# Irrigation

Energy for irrigation may be used to pump ground water, or to move surface water. First you calculate the amount of energy required to move the defined amount of water.

Once you know how much energy was used, the CO2 released will be a function of the energy source used. Irrigation energy can be derived from two major sources: fuel and electricity.

For liquid fuel, if you know the amount of energy required, and the fuel used, you can back-calculate the gallons needed (FTM uses this source, have not investigated: https://www.afdc.energy.gov/fuels/fuel\_comparison\_chart.pdf. You know how much CO2 is released per gallon, so you can then get the CO2 released to do the irrigation.

For electricity…

# Fuel used in field operations

The USDA (I actually don’t know who developed these fuel estimates) has a dataset they use for running erosion models. The dataset includes different types of field operations, with each operation assigned a fuel consumption value (in liters of diesel consumed per acre). These estimates were created in the 1980s.

For non-soil disturbing operations, the range in fuel consumption is quite low, and general categories are as follows:

|  |  |
| --- | --- |
| Operation | Erosion model fuel use (gallons of diesel per acre) |
| Sprayer | 0.133 |
| Planting, double disk opener | 0.655 |
| Plant material handling (chop, flail, shred) | 0.747 |
| Harvesting hay/silage | 1.61 |

For tillage operations, there is some variability between similar operations