**Topology Selection**

When all the topologies are considered, 3-phase diode full-bridge rectifier is selected. Single phase rectifiers are ruled out because of the high output ripple voltage and output voltage loss. Using three-phase will increase the average output voltage and lower the ripples, while destroying the third harmonics completely. Three-phase full bridge rectifiers have low values of THD, which means fundamental component is more dominant over the higher order harmonics when compared to the single-phase rectifiers. Also, since each thyristor would need a gate driver signal, the resultant system would be very complicated. For the simplicity and the advantageous nature of it, three-phase full bridge diode rectifier topology is chosen.

**Component Selection:**

Available components in the laboratory will be mostly used. The selection is based on the constraints of the project. The selected components by looking at the list on GitHub. The components are:

LM555 Timer is the PWM controller in this project.

20A Fuse and Fuse Holder

HCPL3120 optocoupler to drive IGBT

IXGH24N60C4D1 N Channel IGBT Transistor 30A, 600V(Only this IGBT/MOSFET can withstand the high voltages used in this project.).

TO220 HeatSink

**Notes:**

Capacitor can be used at load to decrease the voltage ripple even more

Buck converters for the PWM controller and 555 Timer

The Bonuses we aim for: Tea Bonus, PCB Bonus (Arda knows how to create a PCB), Industrial Design Bonus, Single Supply Bonus, Analog Controller (?), Closed Loop Voltage/Current Control Bonus, Closed Loop Speed Control Bonus (2 of the group member also take EE407), wide-bandgap semiconductor bonus (will look into it)