



Environmental protection 5 kWh

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Uprise Energy is making socially responsible distributed energy resources for the future that will provide power at the grid's edge and beyond. The first product they're bringing to market is a 10kW portable wind turbine that fits in a 20' shipping container, and sets up in one hour to produce clean, affordable electricity directly to the customer.

Using methodology approved by the U.S. Environmental Protection Agency's Science Advisory Board (SAB), the analysis finds that approximately 21,000 people die prematurely each year due to particulate matter pollution from diesels.

While there are differing views about the degree of impact that humans are having on Earth's environment and what should be done about it, it is generally accepted that we do urgently need to alter the path we are on to reduce the volume of pollutants we produce. Carbon Dioxide (CO₂) is the focus of this study.

For reference, the average US home uses 1 kilowatt per hour and 1 Gigawatt equals 1000 kilowatts or enough power for 1000 US homes. To further punctuate this, 1 GW is also the equivalent of 110 million LEDs or roughly 1.3 million horses (more comparisons here). Hopefully, this gives some perspective of the sheer magnitude of 350 - 500 GW of electricity. Generating that much energy with diesel generators burns a tremendous amount of fuel, which produces pollutants as a byproduct, including carbon dioxide (CO₂).

Diesel fuel is a complex mix of hydrocarbons, with an average composition of C_{12.9}H_{23.9} and molecular weight of 178.6 [4]. Therefore, diesel fuel is 86.6% carbon, and 13.4% hydrogen.

A carbon atom has a weight of 12, and each oxygen atom has a weight of 16, giving each single molecule of CO₂ an atomic weight of 44 (12 from carbon and 32 from oxygen).

Therefore, to calculate the amount of CO₂ produced from a gallon of diesel, the weight of the carbon in the diesel fuel is multiplied by 44 / 12 or 3.7.

As an assumption, diesel generators output 5 kW per gallon of fuel, equating to 13% efficiency for the generator. The 13% efficiency is based on Lower Heating Value, as shown in the derivations section near the end of this blog post.

As stated in Equation 2, an Uprise Energy MPS offsets 8,282 gallons of fuel per year. At 20 pounds of CO₂ per gallon, this equals 165,000 pounds of CO₂ per year, or 3.3 million pounds over a 20 year life span.

One tree absorbs 48 pounds of CO₂ per year [9]. 165,000 pounds of CO₂ per year is equivalent to 3,450 trees per year, or 69,000 tree offset over a 20 year life span.



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We at Uprise Energy take pride in using solid data to support our conclusions. A principal at Uprise has an expert understanding of this subject, and wants to say that the sited cost per kWh is an optimum case scenario.

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