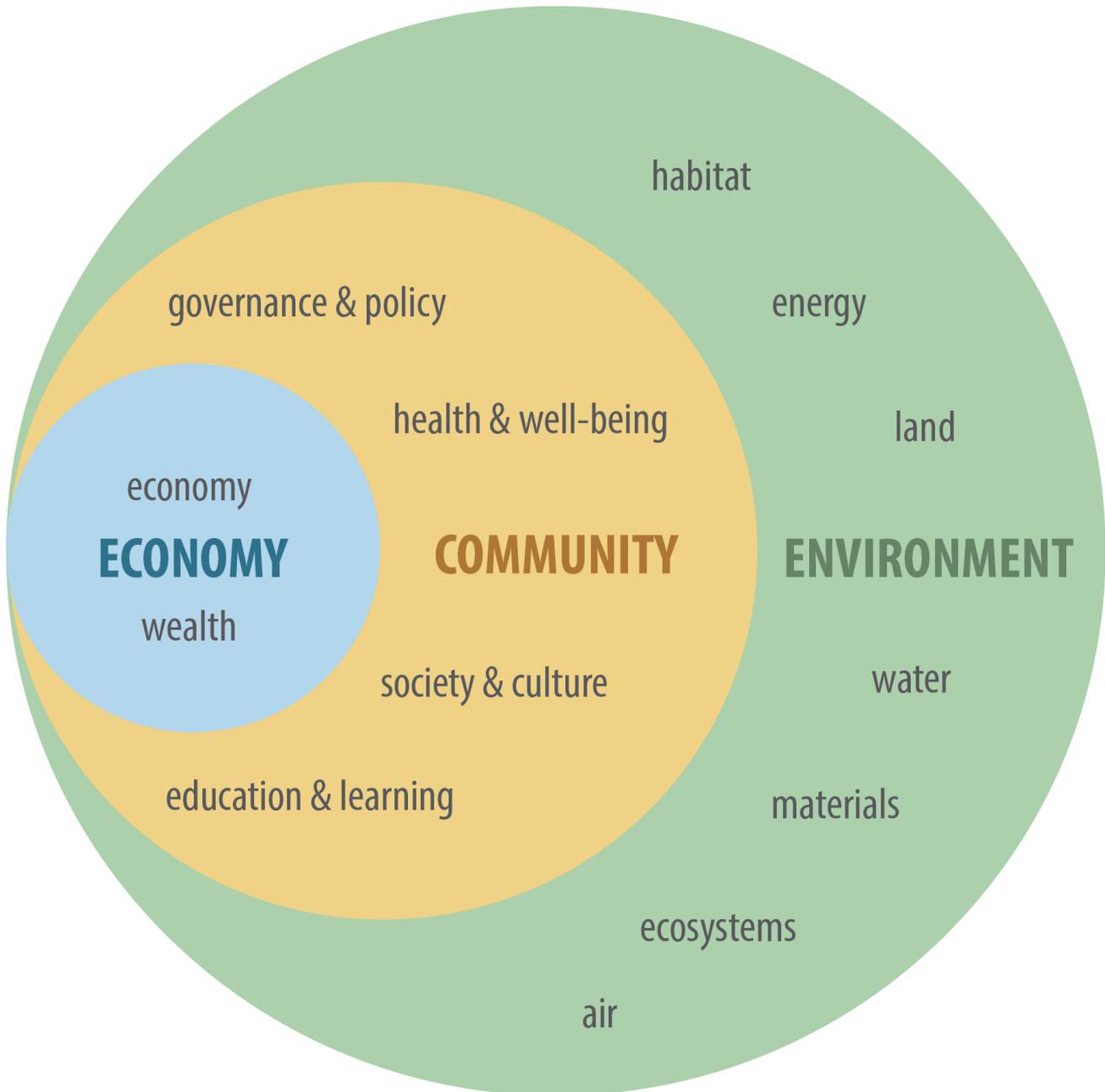
Sources & Resources

- Plan: <http://recycle.meridian.mi.us/energy/plan>
- [Great Lakes Adaptation Assessment for Cities Climate Fact Sheets](#)
- <http://aceee.org/white-paper/pathways-cutting-energy-use>
- <http://glisa.msu.edu/>
- <http://recycle.meridian.mi.us/energy>
- [LIAA Planning for Resilient Communities](#)
- [Meridian Twp. Self-Assessment of Sustainability \(2014\)](#)
- [Michigan Department of Health and Human Services Climate and Health Adaptation Program](#)
- [Michigan Green Communities Challenge](#)
- [University of Michigan Climate Center – Cities Impact and Adaptation Tool](#)
- [US EPA Adaptation Resource Center \(ARC-X\)](#)
- www.miclimateaction.org/michigan_cities_taking_action_on_climate

Evolving views of Community Sustainability



Interdependence View



ECONOMY

economy
wealth

COMMUNITY

governance & policy
health & well-being
society & culture
education & learning

ENVIRONMENT

habitat
energy
land
water
materials
ecosystems
air

Pathway to Cutting Energy Use and Carbon Emissions in Half

DECEMBER 6, 2016

White Paper

Authors

Steven Nadel

Description:

We look at how much energy efficiency can reduce US energy use by 2040 and what this might mean for savings in 2050. Specifically, we analyze 13 packages of energy efficiency measures and find that together they can reduce US 2040 energy use by 34% and US carbon emissions by 35%, both relative to the most recent US Energy Information Administration forecasts. These reductions put us on a path to 50% savings by 2050. To achieve these savings, we will need to expand energy efficiency efforts beyond business as usual by (1) developing new building codes, equipment efficiency standards, and ENERGY STAR® specifications; (2) substantially improving the efficiency of existing factories, homes, commercial buildings, transmission and distribution systems, and power plants; and (3) better managing freight and aviation energy use, reducing vehicle miles traveled, and spurring changes in how individuals use energy at home, at work, and in transport.

[Click Here to Download the White Paper](#)

Goal 1: Preserve and strengthen residential neighborhoods.

Goal 2: Preserve open space and natural areas.

