Power Supply - Source
https://github.com/teaksoon/lmaewapm

BATTERY (with +ve postive and -ve negative terminals)

Contains Chemical that can generate Positive and Negative charged atoms. Often in a packaging with Negative and Positive terminal exposed.

AC to DC CONVERTER (with +ve postive and -ve negative terminals)

A device that is connected to AC Power Source (from the wall socket), which later convert the AC into DC.

CAPACITOR(with +ve postive and -ve negative terminals)

Capacitor cannot generate its own electricty. Capacitor collects and store electricity stored in Positive and Negative terminal. Once Positive and Negative terminal from the Capacitor is connected to a circuit, the electrons will flow into the circuit. Behaves almost like a battery, except that it discharge very fast and needs to be constantly charged. It is normally used together with Battery power or AC/DC source to ensure smooth current flow.

Power Supply - Source
https://github.com/teaksoon/lmaewapm

SOLAR PANEL (with +ve postive and -ve negative terminals)

Contains Chemical that can generate Positive and Negative charged atoms when exposed to the Sunlight

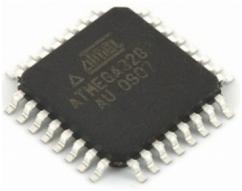
MOTOR (with +ve postive and -ve negative terminals)

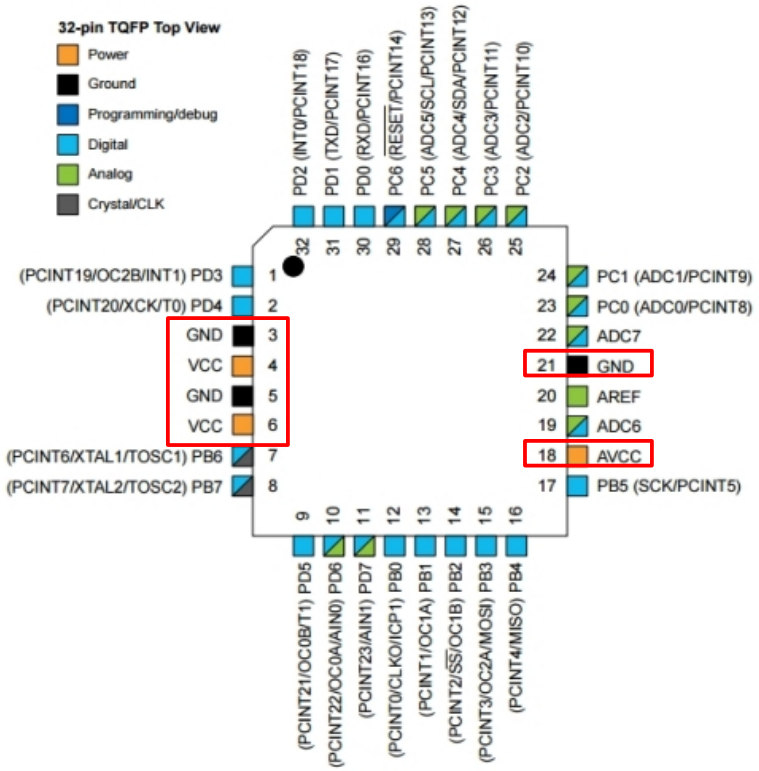
When a MOTOR is applied with electricity, the MOTOR shaft will rotate.

However, when we rotate the MOTOR shaft manually, the MOTOR will generate electricity instead.

Things like Wind Turbine, Gas Turbine, Hydro-Turbine are all rotating the MOTOR shaft to generate electricity.

Power Supply – ATMEGA328 micro-controller
https://github.com/teaksoon/lmaewapm





In order for the ATMEGA328 micro-controller to work, it needs to have DC Power Supply.

DC Power Supply +ve (VCC) Terminal to be connected to VCC and AVCC
DC Power Supply –ve (Ground)Termnial to be connected to GND

Note: AVCC is a special power supply for internal ADC (Analog Digital Converter) Pins (normally done for us when we use the Arduino board)

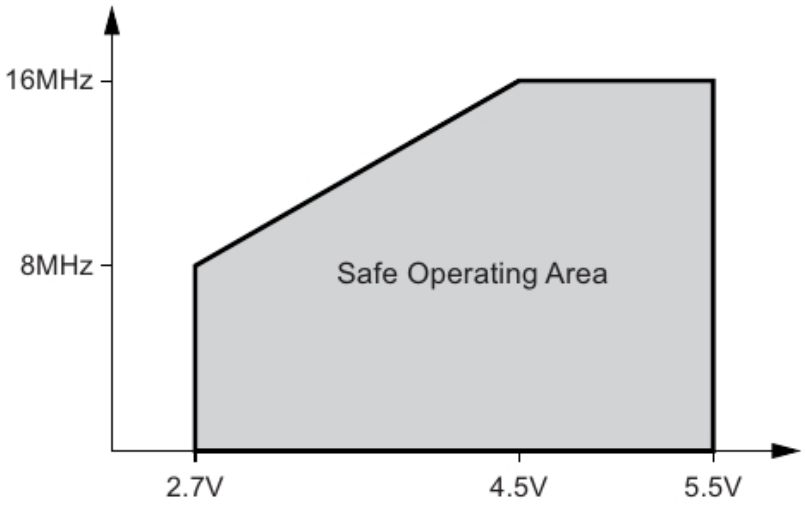
Based on the chart below from ATMEGA328P Datasheet, the Atmega328P micro-controller can work to the maximum of 6V and the maximum Clock Speed of 16Mhz. We would just run the ATMEGA328P micro-controller within its “Safe Operating Area”

28.1 Absolute Maximum Ratings

Parameters	
Maximum operating voltage	6.0 V
DC current per I/O pin	40.0 mA
DC current V_{CC} and GND pins	200.0 mA

Note: 1. Maximum current per port = ±30mA

Figure 28-1. Maximum Frequency



The ATMEGA328 micro-controller on our Arduino Uno board is set run at 16Mhz since it is connected to a 16Mhz External Clock on the Arduino Uno Board.

That is why the ATMEGA328 on the Arduino Uno board requires 5V

Power Supply – Arduino Uno
https://github.com/teaksoon/lmaewapm

We can connect power supply directly to the ATMEGA328 micro-controller VCC and GND pins. However, if we accidently supply voltage higher than the 6V limit, the chip might be destroyed. If we supply unstable voltage, we might get unstable chip operations.

So we will need to have something to prevent "over-voltage" and "unstable voltage" going into the ATMEGA328 micro-controller chip.

One common device that we use to achieve that, is a "Power Regulator chip"

The Arduino Uno board has Power Regulator chip (mostly are AMS1117-5V chip). This chip will reduce the voltage that is fed into it, to a stable 5V. 5V is what our ATMEGA328 micro-controller need, since it is running at 16Mhz on the Arduino Uno Board.

According to the AMS1117 chip datasheet, it can accept a maximum of 18v.

■ Absolute Maximum Ratings Ta = 25℃

Parameter	Symbol	Rating	Unit
Maximum Input Voltage	Vin	18	V

- Try not to feed anything near to 18V into the AMS1117 chip, any small surge will destroy the AMS1117 chip.

- We also do not want to supply exactly 5V to the chip because the chip itself will use a little bit and we will have less than 5V coming out from that chip for our ATMEGA328 micro-controller

Therefore, anything from 7V to 12V should be fine but try to keep it closer to 7V