

#1 Lakeview Plymouth Energy LLC. Merrill Ethanol Plant Energy and Water Usage vs. Cities within a 10 mile radius

Ethanol Plant without CO ₂ Capture					
No.	Ethanol Plant/ Town	Population	**Water Permit Value MGY	**2023 Water Usage MGY	Comments
Ethanol Plant - Near Merrill Iowa			-	-	
	Lakeview Plymouth Energy LLC.		284.0	299.5	Without CO ₂ capture water requirement
	Combined Towns All Water Usage		316.9	316.9	City residential use assumes 70 gal./person/day
1	Seney	50	1.3	1.3	Water usage too small to require a permit
2	Brunsville	129	3.3	3.3	Water usage too small to require a permit
3	Merrill	717	18.3	18.3	
4	Hinton	935	23.9	23.9	
5	Le Mars	10,571	270.1	270.1	
	Percentage of ethanol plant usage of total water usage	12,402	47.3%	48.6%	
Conclusion: Without CO₂ Capture					
This ethanol plant consumes 49% of the water used by the cities and plant within the surrounding 10 mile radius (314 square miles).					

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Ethanol Plant with CO ₂ Capture						
No.	Ethanol Plant/ Town	Population	**Water Permit Value MGY	**2023 Water Usage MGY	2023 Water Usage % of Total	Comments
Ethanol Plant - Near Merrill Iowa		-	-	-	-	
1	Seney	50	1.3	1.3		Water usage too small to require a permit
2	Brunsville	129	3.3	3.3		Water usage too small to require a permit
	No Permits	179	4.6	4.6	0.7%	
3	Merrill	717	18.3	18.3	2.7%	
4	Hinton	935	23.9	23.9	3.5%	
5	Le Mars	10571	270.1	270.1	39.5%	
9	Ethanol plant water for Ethanol Production		284	299.5	43.7%	Without CO ₂ Capture water requirement
10	Ethanol Plant water for CO ₂ Capture		68.3	68.3	10.0%	Additional CO ₂ Capture water requirement
	Total Plant and Towns	12,402	669.1	684.6	100.0%	
	Percentage of ethanol plant usage of total water usage		52.6%	53.7%		
Conclusion: With CO₂ Capture						
This ethanol plant consumes 54% of the water used by the cities and plant within the surrounding 10 mile radius (314 square miles)						
*Ethanol Production Capacity of Plant - MGY		65				
Factor: Water required to cool and compress the CO₂ for capture - MGY Water/ MGY Ethanol		1.05				
Calculate additional water required for CO₂ Capture - MGY		68.25				
Calculate ratio of gallons of water/ gallons of Ethanol		4.6				
Total water requirement of towns and Ethanol plant - MGY		689.2				
Total water requirement of towns - MGY		321.4				
Total water requirement for ethanol plant - MGY		367.7				
Ratio of ethanol plant water use vs. surrounding area		1.14				
Percentage of ethanol plant usage of total water usage		53.4%				
Total Population within the 10 mile radius		12,402				

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Water Use					
Typical water use per person per day - Gallons/ person/ day	70				
Equivalent # of people ethanol plant water use w/o CO2 capture	11,721				
Equivalent # of people ethanol plant water use w/ CO2 capture	14,393				
Electricity Use					
Electricity to produce Ethanol - kWh/ gallon EtOH for production	0.6				
Total Electricity used to produce ethanol - kWh	39,000,000				
Electrical use to capture CO2 - kWh/ gallon EtOH	0.377				
Total Electricity used to capture CO2 - kWh	24,505,000				
Total electricity to produce ethanol and capture CO2 - kWh	63,505,000				
Typical electrical use/ residence - kWh/year	10,476.0				
Equivalent number of residences	6,062.0				
Number of people / residence	2.4				
Equivalent number of people	14,549				
Natural Gas Use					
Natural gas use per gallon of ethanol for production - BTU's/ gal.	26,000				
Natural gas use for ethanol plant - BTU's	1.690E+12				
Natural gas use per gal. of ethanol for CO2 capture - BTU's/ gal.	0				
Typical Natural Gas use/ residence - BTU's/ year	96,000,000				
Equivalent number of residences	17,604				
Number of people / residence	2.4				
Equivalent number of people	42,250				
* Ethanol Capacity per Iowa Renewable Fuels Association		** Ethanol Plant Water usage per the greater of DNR WACOP Permit or 3 times ethanol capacity.			

No. 1 Lakeview Plymouth Energy Ethanol Plant (65 MGY) near Merrill

Ethanol plant 2023 water usage vs. surrounding residential water usage of towns within a ten mile radius MGY (Millions of Gallons per Year).

