Dispelling the Myths about Water use in Ethanol Production
Presented by Myke Feinman

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It takes 1,700 Gallons of Water to Produce a Gallon of Ethanol

This often repeated value is attributed to David Pimentel from Cornell University.

Myth
It takes less than 4 Gallons of Water to Produce a Gallon of Ethanol

This value from the American Coalition for Ethanol (ACE)
Water used in the Production of Ethanol at Dry Mill Plants Decreased 26% from 2001 to 2006

Some plants have reduced water consumption to less than 2.8 gallons per gallon of ethanol

Source: Argonne National Laboratory
If the production of one gallon of ethanol actually uses less than 4 gallons of water, then how are the remaining 1,696 gallons of water in Mr Pimentel's value used and where does the water come from?
Over 96% of the corn grown in the United States is grown with natural rainfall. The remaining 4% is irrigated.

Source: ACE
Of the corn that is actually irrigated, it requires 785 gallons of water to produce feedstock to produce one gallon of ethanol.

Source: American Coalition for Ethanol (ACE)
An acre of corn also gives off 3,000 to 4,000 gallons of water per day through transpiration.

Source: US Geological Survey
Myth Dispelled

One gallon of ethanol requires 785 gallons of irrigation water to grow the corn for feed stock + 4 gallons of water to manufacture = 789 gallons actual water use.

A difference of 911 gallons when compared to the widely quoted 1,700 gallon value.
How does less than 4 gallons of water required to manufacture one gallon of ethanol compare with other water uses?
Water usage to produce a gallon of gasoline is 2 to 2.5 gallons.

There is no recovery of water from the refining process of gasoline.

Source: National Renewable Energy Laboratory (NREL)
Over 1/3 of the water used in the manufacture of ethanol is recycled in the process.

One trend is to achieve zero waste water discharge from plants - VeraSun’s Plant in Welcome, MN has met this goal.
Municipal waste water plants treat gray water drained from sinks and showers at water treatment plants.
Many ethanol plants are finding value in gray water as a replacement for fresh water in the manufacturing process.

One such facility is the POET plant in Corning, Iowa which uses gray water for its cooling tower saving 40% of their fresh water requirements.
In addition to having the ability to utilize “gray water” in the manufacturing process, ethanol production yields many useful by-products as well.
Production of ethanol produces these useful by-products further adding to the value of the water used in the manufacturing process.

- Dried Distillers Grains with Solubles (DDGS) which are used as livestock feed
- Carbon Dioxide which, if captured, can be used in a number of industrial and food applications
- Corn Oil extracted from DDGS which is a prime feedstock for biodiesel production
Additional uses:

• Food grade corn oil can be extracted with reduction in yield of ethanol.

• Fiber can be fractionated from the corn kernel and be used as a fuel source in lieu of natural gas or used as a source of cellulose for cellulosic ethanol production.
The Food versus Fuel Question Surrounds Ethanol
The Primary Uses of Corn in North America

- 47% Livestock Feed
- 17% Export
- 17% Ethanol
- 8% Surplus Stock
- 4% High Fructose Corn Syrup
- 7% Other Uses

Source: National Corn Growers and USDA
Is Ethanol Production a Wise use of Water Resources - A Financial Perspective -
• Ethanol Production 2007: 6.5 billion gallons
• Employment for 238,000 People
• GDP Contribution $47.6 billion
• Federal Tax Revenue: $4.6 billion
• State and Local Revenue: $3.6 billion
• Reduction in Farm Subsidies: ($8 billion)
• Saved Import of Oil: 228 million barrels or $16 billion dollars

Source: Bob Dinneen - Renewable Fuels Association Feb 2008
Is ethanol production a wise use of water resources? Given the facts, I believe it is!

Thank You for Your Attention

Questions?