

#3 Quad County Corn Processors - Galva 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 Galva Iowa						
	Quad County Corn Processors Galva Plant		315	209.2		Without CO ₂ capture water requirement
	Combined Towns All Water Usage		121.8	121.8		City residential use assumes 70 gal./person/day
1	Hanover	50	1.3	1.3		Water usage too small to require a permit
2	Galva	435	11.1	11.1		
3	Schaller	729	18.6	18.6		
4	Holstein	1,501	38.4	38.4		
5	Ida Grove	2,051	52.4	52.4		
	Percentage of ethanol plant usage of total water usage	4,766	72.1%	63.2%		
Conclusion: Without CO₂ Capture						
This ethanol plant consumes 63% 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 Galva Iowa		-	-	-	-	City residential use assumes 70 gal./person/day
1	Hanover	50	1.3	1.3	0.3%	Water usage too small to require a permit
2	Galva	435	11.1	11.1	3.0%	
3	Schaller	729	18.6	18.6	5.1%	
4	Holstein	1501	38.4	38.4	10.5%	
5	Ida Grove	2051	52.4	52.4	14.3%	
6	Ethanol plant water for Ethanol Production		315.0	209.2	57.0%	Without CO ₂ Capture water requirement
7	Ethanol Plant water for CO ₂ Capture		35.7	35.7	9.7%	Additional CO ₂ Capture water requirement
Total Plant and Towns		4,766	472.5	366.6	100.0%	
Percentage of ethanol plant usage of total water usage			74.2%	66.8%		
Conclusion: With CO₂ Capture						
This ethanol plant consumes 67% of the water used by the cities and plant within the surrounding 10 mile radius (314 square miles)						
*Ethanol Production Capacity of Plant - MGY		34				
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		35.7				
Calculate ratio of gallons of water/ gallons of Ethanol		6.2				
Total water requirement of towns and Ethanol plant - MGY		366.6				
Total water requirement of towns - MGY		121.8				
Total water requirement for ethanol plant - MGY		244.9				
Ratio of ethanol plant water use vs. surrounding area		2.01				
Percentage of ethanol plant usage of total water usage		66.8%				
Total Population within the 10 mile radius		4,766				

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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	8,186				
Equivalent # of people ethanol plant water use w/ CO2 capture	9,584				
Electricity Use					
Electricity to produce Ethanol - kWh/ gallon EtOH for production	0.6				
Total Electricity used to produce ethanol - kWh	20,400,000				
Electrical use to capture CO2 - kWh/ gallon EtOH	0.377				
Total Electricity used to capture CO2 - kWh	12,818,000				
Total electricity to produce ethanol and capture CO2 - kWh	33,218,000				
Typical electrical use/ residence - kWh/year	10,476.0				
Equivalent number of residences	3,170.9				
Number of people / residence	2.4				
Equivalent number of people	7,610				
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	884,000,000,000				
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	9,208				
Number of people / residence	2.4				
Equivalent number of people	22,100				
* Ethanol Capacity per Iowa Renewable Fuels Association		** Water usage per the greater of DNR WACOP Permit or 3 times ethanol capacity.			

#3 Quad County Corn Processors Ethanol Plant (34 MGY) near Galva

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

