

Gurteen Agricultural College – AA011

Unit 8.1 - 8.5 Revision Worksheet

Sustainable Energy and Resources on Farms

Work in pairs, complete the questions on the Units completed to date below using the internet, your own farm experience and class notes.

Answers are given in red.

1. *What is the main type of energy used on a farm?*

Diesel/Kerosene

Name one other:

Animal Feed

2. *Name 3 delivered/useful energy forms on a typical farm:*

1. **Heat**

2. **Cooling**

3. **Mechanical/Light**

3. *Why is electricity such a useful power source?*

It is an instant power source, and is easily converted to other useful forms such as heat, cooling, pressure, light, mechanical and machine operations

4. *Why does 1 kWh of heat produced from electricity have a higher carbon emission rate than 1 kWh derived from kerosene?*

Because it takes approximately 2.5 units of primary energy to create 1 unit of electricity, so if the electricity uses fossil fuels to generate it, it creates significantly more CO₂.

5. What is the:

A. Unit of power **Kilowatt (kW)**

B. Unit of power consumption/usage **Kilowatt Hour (kWh)**

6. What is the unit of efficiency of a tractor?

Hp-Hr/Gallon

7. Give the web address of an energy provider comparison site:

Bonkers.ie

8. A survey of dairy farms in Ireland showed an average of 6kWh/ week/ per cow in a standard milking parlour

Using the results of your internet search, complete the cost comparison for a 100 herd farm:

Total weekly power consumption	Annual Power consumption	Name of cheapest supplier		Name of most expensive	
600 kWh	312,000 kWh	Energia		SSE	
		Day rate	Night rate	Day rate	Night Rate
Cost comparison		17.62	8.44	20.17	9.99

9. Find an electricity consumption calculator and use to complete typical power ratings for an

A. Electric kettle: **2250w**

B. Pump: **30w**

C. Washing machine: **1,250w or 1.25kw**

10. Which costs more to run - 10 bulbs (each bulb being a 40-watt fluorescent bulb) which run for 10 hours a night or 1 water heater (3 kW) which runs once per day for 30 minutes? Give the reason for your choice:

Lighting 10 lights X 40w each = 400w or 0.4kw for 10 hours = 4kWh

Water heater: 3kw divided by 60 minutes = 0.05kWh per minute

30 minutes = 1.5kWh;

Therefore lights have greater power consumption (a larger number of them on for a long time)

11. Rank from largest to smallest the typical running cost items for a 2 year old tractor purchased with bank finance:

Interest

Diesel

Maintenance

Insurance

Repairs

12. What has the biggest impact on tractor and farm vehicle fuel consumption?

Driver habits & behaviour

Why?

Because the driver controls the impact on fuel usage through speed, load, rpm, tyre pressure and farm practices such as furrow depth etc.

13. Access the results from the farmer led research project Efficient 20 - "Putting your tractor on a diet":

<http://efficient20.eu/2013/04/11/put-your-tractors-on-a-diet/>

List 5 specific measures that would reduce fuel consumption:

1. Tyre pressure@ field pressure 1.39 bar

2. Working depth (furrow)

3. **Use of ballast**
4. **Tyre pressure and rpm (0.9mbar and 1600 rpm)**
5. **Reducing speed by 400 rpm**