Goal 3: Enhance the viability of Township businesses.

Goal 4: Maintain and expand a diverse park system.

Goal 5: Maintain essential public services.

Goal 6: Provide and support an efficient, safe, and environmentally sensitive multi-modal transportation network.

Goal 7: Promote efficient and sustainable growth principles.



GOALS AND OBJECTIVES

Promote efficient and sustainable growth practices

A

Implement sustainable energy and environmental practices throughout the Township utilizing the most current best practices.

STRATEGIES:

1. Budget funds to have Township buildings assessed for energy efficiency a minimum of once every five years.
2. For Meridian Township procurement purposes, when equivalent products or services are available, preference should be given to the more sustainable services or products.
3. Encourage electric car charging stations.
4. Establish a minimum level of LEED certification or the equivalent for all projects undertaken by the Township.
5. Establish ordinances providing incentives for development that emphasize redevelopment, infill development, alternative energy, and building material reuse.
6. Increase the use of alternative transportation modes for commuting and recreation by encouraging the use of mixed use planned unit developments and implementing the Greenspace Plan.
7. Explore methods through ordinances or by providing incentives for existing businesses to upgrade their parking lots and landscaping to increase tree cover and shade to be energy efficient and environmentally friendly.
8. Explore incentives for new or redeveloped projects to be LEED certified or equivalent.
9. Work with developers to consider alternative energy in site plan and construction of new development.
10. Encourage the use of alternative energy throughout the Township and develop a coordinated, integrated vision to incorporate renewable energy into the energy mix.
11. Consider developing a Sustainability Plan that would include energy efficiency, renewable energy, water and waste management and public education. Use this framework for the future to illustrate a commitment to being a “green” community, maintaining a healthy ecosystem and reducing the Township’s carbon footprint.

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