

## Energy Use

### 2030 Goal

*U.S. corn farmers are committed to increasing energy use efficiency by 13 percent from 2020 to 2030.*

### Background

Planting, harvesting, grain drying, irrigation and fertilizer are all energy intensive activities.

Increasing energy use efficiency will be principally impacted by field passes, drying of grain, and commercial nitrogen use. Farmers are already very efficient in field passes such that little gain likely will happen in fuel use relative to field passes.

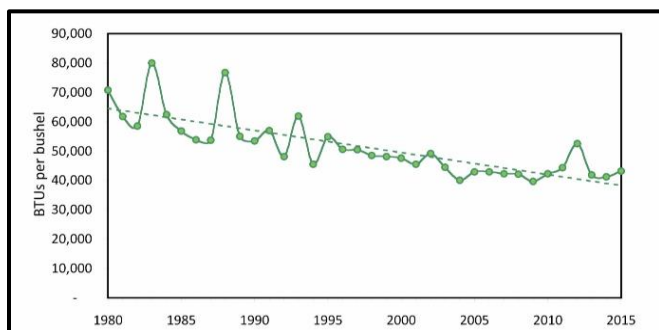
Drying of grain could be reduced if corn hybrids were bred to have lower moistures at harvest, a situation that would lower drying in the northern part of the United States. Improved techniques for commercial nitrogen use for fertilizer will have the largest impact on energy use efficiency in corn production.

Increased adoption of cover crops should increase soil carbon and nitrogen fixation, storing unused nutrients until the following year's crop can utilize them, reducing nitrogen applications.

The advances in efficiency in each sector combined, along with the use of renewable fuels, will contribute to energy efficiency goals over the decade.

### Improvements from 1980 - 2015

As cited in the 2016 Field to Market National Indicators Report, over the 36 years from 1980 – 2015, corn for grain improved resource efficiency with a per bushel decrease in energy use of 41%.



*Energy Use for corn for grain.*

The energy use (BTU per bushel) of corn for grain production improved (decreased) over the study period, decreasing from 70.9 thousand BTU per bushel in 1980 to 43.2 thousand BTU per bushel in 2015. This shows improvement over time, with steady declines occurring in the late 1990s and early 2000s, presumably due to decreases in tillage energy associated with increases in conservation tillage adoption. Another factor influencing the trend is nitrogen application rates, which

declined on a per-bushel basis up to the mid-1990s, and then began to increase. The most recent years show a spike in 2012, likely due to low crop yields during the drought, followed by a leveling off of the downward trend.

## **Sustainability Outcomes**

From the generation of electricity to power farm operations to the production of nitrogen fertilizer to the fuel used in farm equipment, agriculture uses energy in many forms. Numerous studies have estimated the energy use, both direct and indirect, from crop production at a point in time. This evaluates the energy used annually for each crop and provides a measure of the efficiency of energy use relative to the amount of crop yield. Energy use is also an important indicator for evaluating the cost of production of a farm operation, and recent trends indicate farms are increasingly both producing and using renewable energy.

## **Getting to Goal**

A normal trend yield would be expected to increase energy efficiency by 10%, so a 13% increase in overall efficiency will require the adoption of additional technologies by corn growers. There are several promising technologies that could lead to sustained lower use of nitrogen in corn, such as variable rate nitrogen applications. Data modeling efforts, split nitrogen applications, and late-season applications could also lead to lower nitrogen application rates. Soil amendments and fertilizer enhancers will make nitrogen use more efficient.

## **Alignment with UNSDGs**



Progress made on the NCGA environmental sustainability goals will support multiple United Nations Sustainable Development Goals (SDGs). The 17 SDGs and 169 targets established by the UN in October 2015 “stimulate action over the next 15 years in areas of critical importance for humanity and the planet.” These 2030 goals are interrelated, and actions taken specifically towards one goal or target may also address another area of concern.

The NCGA Energy Use Environmental Sustainability Goal is most closely aligned with the following SDGs and targets:



### **UNSDG 7: Affordable and Clean Energy**

- 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.
- 7.3 By 2030, double the global rate of improvement in energy efficiency.

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- Field to Market: The Alliance for Sustainable Agriculture, 2016. Environmental and Socioeconomic Indicators for Measuring Outcomes of On Farm Agricultural Production in the United States (Third Edition). ISBN: 978-0-692-81902-9.
- Integrated Financial Analytics & Research (iFAR), LLP, January 2021. *Sustainability Goals for NCGA Trendline Report*.
- NCGA “Corn Sustainability Report,” 2021.
- United Nations, 21 October 2015. *Transforming Our World: The 2030 Agenda for Sustainable Development*.