#6 Louis Dreyfuss - Grand Junction 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 Grand Junction, Iowa			-	-		
	Louis Dreyfuss - Grand Junction Plant		630.7	375.0		Without CO_2 capture water requirement
	Combined Towns All Water Usage		140.7	140.7		City residential use assumes 70 gal./person/day
1	Berkley	23	0.6	0.6		Water usage too small to require a permit
2	Dana	38	1.0	1.0		Water usage too small to require a permit
3	Beaver	46	1.2	1.2		Water usage too small to require a permit
4	Cooper	50	1.3	1.3		Water usage too small to require a permit
5	Rippey	220	5.6	5.6		Water usage too small to require a permit
6	Paton	221	5.6	5.6		
7	Grand Junction	725	18.5	18.5		
8	Jefferson	4,182	106.9	106.9		
	Percentage of ethanol plant usage of total water usage	5,505	81.8%	72.7%		
Conclusion: Without CO2 Capture						
	This ethanol plant consumes 73% of the water used by the cities and plant within the surrounding 10 mile radius (314 square miles).					

#6 Louis Dreyfuss - Grand Junction Ethanol Plant Energy and Water Usage vs. Cities within a 10 mile radius

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 Grand Junction, Iowa		-	-	-	-	City residential use assumes 70 gal./person/day
1	Berkley	23	0.6	0.6		Water usage too small to require a permit
2	Dana	38	1.0	1.0		Water usage too small to require a permit
3	Beaver	46	1.2	1.2		Water usage too small to require a permit
4	Cooper	50	1.3	1.3		Water usage too small to require a permit
5	Rippey	220	5.6	5.6		Water usage too small to require a permit
	No Permit	377	9.6	9.6	1.5%	
6	Paton	221	5.6	5.6	0.9%	
7	Grand Junction	725	18.5	18.5	2.9%	
8	Jefferson	4182	106.9	106.9	16.5%	
9	Ethanol plant water for Ethanol Production		630.7	375	58.0%	Without CO2 Capture water requirement
10	Ethanol Plant water for CO_2 Capture		131.3	131.3	20.3%	Additional CO_2 Capture water requirement
	Total Plant and Towns	5,505	902.6	646.9	100.0%	
	Percentage of ethanol plant usage of total water usage		84.4%	78.3%		

Conclusion: With CO2 Capture

This ethanol plant consumes 78% of the water used by the cities and plant within the surrounding 10 mile radius (314 square miles)

***Ethanol Production Capacity of Plant - MGY**	**125**
Factor: Water required to cool and compress the CO_2 for capture - MGY Water/ MGY Ethanol	1.05
Calculate additional water required for CO_2 Capture - MGY	131.25
Calculate ratio of gallons of water/ gallons of Ethanol	3.0
Total water requirement of towns and Ethanol plant - MGY	656.5
Total water requirement of towns - MGY	150.3
Total water requirement for ethanol plant - MGY	506.3
Ratio of ethanol plant water use vs. surrounding area	3.37
Percentage of ethanol plant usage of total water usage	77.1%
Total Population within the 10 mile radius	5,505

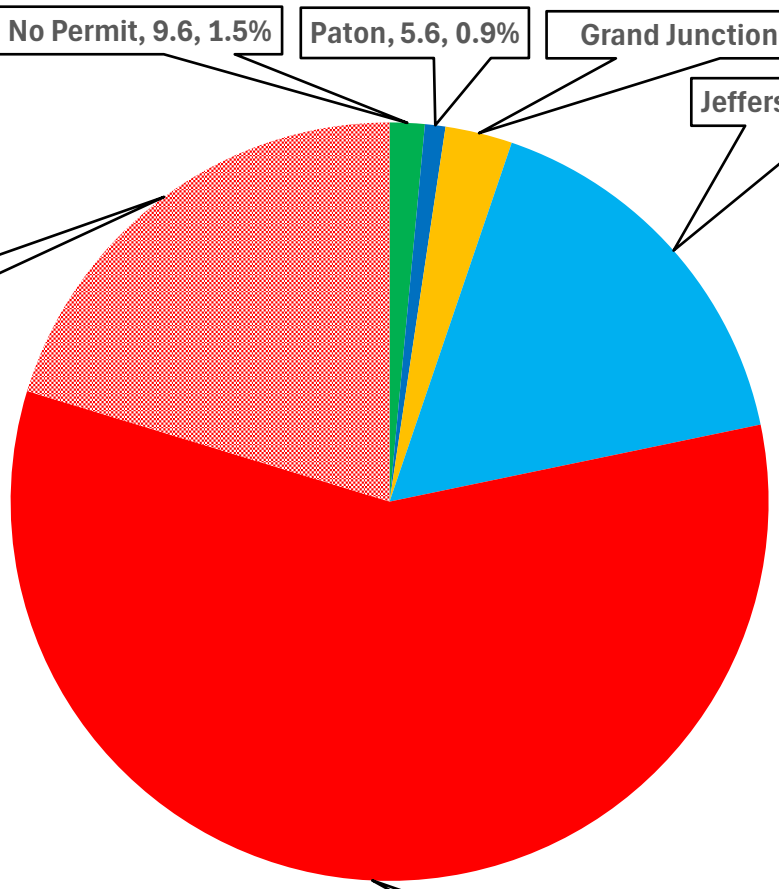
#6 Louis Dreyfuss - Grand Junction Ethanol Plant Energy and Water Usage vs. Cities within a 10 mile radius

Water Use	
Typical water use per person per day - Gallons/ person/ day	70
Equivalent # of people ethanol plant water use w/o CO2 capture	14,677
Equivalent # of people ethanol plant water use w/ CO2 capture	**19,814**
Electricity Use	
Electricity to produce Ethanol - kWh/ gallon EtOH for production	0.6
Total Electricity used to produce ethanol - kWh	75,000,000
Electrical use to capture CO2 - kWh/ gallon EtOH	0.377
Total Electricity used to capture CO2 - kWh	47,125,000
Total electricity to produce ethanol and capture CO2 - kWh	1.221E+08
Typical electrical use/ residence - kWh/year	10,476.0
Equivalent number of residences	11,657.6
Number of people / residence	2.4
Equivalent number of people	**27,978**
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	3.250E+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	33,854
Number of people / residence	2.4
Equivalent number of people	**81,250**
* Ethanol Capacity per Iowa Renewable Fuels Association	** Water usage per the greater of DNR WACOP Permit or 3 times ethanol capacity.

#6 Louis Dreyfuss Ethanol Plant (125 MGY) near Grand Junction

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

No Permit cities:
Berkley
Dana
Beaver
Cooper
Rippey



With the proposed CO_2 capture system the Louis Dreyfuss Grand Junction Plant will use 78% of the total water used by the plant and cities within the surrounding 10 mile radius. (314 square miles)

This plant will use four times as much water as all the cities within a 10 mile radius of the plant.

With combined production and CO2 capture the ethanol plant power and 2023 water usage would be equivalent to:
Water: 19,800 people.
Electricity: 28,000 People.
Natural Gas: 81,300 People

The total population of the cities within the 10 mile radius is 5,505.

3.0 gallons of water per gallon of ethanol is used for production. An additional 1.05 gallon is required for CO2 capture.

The plant draws it's water from the Pennsylvanian aquifer. The water level in this area is down as much as 30 feet since 2015